

ESTABLISHED 1853.

ILLUSTRATED PRICE LIST,

FOR

1884.

T. F. RANDOLPH,

Manufacturer, Importer and Dealer in

Surveyors' & Engineers'

**INSTRUMENTS,**

SOLE MANUFACTURER OF

*Randolph's New Patent Telescope Compass,*

*Patent Telescope Attachment for Common Compasses,*

*Patent Quick Leveling Tripod,*

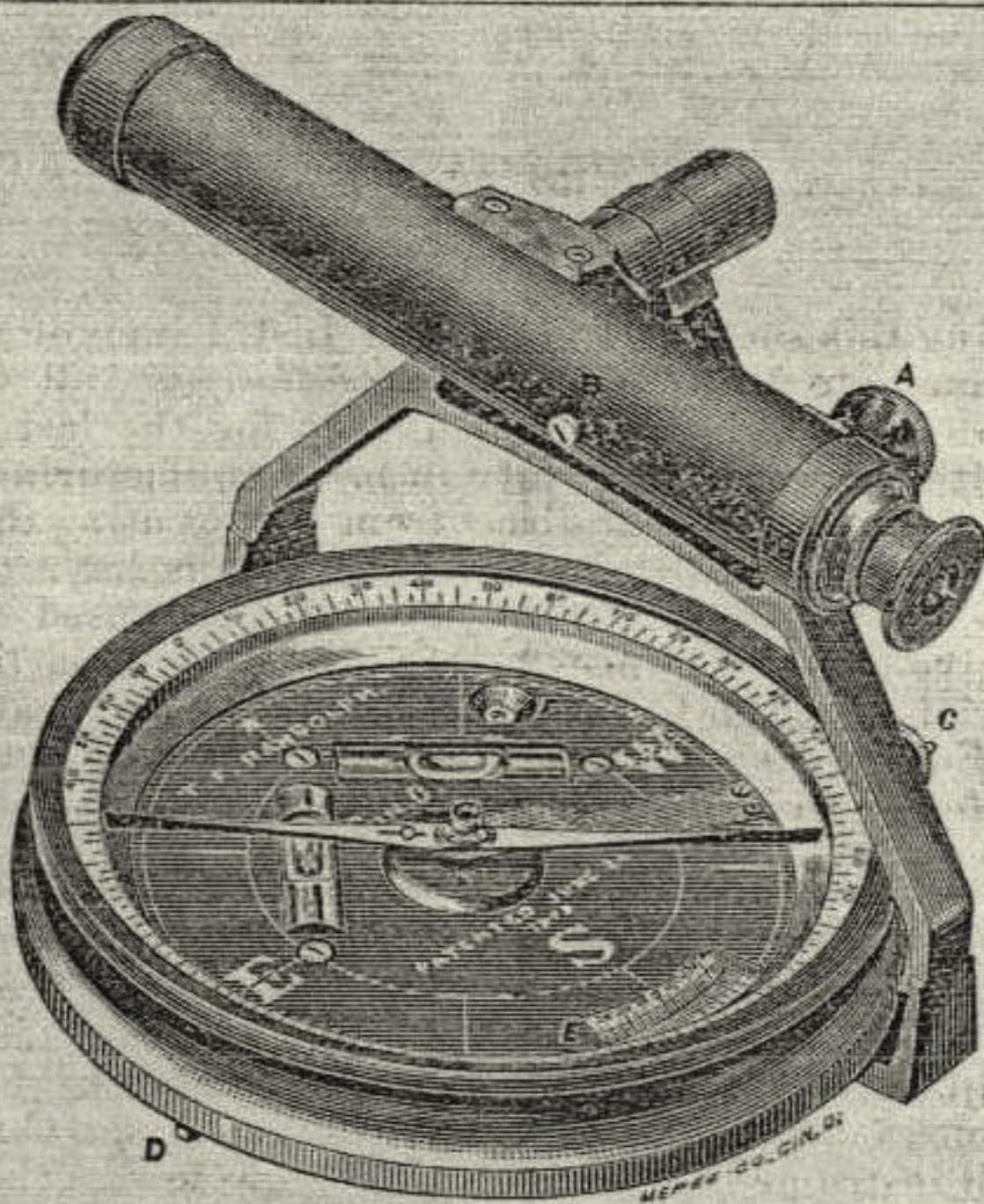
*And Patent Sole Leather Boxes,*

No. 51 W. Fourth Street,

ROOM 24, GARLISLE BUILDING,

CINCINNATI, O.

WORKS RUN BY STEAM.



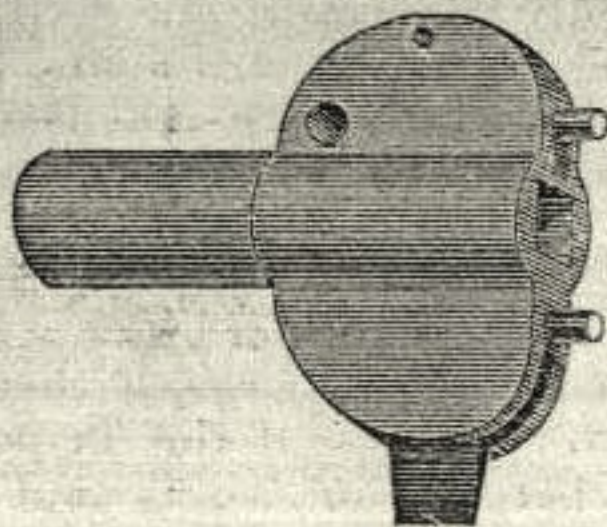
(Fig. 1.)

### Vernier Telescope Compass.

(Patented, June 24, 1879.)

FIG. 1 represents a compact, accurate Vernier Compass, with Telescope complete, selling at a small advance over the ordinary sight compass, which I have been successful in inventing, and introducing to Surveyors, as testimonials show. A cut of the Plain Compass would show same without the Vernier E.

The following explanation, with reference to the cut, will enable any surveyor to understand it: The Telescope is detached when in the box, similar to ordinary sights, and the whole instrument, except the staff mounting or tripod head, fits into a sole leather box, 8 inches square by 5 inches thick outside, and can be carried by a strap over the shoulder while the instrument is in use, without inconvenience. Weight of box 2 pounds. Patented, Nov. 9, 1880.



The key represented by the cut operates every part; the head A is the focus screw for the Telescope; B is the adjustment of the cross wire; C raises or lowers needle. There is a device for settling the needle, independent of the screw, and is operated instantly with the thumb and finger; D is a rack movement for the vernier, the clamp head is near this with a shoulder on the outside, but not shown in the cut; E is the variation vernier, reading to minutes; F is the outkeeper, operated at the edge of the plates; the Levels are entirely protected, being covered by the lower plate, and adjustable from the face of the compass; the bearing of the centre spindle is  $1\frac{1}{2}$  inches long, but not shown in the cut, and is fastened by a spring pin, working in a slot. The Compass can be used on Tripod or Jacob Staff. Needle circle divided into  $\frac{1}{2}$  degrees. The center of the Telescope is in a parallel

line with the zeros, and over the center of the compass. The Telescope revolves both ways, for back and forward sights; its detachment from the compass for boxing is as simple as the ordinary sights, the screws being operated by the two pins on the key; the screws fit through the bottom plate, and will unscrew only far enough to let the standards drop off of the steady pins, and should be left at this point, as screwing them up tight, when standards are not on they press against the top plate. The adjustment of the cross wires is made between two points, as follows: the instrument being level, bisect some point with the vertical wire, revolve the telescope one-half around on its axis, and the opposite direction from the first object to another distant point; turn the instrument one-half around on its axis until the vertical wire bisects the first object observed, turn the telescope as before, and see if it again bisects the second point observed; if it does the adjustment is right, if not, one-quarter of the error is corrected by moving the cross-wire, one-quarter by moving the instrument on its socket, and one-half by moving one of the points observed. Adjustment of levels same as sight compass, page 14.

The many advantages of the above instruments, are, in the first place, the simplicity of construction; second, telescope instead of ordinary sights; third accuracy; fourth, compactness for transportation; fifth, cheapness and lightness of the instrument. The Level on the Telescope and Tripod, or both as represented in Fig. 2, can be added to any style of Telescope Compass I make, and will answer as good purpose as on Fig. 2.

### Prices of Patent Telescope Compasses.

FOR THE JACOB STAFF, INCLUDING THE BRASS MOUNTING.

Vernier, 6-inch Needle, (Fig. 1,) weight	6½ to 7 lbs.	-----	\$60 00
Plain, " " " "	6½ to 7 lbs.	-----	55 00
Plain, 5-inch " " " "	4½ to 5 lbs.	-----	50 00
Vernier, " " " "	4½ to 5 lbs.	-----	55 00

### Extras for the above, and Folding Plate or R. R. Compass.

Tripod, with clamp and Leveling Screws, (represented in either Figs. 2 or 4½,)	-----	15 00
Tripod, with Ball and Socket adjustment	-----	5 00
Jacob Staff, with Steel Pointed Socket	-----	2 00
Staff Mounting, with first Tripod,	-----	3 50
" " " last "	-----	2 00
<i>In the latter case one Ball answers for both Staff and Tripod.</i>		
Vertical Arc, 100 degrees, read to minutes	-----	15 00
" " " " ½ degrees	-----	10 00
Key, when separate or an extra one	-----	1 00
Level and Clamp and Tangent on Telescope axis (Fig. 2.)	-----	15 00
<i>The Level revolves on its own axis for back and foresights.</i>		
Set of Folding Sights on the telescope	-----	8 00
Steel point for Staff	-----	50
Telescope attachments for common Compass, (Fig. 3,)	-----	15 00
Balance Weight	-----	2 00
20 in. Folding Plate Compass, 5½ in. Needle, with variation Vernier, Fig. 4	-----	55 00
" " " " " " without " "	-----	50 00

### Style of my Compass Needle.

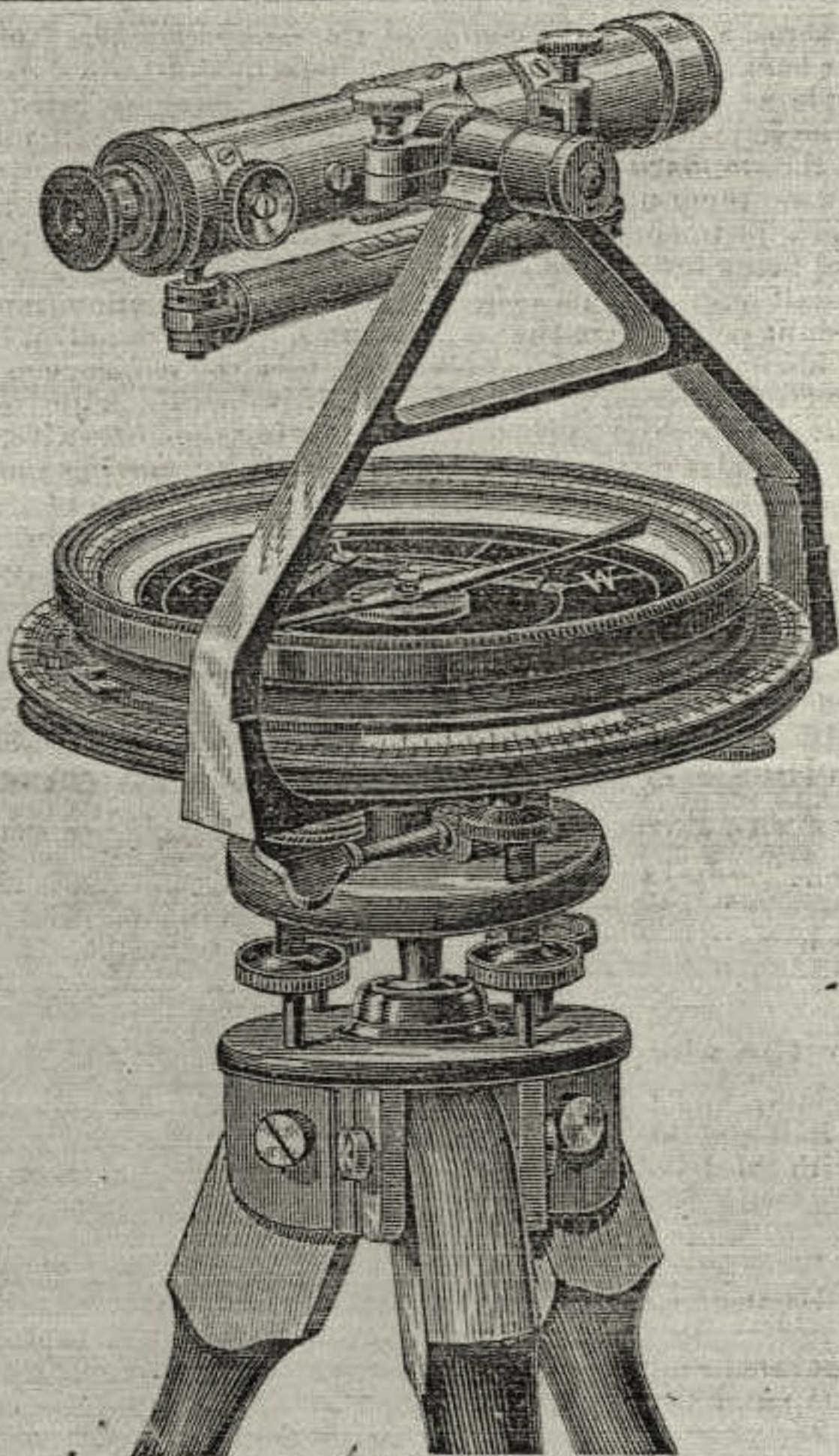


This cut represents the shape and style of my Magnetic Needles. The needle is light, and gives large surface to the points; up and down being only a fine line when looking down upon it. This large surface enables the needle to retain a large amount of electricity. They are finely polished and blued.

Price, by mail, ----- \$3.50 adjusted to Compass, ----- \$4.50

When needle instruments are not in use, we recommend Surveyors and Engineers, to let the needle rest on the pivot, in this way it will retain its magnetism longer, but always in transportation, screw the needle firm against the glass.

In wiping the glass that covers the needle-box, always breathe on it; this removes any electricity which may be caused by rubbing, for the purpose of cleaning the glass; if the point of needle still inclines to stick to glass touch glass with tip of finger wet.



(Fig. 2.)

**R. R. Vernier Telescope Compass.**

(Patented, June 24, 1879.)

FIG. 2 shows the \$90 R. R. Compass, with level and clamp to Telescope and Leveling Tripod, making the price as represented by the cut, \$120.00. This is a compact and convenient instrument, doing everything a Theodolite will do, but I do not claim as accurate work for it. The \$75.00 R. R. Compass would show different in cut, as the outside graduations are covered.

FIG. 2 has two verniers to the limb, reading flush and to single minutes, the verniers are operated with rack and pinion, and can be clamped at any desired point. \$75.00 R. R. has one vernier to limb, with rack and pinion the same, and can be used as a Vernier Compass if desired. I consider these instruments most too heavy for staff, and would recommend a tripod, adjustment of level to cross wires, same as (Daisy) Level page 15.

**Prices of R. R. Vernier Telescope Compass,**

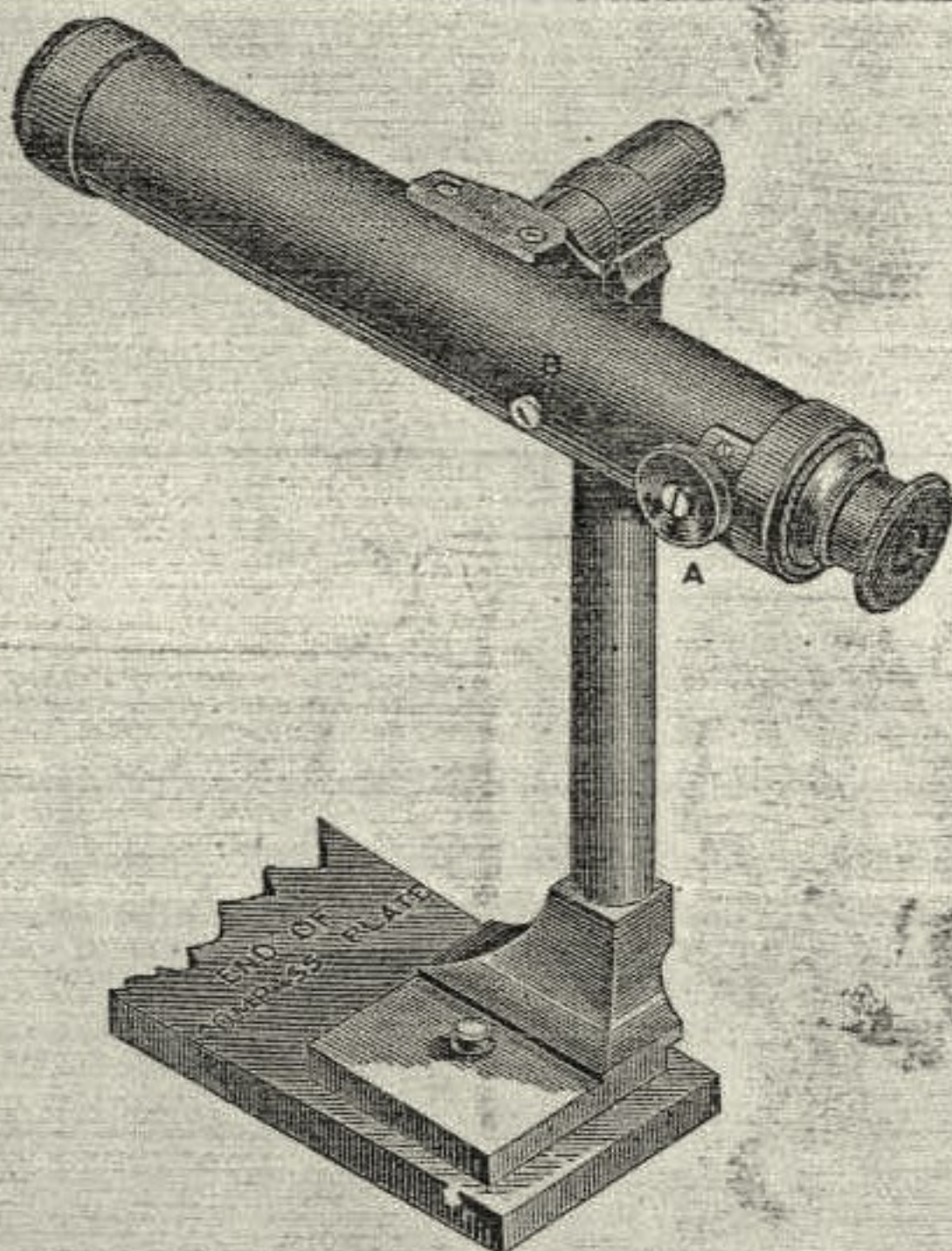
FOR JACOB STAFF, INCLUDING THE BRASS MOUNTING.

5½-inch Needle R. R. Compass, with full circle, 6½-in. diam. with variation vernier. (Fig. 2.) Weight 8 to 8½ lbs. ----- \$90.00

Also, R. R. same size as above, without variation vernier, weight 7 to 7½ lbs. 75.00

Prices of extras the same as the Vernier Telescope Compass, page 3.

This Instrument is becoming very popular, much more so than I first expected, there being so many surveyors wishing an instrument to read angles to one minute, and independent of the needle.



(Fig. 3.)

### Telescope Attachment for Common Compass.

(PATENTED, NOV. 9, 1880.)

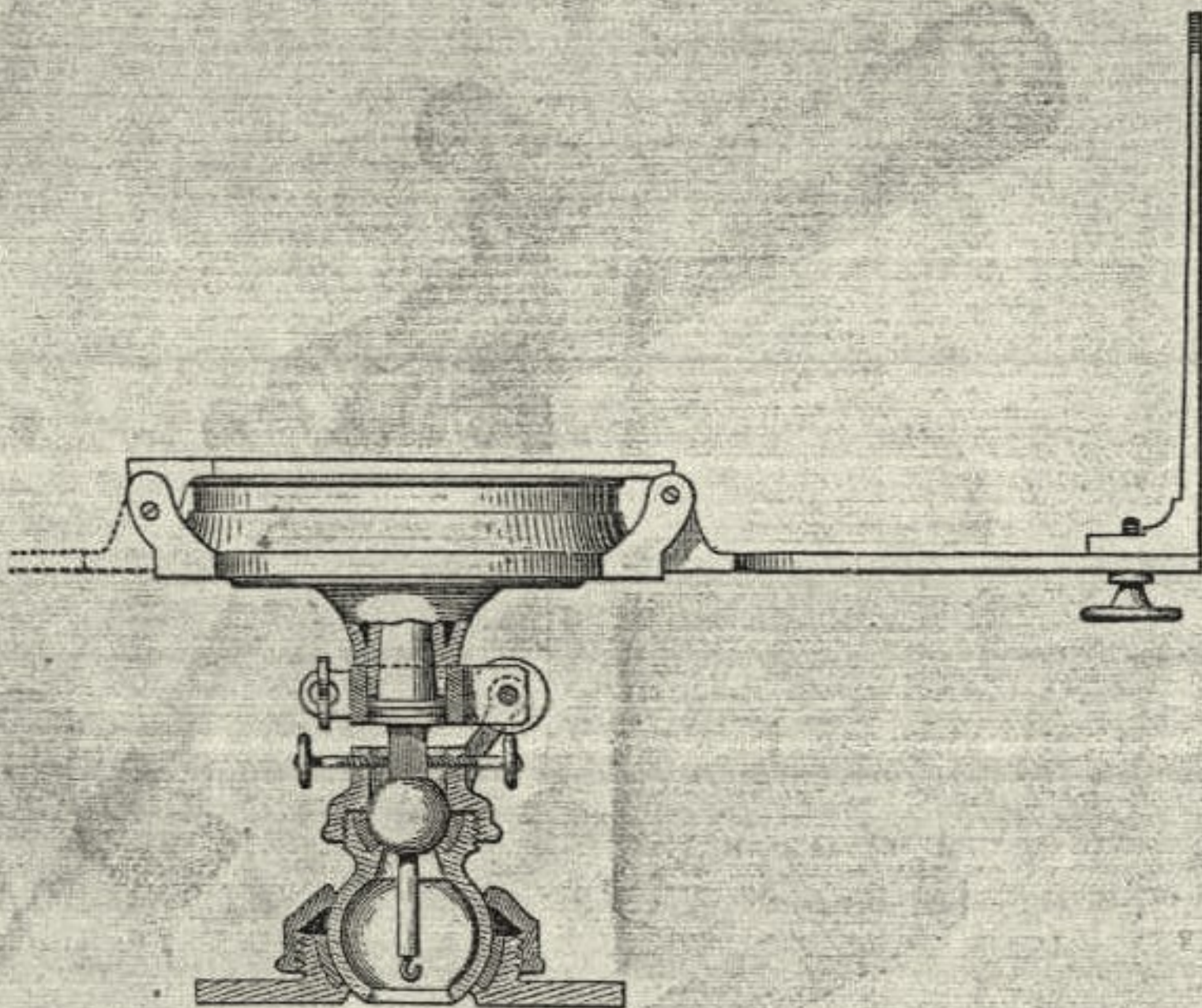
To take the place of one of the sights of a Common Compass, using the same Telescope that I use on New Telescope Compass. It reads in line with the zeros, without any offset from the center of the instrument. Can be removed same as the sight. Must have the Compass to make the attachment right. It is quite necessary to have the balance weight if the Compass is a light one.

The above will be easily understood from the cut, as representing the end of the Compass Plates. I have a balance weight for the opposite end of the Compass, this attachment will generally go into the Compass Box with the Compass. Some parties wishing this attachment without sending their Compass, I have concluded on receipt of a thin piece of wood or card-board, the fac-simile of the end of the Compass Plate, showing exact size and position of the holes for sight screw and steady pins, with \$13.00 (and 25 cts. postage if they wish it sent in that way), I will forward the attachment and give the directions for adjusting it.

Price of above Attachment put on Compass, complete	.....	\$15 00
“ “ “ sent by mail	.....	13 25
“ “ “ Balance Weight	.....	2 00
Postage on Balance Weight	.....	25

### Repairs of Needles.

Surveyors sometimes complain of their Compass needles losing their magnetic qualities; this, in most all cases, is owing to the bluntness of the center pin or needle pivot. This is one of the most difficult parts of an instrument to repair, and can only be done right by an experienced Instrument Maker. The center pin can be unscrewed and sent by mail, with the needle, all enclosed in a piece of light wood so as not to be injured. To save time and trouble of writing two or three letters, in a case like the above, our charge for sharpening the center pin and recharging the needle is ONE DOLLAR. If this amount is remitted to us with the needle, we can return it as soon as done.



(Fig. 4.)

### Folding Plate Compass.

This is a Compass with the ordinary sights, with Plates that fold over the Needle box, which is made otherwise the same as the Telescope Compass, as to Levels, Outkeepers, etc. When not in use, the Plates are folded as shown on the left of the cut, and the Compass is carried in the Patent Sole Leather Box. Distance between the sights is 20 inches. This improvement is for the purpose of doing away with the cumbersome Compass Box, and still have a convenient safe way of carrying the compass. In this cut is represented a new style of Tripod, and more fully illustrated by the cut in Fig. 4½.

Price of above, for Jacob Staff, including Brass Mountings.

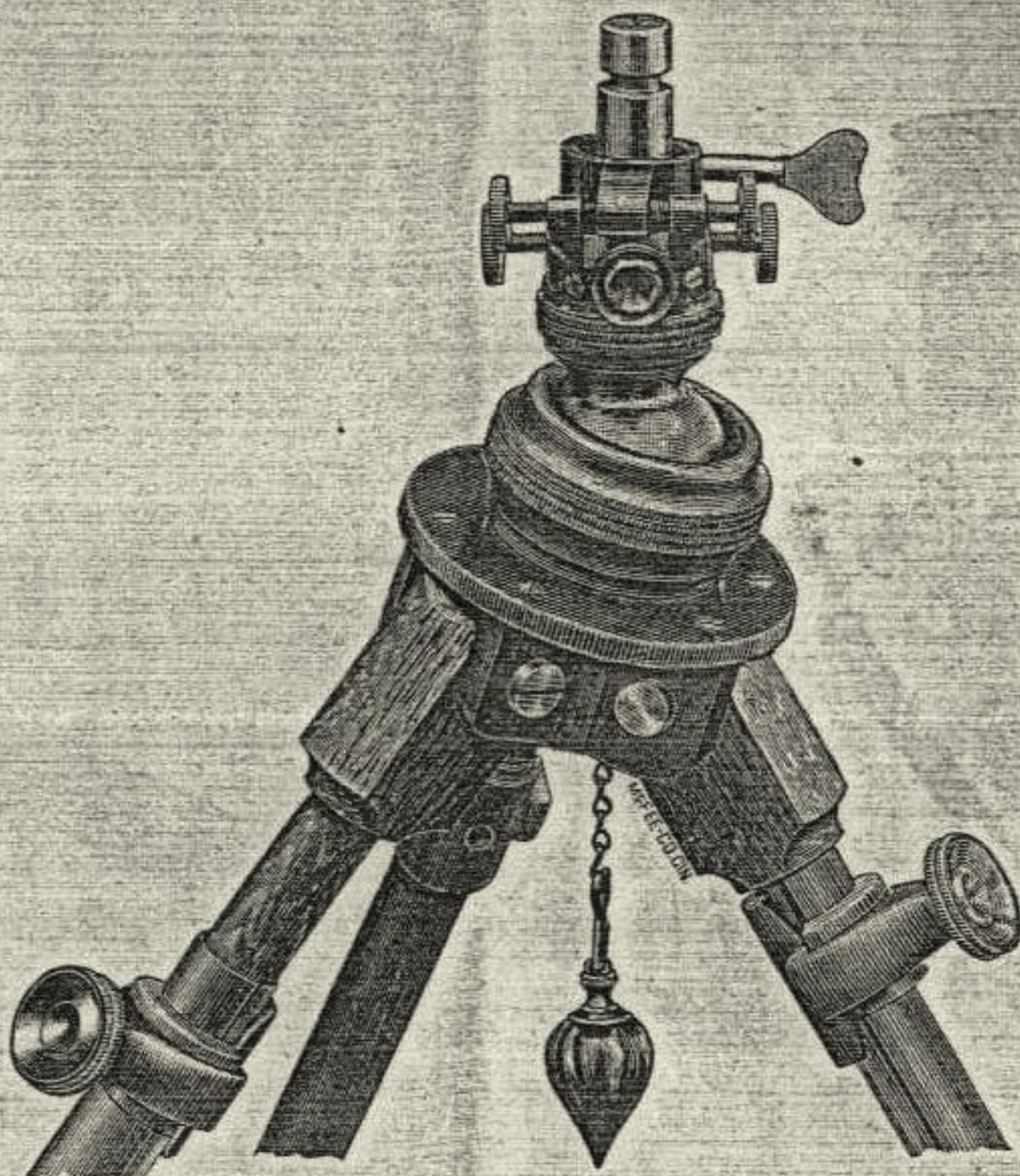
5½ inch Vernier	-----	\$55 00
5½ inch Plain	-----	50 00

#### EXAMINATION OF INSTRUMENTS.

I desire to be as liberal as possible in reference to giving satisfaction to customers. To parties needing Instruments I will forward new Instruments ordered, with instructions to Express Agent to collect the amount of bill, and hold the money and give the purchaser a reasonable time to test the Instrument, (the purchaser to name the time desired, in order) say from five to ten days.

If not found to be satisfactory, the purchaser to have his money returned to him, and Express Agent be directed to return goods to me, otherwise the money to be forwarded to me. In making this concession to customers, I ask that when they order, they send the name or names of some prominent persons in their vicinity as reference; or if there is no express office at the point you wish the goods shipped, name the nearest point; or get some Merchant of your place to endorse on your letter, thus "I will guarantee the payment of the within according to promise," and let that merchant refer to some person or firm in Cincinnati, with whom he does business—when if found satisfactory the goods can be shipped without collecting by express.

The purchaser pays freight in all cases. The purchaser also pays charges for return of money by Express, if sent C. O. D. Instruments properly packed for shipment, without extra charge. In ordering, great care should be taken to give plain directions, NAME, TOWN OR CITY, COUNTY AND STATE.



(Fig. 4½.)

**Quick Leveling Tripod.** (PATENTED, JULY 31, 1883.)

This cut represents a new style of Quick Leveling Tripod, for light instruments. It is heavy enough for any of my Telescope Compasses, with probably the exception of Fig. 2, Vernier R. R. Compass; but for any of the others it is very desirable, the Tripod being set up with the bottom plate at an angle of anything less than 25 degrees. The instrument is brought to an approximate level instantly by turning the whole upper part of the Tripod on the large 2 inch hollow ball. The upper small ball (shown in Fig. 4, sectional view) being a continuation of the spindle, acts for a fulcrum for it, and the instrument is brought quickly to a level by the Leveling Screws bearing on the square of the main spindle. The spindle being continued through the hollow large ball, the plumb is attached to lower end, it therefore makes no difference at what angle the Tripod Plates are to the Compass, the plumb is in right line, precisely under the center of instrument. There is a Clamp and Tangent Screws to this Tripod. For a light instrument this is the very best Quick Leveling Tripod made. The steadiness of the two inch ball can be increased if desired by screwing the large cap tightly.

Price, as an extra, with new instrument, Legs same as Fig. 2	\$15 00
Fitted to an old instrument, " " "	18 00
For Jacob Staff, including the Staff	10 00

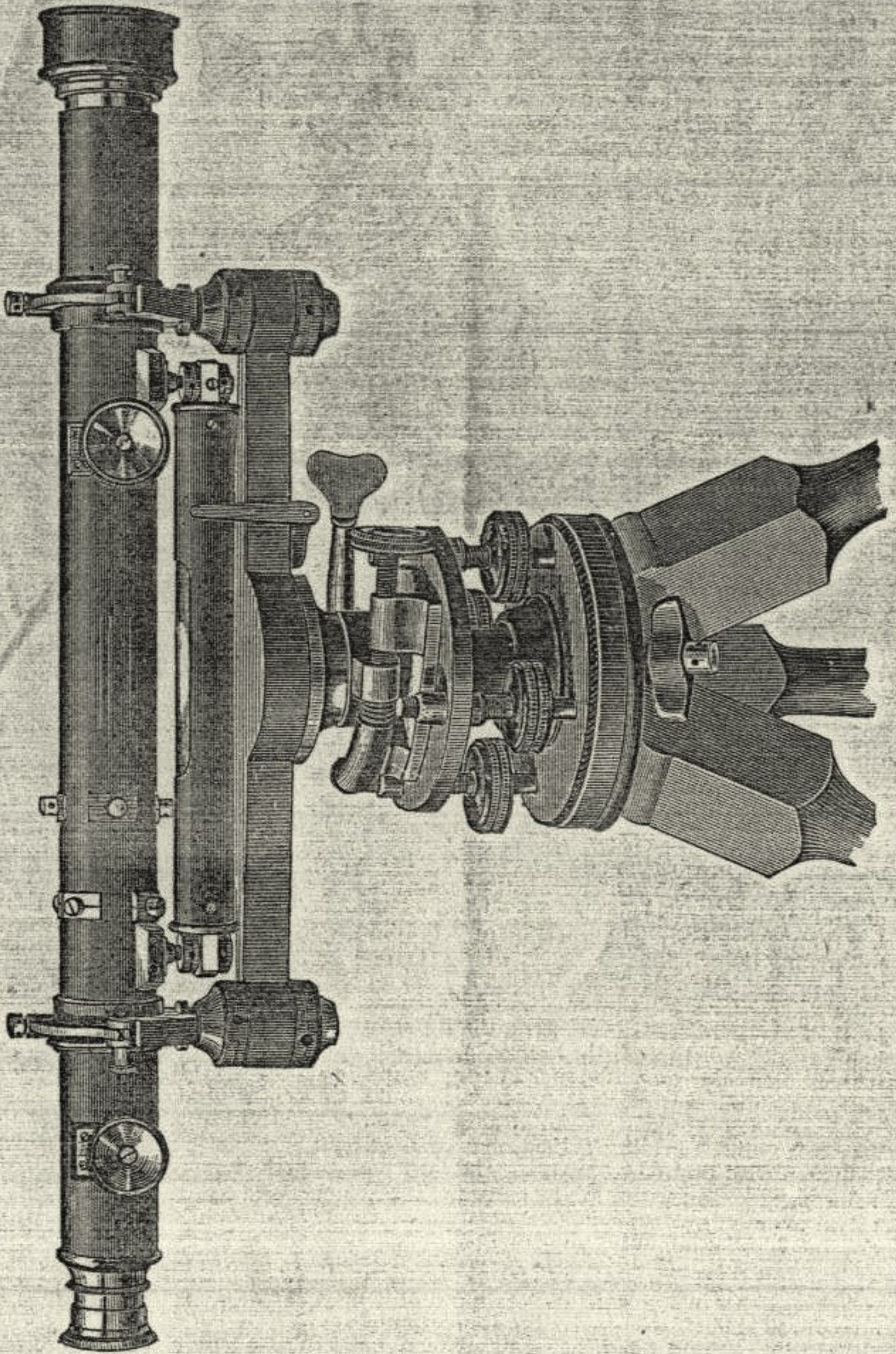
**Adjustable Tripod Legs.** (PATENT PENDING.)

Are shown in Fig. 4½, for use in mining or rough hilly country. The legs close up to about 3 feet including the Tripod head, extending out nearly 2 feet, the outside or sliding portion being made of brass tubing, with a ring of brass and Clamp Screw to clamp at any desired length. Where a Tripod is to be used in hilly or mountain country, it is well to have one adjustable leg, if no more, where mining and surveying are both to be done—the whole set is convenient. The whole Tripod weighs 10½ lbs., being 2½ lbs. heavier than the Tripod with the wooden legs.

One adjustable leg \$4.00 extra.	Full set	\$10 00
" " " 4.50 for Transit.	"	12 00

I have Jacob Staffs made adjustable in length, closing up to 2 feet 8 inches in length, with Steel Point complete. Price

Price	6 00
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(Fig. 8.)

The Y Level, 18 Inch Telescope.



## THE Y LEVEL.

In this instrument, the telescope is made to revolve readily and truly in its Ys, on bearings of hard metal, which are turned of exactly the same diameter, and when desired, may be firmly clamped by the small capstan head-screw in the clips. A device on the bar holds the Level direct under the Telescope. A rack and pinion movement adjusts the object and eye glasses. The Ys each have two nuts, both being adjustable with an ordinary steel pin. The level bar is made of hammered brass, and shaped so as to possess the greatest amount of strength in the parts most subject to sudden strains. The level tube and bar are compact so that there is the least possible distance between the spindle bearing and cross-wires; the tripod plates are substantial, and with the horizontal adjusting screws are boxed with the instrument. This level is well represented by cut.

**ADJUSTMENT OF THE Y LEVEL.** First is that of the line of collimation, or the intersection of the cross-wires to revolve on a given point by the entire revolution of the telescope in its Ys. The instrument is set on its tripod, and the eye piece is moved in focus with the cross-wire by turning the pinion at the eye end; the object glass is then moved out, by turning the pinion, until the object appears distinct; the horizontal line is brought to bear on some line or point, the telescope is turned one-half around in its Ys, and if the wire cuts the same point that wire is adjusted; but if it comes on either side of the first point observed, one-half of the variation is corrected by one of the four small capstan head-screws on the telescope, the other half by raising or lowering the end of the instrument with the horizontal adjusting screws. The telescope is then turned one-quarter of the way around, and the other wire is adjusted to the same point. The four screw-driver head screws between the eye piece and the capstan head screws, are for bringing the cross-wires to the center of the field. It will be noticed that in the adjustment of the cross-wires, it apparently moves out of the center of the telescope. These screws bring them to the center of the field.

**ADJUSTMENT OF THE Ys.** Raise the clips, bring the horizontal wire on a point, turn the telescope end for end in the Ys; turn the instrument one-half around on the socket. If the cross-wire cuts the first point observed, the Ys are adjusted; if not, one-half the error is corrected by the nuts securing the Ys to the level bar, and the other half by the horizontal adjusting screws.

**ADJUSTMENT OF THE SPIRIT LEVEL.** Bring the level over a set of horizontal adjusting screws, and bring the bubble to the center, (the glass tube has lines marked on it to correspond with the length of the bubble in the place of a brass scale over the level tube), turn the instrument one-half around; if the bubble again runs to the center, the level is in adjustment, if not, one-half of the adjustment is made by the capstan nuts, which secure the level to the telescope tube, the other half by the horizontal adjusting screws; all of these adjustments should be repeated.

My telescope glasses are the very best.

### Price of Y Level.

Complete, 18 inch Telescope	-----	\$110 00
New York Leveling Rod	-----	15 00
Philadelphia " " "	-----	16 00

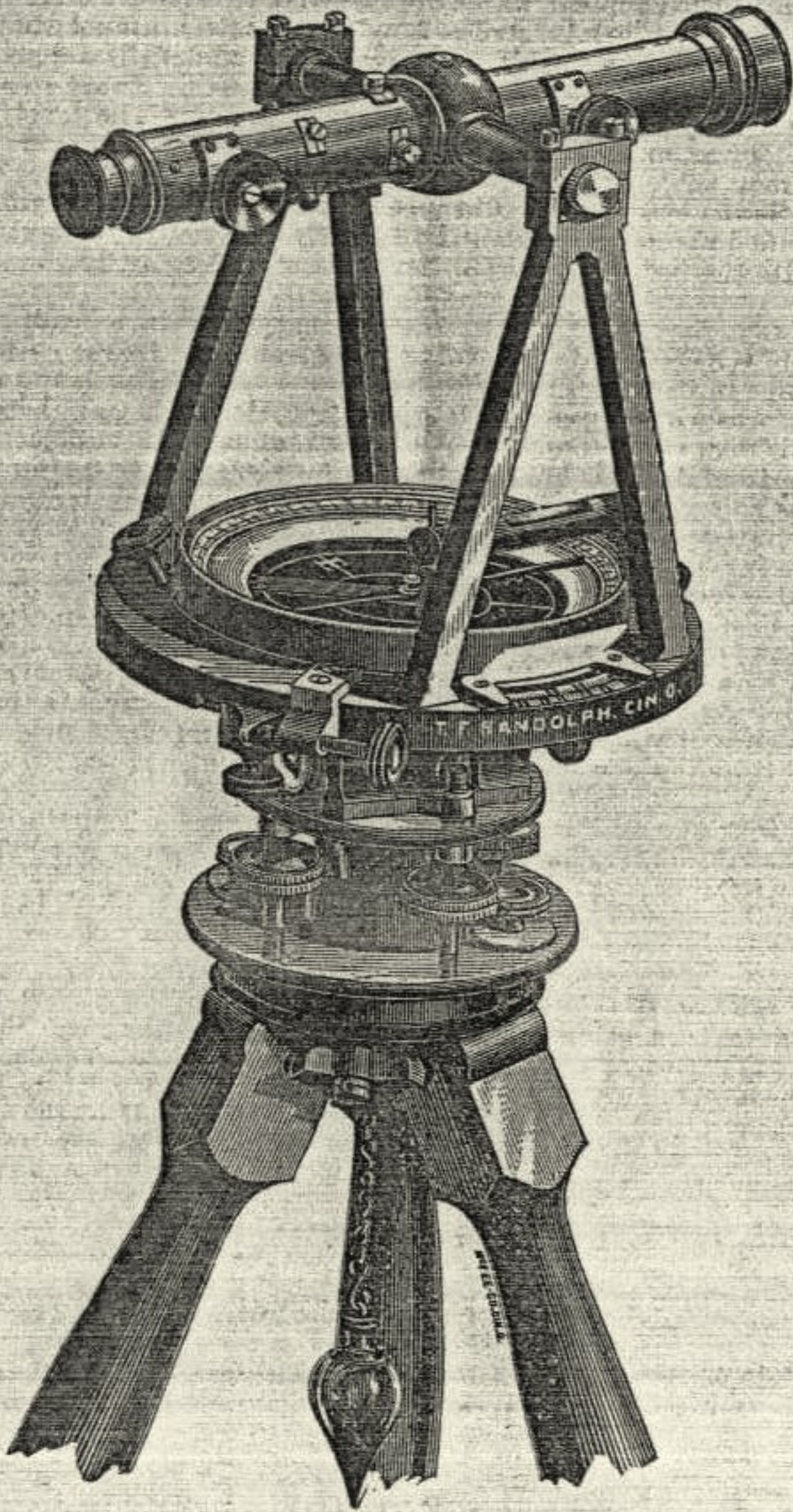
### REFERENCE TO THE ABOVE.

LOUISA, KY., April 30, 1882.

T. F. RANDOLPH, Cincinnati, Ohio.

Dear Sir: The Level you sent me gives entire satisfaction, and is just the thing for the mountain country, on account of its light weight. It is the most accurate Instrument I have used in ten years, though in that time I have had ample practice with seven Levels, two or three of which were entirely new.

Very truly,  
BEN. F. THOMAS,  
Engineer Chattaroi Railway.



(Fig. 9.)

The Transit Instrument.

This instrument is used for taking horizontal angles exclusively, and has a graduated circle in addition to needle circle. This instrument is made in the most approved style. The principal plates are made of hard metal and turned, so that there are no irregular corners on the plates. The socket bearings are four inches long, which allows the plates to move with the least possible friction. There are no grooves turned in the plates to hold the clamp of the tangent screw to its place. The whole attachment being made to the upper plate by means of a concealed spiral spring, working opposite to a milled head screw against a solid clamp, that revolves from the center or spindle; the clamp being solid, it only requires a slight force to clamp; there is no slack or shake in the movement. As soon as unclamped the plates are perfectly free from each other, and move around without any catching as in instruments where there are grooves and indifferent clamps. This is one of the most important movements of the Transit. The needle is four and three-fourths inches long; the vernier circle six and one-half inches in diameter, divided to half degrees, with two double verniers to read flush and to minutes. The verniers are covered with glass, which protects the graduation. They also have the ivory reflectors, which is a great improvement in reading verniers. Weight, including shifting plate, above the Tripod Legs, 15 lbs. The Theodolite is about 1 lb. heavier. Two ground spirit levels adjustable. The telescope glasses have the same means of adjustment as that of the Level Telescope and glasses equal to any used. My Transit and Theodolite Plates are all graduated on sheet silver and the best engine in the country, (the Government Engine at Washington, D. C.) I make the Transits and Theodolites with either parallel standards to the telescope axis (as shown in cut of Transit) or inclined as shown in the Theodolite; some prefer one style, some the other.

**ADJUSTMENT OF THE TRANSIT.**—The instrument is set up firm on its tripod, and the levels are adjusted by revolving the instrument on its axis, in similar manner to that of the Surveyor's Compass.

**ADJUSTMENT OF THE CROSS-WIRES.**—The zero of the vernier is brought to coincide with the zero of the circle. The telescope is then adjusted to the focus of the object, and the vertical wire brought to bear on a distant object near the intersection of the wires. The telescope is then moved in a vertical direction to see if the vertical wires keep on the same point to the edge of the field; if it does not, the capstan head-screw must be turned on the telescope tube, by bearing gently and turning at the same time, to bring the wire in a vertical position. This adjustment being correct, and the wire being still on the same point, see that the instrument is all firm; now unclamp the plates and turn the vernier plate one-half around, so the same zero point on the vernier will coincide with the opposite zero on the circle, turn the telescope one-half around on its axis, and if the vertical wire cuts the same point, this adjustment is correct; if it does not, one-half the error is corrected by the cross-wire, and the other half by the lower tangent screw. The horizontal wire in a Transit Telescope is brought as near as can be judged to the center of the telescope, there being no particular use for it. The Tripod heads for Transits and Theodolites have shifting centers for setting the instrument over a given point, without changing the level of the instrument or position of the legs. Do not need to loosen the leveling screws, which is a great objection in some, as the instrument has to be leveled up again, and but little time is saved by having the Shifting Tripod.

### Price of Transit.

Boxed, complete ----- \$160 00

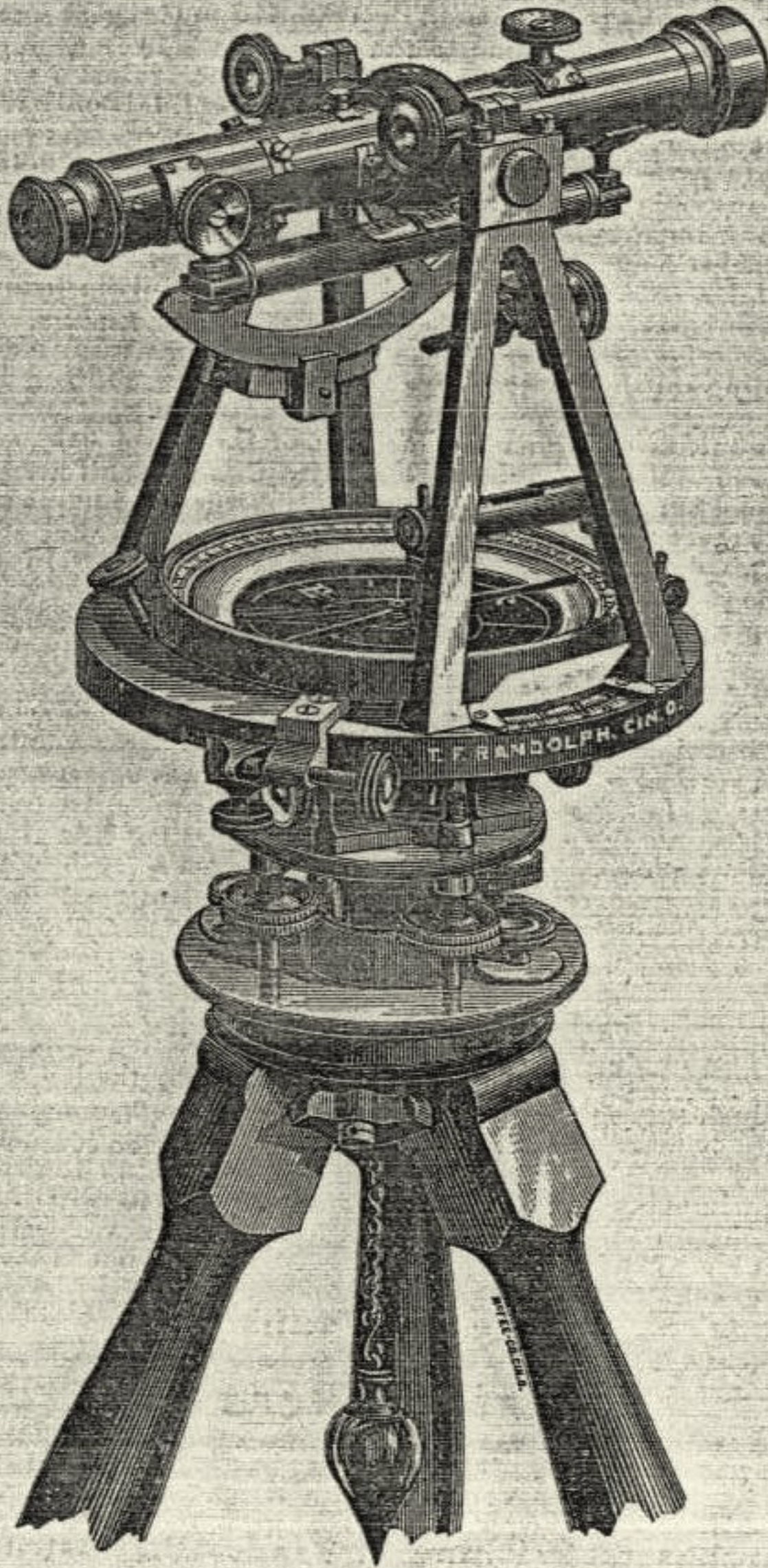
### REMITTANCES.

Post-Office Orders, Registered Letters, Express Packages, or Drafts on N. Y. payable to my order. Don't send personal checks on your local bank. I refer to the Exchange National Bank of this city by permission.

### To Purchasers Wishing to Trade Old Instruments.

Parties wishing to trade old instruments on account of new ones, must send their old ones for my examination and valuation. This will save writing several letters, and is absolutely the only way in which I can trade; or place the price on the old instruments when you ship, and, if satisfactory, the new instruments can be shipped at once. C. O. D. the balance, if any. I allow for old instruments the highest possible price.

I have a general assortment of Second Hand instruments in good working order constantly on hand, which I sell at low prices. Persons wishing any second hand instruments, when they write, will please state what kind of an Instrument they wish; if a Compass, what size; and whether plain or vernier; specify about what you wish, or work you want it for.



(Fig. 10.)

**The Theodolite.**

This instrument is the same as the Transit instrument, with the addition of the vertical arc (which is one-fourth circle) and revolving level on the telescope. This instrument, therefore, can be used for leveling horizontal and vertical angles, and is mostly used by City Engineers, it being adapted to all kinds of work, and but little heavier than the Transit. The vertical cross-wire is adjusted the same as that in a Transit instrument. The revolving level is adjusted on its own axis by the maker, and made permanent in its tube.

**TO ADJUST THE REVOLVING LEVEL.**—Level the instrument by the two small levels; bring the telescope as near to a level as possible, by turning it on its axis; now clamp the axis and move the telescope and level together on their axis, by the slow motion tangent screw until the bubble stands in the center, designated by the lines made on the level glass; turn the instrument one-half around; if the bubble again comes to the center, the level is adjusted; if not, one-half of the adjustment is made by raising or lowering one end of the level, as the case may be, by the adjusting nuts at its end, the other half by the tangent screw.

**ADJUSTMENT OF THE HORIZONTAL CROSS-WIRE TO THE LEVEL.**—Observe a point, say one hundred yards distant, bringing the horizontal wire to bear on it, the level still remaining in the center, unclamp the telescope axis and turn it half over on its axis; this will bring the level to the top of the telescope; turn the level on its own axis until the bubble comes to the top; turn the instrument one-half around on its socket; clamp the telescope axis and bring the bubble to the center by the tangent screw; now see if the wire cuts the same point; if it does, the cross-wire is in adjustment with the level; if not, one-half of the error is corrected by moving the cross-wire, the other half by raising or lowering the point observed. The vertical arc being loose on the telescope axis, which can be clamped at any point, needs no adjustment. To start from zero on the vertical arc, the telescope must be level; the zero on the arc is then made to coincide with that on the vernier, and clamped to the vernier, the arc is then clamped to the telescope axis, the clamp of the vernier is then unloosed, with that of the tangent screw, and the arc will move with the telescope. The tripod legs can be tightened, to suit the operator, by the capstan screws. The wood has a bearing of near half a circle, and allows the legs to open to right angles with the axis of the instrument.

Price of Theodolite, complete ----- \$200 00

### Price List of CHAINS.

50 feet, No. 16 Steel Wire,	100 link, not tempered	\$ 2 50
33 " " 8 Iron Wire,	50 " Coppered	2 50
66 " " 8 " "	100 " "	4 00
50 " " 8 " "	50 " "	4 00
100 " " 8 " "	100 " "	6 00
33 " Brazed Links and Rings, No. 12 best Steel Wire		5 50
66 " " " " " "		10 00
50 " " " " " "		6 00
100 " " " " " "		10 50
20 VARA Chain, same price as 4 pole or 66 feet		
10 " " " " " "		
33 feet, 40 link Chains, same as 50 link		
66 " 80 " " " 100 "		

### CHESTERMAN'S METALLIC TAPES.

33 feet long, in 10ths or 12ths, each	2 35
50 " " " " " "	3 00
66 " " " " " "	3 30
75 " " " " " "	3 75
80 " " " " " "	4 00
100 " " " " " "	4 75

### CHESTERMAN'S STEEL TAPES.

All Steel, to wind up in a Box same as Linen Measures; the most accurate, durable and portable measure.

10 feet long, in 10ths or 12ths, in German Silver Case, each	3 50
33 " " " " " each, Leather	6 25
50 " " " " " "	8 50
66 " " " " " "	11 00
75 " " " " " "	12 50
100 " " " " " "	16 00
100 " Common Steel Tape, marked in feet only. No Case	6 50

### The Plain or Single Plate Compass.

All of our Instruments, when sold, are in adjustment and ready for use. The Compasses as we make them scarcely ever need any readjustment, except the levels. To adjust the levels on a compass—these same adjustments will also answer for the small levels on all other Instruments—we generally adjust one level first. Set the Compass on the Jacob Staff and bring the bubble of one level to the center of the slot in the brass tube; turn the Compass one-half around on its sockets; if the bubble again settles in the center, the level is adjusted; if the bubble runs to one end of the slot, raise the opposite end by unscrewing the capstan head screw, so as to bring the bubble one half way back to the center; move the Compass on the ball-joint until the bubble remains in the center. Repeat the operation until the level remains in the center during a complete revolution of the Compass on its socket. One level being in adjustment, and the compass level, raise or lower one end of the other level until the bubble stands in the center, and the levels are adjusted. The sights should now reverse on a plumb line. All other adjustments made by the maker. It will be seen that my style of compasses are changed so that the levels, outkeeper and vernier come inside the needle box the same as my Patent Telescope Compass, which I believe makes them more desirable, and the Boxes are about one and a quarter inches less in height.



(Fig. 6.)

### THE VERNIER COMPASS.

This instrument has the same adjustments as the Plain Compass, and is made the same with the addition of the vernier plate, with clamp and pinion movement to turn the vernier plate. This vernier reads to minutes, and is for reading the variation of the magnetic meridian from the true meridian. The Vernier Compass is almost exclusively used by surveyors at the present time.

**RULES FOR READING THE VERNIER.**—This Rule will apply to all our Verniers. Read the degrees from the zero on the circle in the direction of the graduations up to the line next preceding the zero line on the vernier, this is the reading of degrees; look along the vernier, in the same direction from the zero of the circle, until a dividing line is found to coincide with a line of the circle, the numbers on the vernier will give the minutes, the minutes added to the degrees will be the reading of the instrument. The Needle should cut opposite graduation in every position very accurately.

**Prices.**—Tripods as Extras, same as for Telescope Compass.

Plain Sight Compass, 6 in. Needle, (No. 5.) 15½ in. Plate, Brass Cover, 2 Ground Spirit Levels, Adjustable, Outkeeper, strong, well made Box of Walnut, and Staff Mountings	\$40 00
Plain Sight Compass, 5 in. Needle, (No. 5.) same otherwise as above	35 00
Vernier Sight Compass, 5 in. Needle, (Fig. 6.) balance same as 5 in. plain	40 00
Vernier Sight Compass, 6 in. Needle, (Fig. 6.) balance same as 6 in. plain	45 00

## Prices of Instruments, etc.

## PATENT TELESCOPE COMPASSES.

*For Jacob Staff, including the Brass Mounting.*

Vernier, 6-inch Needle, ( <i>Fig. 1</i> ), weight 6½ to 7 lbs	\$60 00
Plain, 6-inch " " 6½ " 7 "	55 00
Plain, 5-inch " " 4½ " 5 "	50 00
Vernier, 5-inch " " 4½ " 5 "	55 00
5½-inch Needle R. R. Compass, ( <i>Fig. 2</i> ) with full circle, 6¼-inch diameter, with variation Vernier, weight 8 to 8½ lbs	90 00
Also, R. R., same size as the above, without variation Vernier, weight 7 to 7½ lbs	75 00

*The above are the only sizes of Telescopes or R. R. Compasses I make.*

## Extras for the above and Folding Plate or Common Compass.

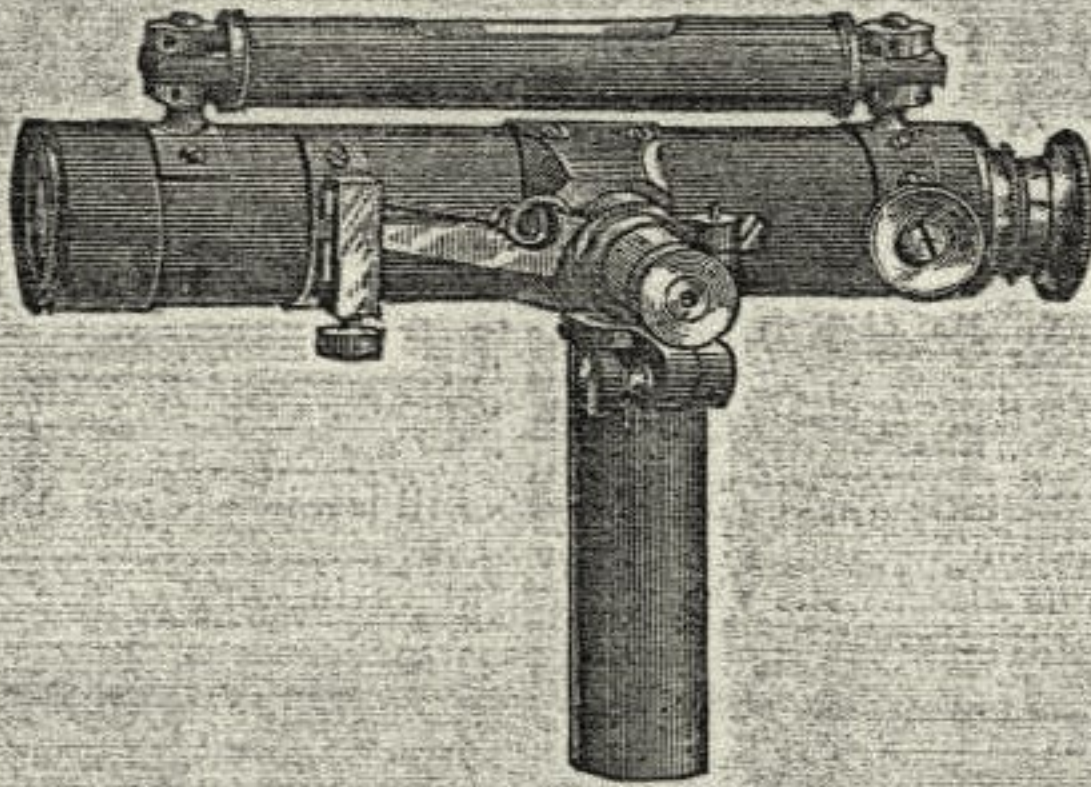
Tripod, with Clamp and Leveling Screws	15 00
<i>Represented in either Figs. 2 or 4½.</i>	
Tripod, with Ball and Socket Adjustment	5 00
Staff Mountings, with first Tripods	3 50
" " " last "	2 00
<i>In the latter case one Ball answers for both Staff and Tripod.</i>	
The first Tripod as an entire extra	18 00
The last " " " "	7 00
Single Adjustable Tripod Leg, ( <i>Fig. 4½</i> )	4 00
Full set " " " "	10 00
Vertical Arc, 100 degrees read to minutes	15 00
" " " " ½ degrees	10 00
Single (Stationary) Stadia Wire, to cover 6 inches in 100 feet	3 00
Key, when separate, or an extra one	1 00
Level and Clamp and Tangent on Telescope Axis; the Level revolves on its own axis for back and foresights	15 00
Set of Folding Sights on the Telescope	8 00
Jacob Staff, with Steel Pointed Socket	2 00
Steel Point for Staff	50
Telescope Attachments for common Compass, ( <i>Fig. 3</i> )	15 00
Balance Weight	2 00
5½-inch Needle, 20-inch Folding Plate Compass, with variation vernier,	55 00
5½-inch, without variation Vernier	50 00
Set extra Sliding Sights for leveling with Common Sight Compass	6 00

## ENGINEERS' INSTRUMENTS.

Y Level, 18-inch Telescope, Walnut Box, ( <i>Fig. 8</i> )	110 00
Transit, Box of Walnut, ( <i>Fig. 9</i> )	160 00
Theodolite, " " ( <i>Fig. 10</i> )	200 00
Adjustable Stadia Wire, with new Instrument	5 00
Either 9 or 10, with variation Vernier, costs extra	20 00
Single Adjustable Leg for Transit or Level, \$4.50. Full set	12 00
Brass Parallel Rulers, 18-inch long, 2¼ inch wide	14 00
" " " 15 " " " "	12 00
Steel Pointed Plumb Bobs, 6 sizes—5 oz	1 50
10 oz. 2.00, 15 oz. 2.25, 20 oz. 2.50, 2½ lb. 4.00, 4¼ lb	5 00
Philadelphia (self-reading) Leveling Rod	16 00
New York Leveling Rod	15 00

## MARKING PINS.

No. 4 Iron Wire, set of 11 pieces, 16 inch long	75
No. 6 " " " 12 " "	50
No. 10 Steel " " " 12 " "	75
Timber Scribe or Marker	1 25
Flag Poles, 8 or 10 feet long, Steel Socket, well painted, Red and White, Pine	each, 2 50



(Fig. 11.)

### NEW "DAISY" LEVEL. (PATENT PENDING.)

Shows a new, cheap, light and accurate level for ditching, turnpike and ordinary leveling of all kinds; also for builder's and architect's use. I don't believe anything but a first-class (Wye) Level will do better work. The Level revolves on its own centers, and is adjusted to the *cross* wires on one *point*. The *cross* wires never need any adjustment, "but the level is adjusted to them" *thus*: Bring the level to the center of tube by the lines on the *glass*; let the horizontal wire cut some distant point, turn the instrument on its vertical spindle half around, turn the telescope. Turn the level on its own axis, bringing the bubble to the top and center of the tube. If the cross-wire cuts the same point, the adjustment is right, if not, move the cross-wire by tangent screw one-quarter the error, then adjust the level to center by the capstan nuts; the other half is corrected by raising or lowering the point observed. The level is adjusted in its tube by the *maker*, the same as those used on Figs. 2 and 10.

There is clamp and spindle for horizontal movement. This small level is intended to be used on a single staff or a simple tripod with stiff spindle, or it may be a ball spindle, the same as surveyor's compass. There is no necessity of leveling screws to the tripod. Weight of the entire brass part  $1\frac{1}{2}$  lbs.; Box  $7\frac{1}{2}$  in. long,  $3\frac{1}{2}$  in. in diameter, with strap for carrying.

Price, with light Jacob Staff similar to tripod leg with steel socket-----	\$30 00
Level, without Staff-----	28 00
Level, with light stiff spindle tripod-----	33 00

Other light tripods as extras same as Telescope Compasses.

### STANDARD SET BRASS DRAWING INSTRUMENTS.

Rosewood Box, with tray, pair 6-in. needle point Dividers, with Pen and Pencil Points and Lengthening Bar;  $4\frac{1}{2}$  inch plain Dividers;  $3\frac{1}{2}$  inch Needle Point Dividers, with Pen and Pencil Points; spring bow Pen with Needle Points; Drawing Pen; brass and horn Protectors; divided wood Rule; 6 inch ivory Scale; 6 inch ebony Parallel Rule. Price, \$5.00; by mail, \$5.20. Same without Spring Bow Pen, \$4.50; by mail, \$4.70.

I also keep on hand the following goods, at lowest prices:

BRASS, GERMAN SILVER, SWISS AND ALTENEDER'S MATHEMATICAL DRAWING INSTRUMENTS. *Single or in Sets.*

ALSO, SCALES; PROTRACTORS; THUMB TACKS; INDIA INKS; WATER COLORS; INK SLABS AND NESTS; DRAWING, PROFILE, BOND, AND CROSS SECTION PAPERS; MOUNTED AND UNMOUNTED; FIELD, LEVEL AND TRANSIT BOOKS; TRACING VELUM AND PAPER; THERMOMETERS; ANEROID AND MERCURIAL BAROMETERS; TRIANGLES; CURVES; PENCILS; HORSE SHOE MAGNETS; READING OR MAGNIFYING GLASSES; POCKET, MINING AND PRISMATIC COMPASSES; LOCKE & ABNEY'S POCKET AND CLYNOMETER LEVELS.

The above, or any make of Engineering or Surveying Instruments, or Supplies, I will furnish in Cincinnati, at the respective Catalogue Prices of any responsible Eastern firm, the number of the article and name of Catalogue being given.



Engineers and surveyors know I have in the past been willing that my Patent Telescope Compass, with its separable Telescope, should stand upon its own merits; and I have not seen fit to heed any attacks of manufacturers or dealers in instruments. But the recent remarks having *direct* reference to my Separable Telescope, (the only instrument made in this style), by B. & H. of St. Louis, Mo., on the third page of their circular of recent issue, I hereby deny and pronounce them fabrications as far as my instrument is concerned, and have entered suit for \$20,000 damages for its publication.

I made requests on 6th of October for references to parties using my Patent Telescope Compass, and publish those dated from 8th of October to 2d of November, 1883, inclusive.

If any surveyor needs any thing better or more thorough and satisfactory as to the completeness of my *Telescope Compass*, I don't believe I can give it to him, as reference is made to every point in the instrument by one or more of the letters. I believe my Telescope Glasses are improved in every new lot I get in; the minor details we also make slight improvement on. If anything, they are better than ever in every particular.

I now *assert* that an instrument that will answer the same purpose can not be *made* as compact for transportation any other or better way. If it *can*, I will give \$5,000 for the *patent assigned* to me on the following conditions:

1st. It must be patented, and within two years prior to date offered, and offered before July, 1884.

2d. It must be the same or less in weight, for the same sized graduated circles and needle.

3d. It must be a substantial instrument when made.

4th. It must be as *cheap* to manufacture or cheaper than my Telescope Compass.

5th. It must be as accurate and complete with a telescope.

6th. It must be easier and safer of transportation.

7th. It must be complete in every particular when offered.

8th. I must be the principal *judge*.

I have just completed a Pocket OUTKEEPER that can be counted while in the pocket or held in one hand. Weight about  $\frac{1}{4}$  of lb. Price, by Mail, \$3.75.

I am getting up a Solar Attachment to add to the Telescope of my Telescope Compass or Theodolite, at about \$40 for the former, and \$45 to the latter.

In my circular of 1882, I made the above announcement, and intended to use Saegmillers' Patent, whatever instrument this is attached to needs a vertical arc and a level on the telescope; costing on my Telescope Compass, where the arc reads to minutes, \$30.00 extra, making the *cost* really \$70.00; and then the Instrument would not go into the Sole Leather Box. I came to the conclusion to get up the regular Burt Solar Attachment complete, and have nothing to do with the telescope further than leaving it free to transit while the Solar Attachment was on the instrument. The Solar Lenses will have a focus of  $4\frac{1}{2}$  inches declination, and latitude arcs  $8\frac{1}{2}$  inches in diameter, hour arc  $5\frac{1}{2}$  inches in diameter, all graduated on sheet silver, and the two first having tangent screws, the whole solar attachment is detachable from the instrument, and will go into one of my Patent Sole Leather Boxes. It is set and adjusted to the instrument by the zeros of the needle circle. For my Telescope Compasses, while the Telescope is in its place, there is an offset of  $\frac{1}{16}$  of an inch from the zeros, but is parallel to them. It can be used on any common compass. The latter and my Telescope Compass are about the only instruments it can be used on. Weight of Solar Attachment 3 lb. Price with Leather Box----- \$100 00

To make this fit any instrument, I need the exact outside diameter of the bezel or ring that holds the glass, for the needle box.

PARIS, TENN., Oct. 8, 1883.

MR. T. F. RANDOLPH—Dear Sir: Your circular letter, mailed the 6th inst., to hand. I take great pleasure in stating that the Patent Telescope Compass, which I ordered of you last January, after having thoroughly tested its powers in large and small surveys, in hills and plains, through dense forests and open lands, is incomparable to any and all other instruments I ever handled. For *accuracy* at short, intermediate, or long ranges, it is just simply *perfect*. I can set a stake six feet distant, center a pin's head six hundred feet, set a flag-staff *easily one mile and a quarter*.

For convenience for transportation there is nothing more to be desired. I do not know of a single improvement that could possibly be added. It is complete in all its arrangements and appointments, and far exceeds all that is claimed for it. Its advent is a public benefaction, and is bound to revolutionize land surveying.

Yours truly, J. W. JOHNSON,  
Surveyor, Henry County.

JAMESON, MO., October 8, 1883.

T. F. RANDOLPH, ESQ.—Dear Sir: Having used one of your Patent Telescope Compasses for about two years, I find it one of the most convenient instruments I have ever used. I do not think I could do without one. Anything of a clear day I can set staff the distance of a mile. Can do double the amount of work with it in hilly and brush land. Was surveying in brush and hilly land last week. Set the flag-staff, a white pole with a strip of red flannel wrapped around it. By-standers said good. Guessed it off. Made them look for themselves, and they found it correct. It was one-fourth mile. It is one of the most convenient instruments for transportation I have ever used. One ought to be in the hands of each County Surveyor. You can dispatch work with less labor to yourself and hands employed.

I let my compass fall. Thought I would have to send it to you to doctor, but it is all right. It will stand a good knock. I was mad at myself for having been always so careful.

GEO. P. ALLEN,  
Surveyor, Daviess County, Mo.

STILLWATER, MINN., Oct. 9, 1883.

T. F. RANDOLPH—Dear Sir: After a fair and impartial trial, I am satisfied that the Telescope Compass bought of you, whether on a level or on rolling ground, open or wooded country, is far better than any open-sight compass, and I prefer it to any that I have used or seen. It is convenient for general use, accurate in details, and easy of transportation, and I can cheerfully recommend it to any one in want of a reliable instrument.

JAMES STEWART,  
Practical Surveyor.

ROBERTSON, KY., Oct. 9, 1883.

MR. T. F. RANDOLPH—Dear Sir: As I am now and have for three years been using one of your Patent Telescope Compasses, and from the satisfaction it gives me, I know it my duty to give them that contemplate buying a compass a few (out of the many) advantages that your Patent Telescope Compass has over the old-style compass. First, from its compact form, it is more convenient for carrying, and without any danger of breaking or springing any part, whilst there is danger of breaking, and especially of springing the upright sight of the old compass. In such case, no work can be done accurately. For surveying hilly land, it can not be surpassed by any other instrument I ever saw; for, by the telescope sight, an object can be taken from the top of a hill to the hollow, or from hollow to top of hill, as easy and as quick as a sight on level land; for long sights it is the very instrument, for, with the aid of the telescope, I can take an object at a great distance with as much accuracy as I can take an object two rods with any other compass. For surveying through bushes or woods *it is the very compass*, and in fact *it far exceeds* any part of the old compass that I could name; hoping that you may succeed in scattering your Patent Telescope Compasses through the country, so that with them work may be done more accurately than has been done heretofore with the old upright sight-compass,

I am yours, respectfully, THOS. J. CONRAD,  
Surveyor and Engineer.

MILL BROOK, TENN., Oct. 9, 1883.

T. F. RANDOLPH—Dear Sir: Yours of the 6th inst. to hand, desiring my opinion of the Patent Telescope Compass purchased of you June, 1882. I have been using it almost constantly since received, and find it by far the best compass I have ever used. It is conveniently arranged for transportation, works well on

level land, and is far superior to the common compass on hilly and mountain land; with it I can take sights as well up and down slopes as on a level. I can set a flag a mile distant. I can conscientiously recommend your compass to any one wishing to buy a first-class instrument.

Respectfully,  
JOHN C. ROBERTSON,  
County Surveyor of Washington Co.

JEFFERSON, IOWA, Oct. 9, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: I have one of your Patent Telescope Compasses, and for the purposes of ordinary land surveying, I know of no other instrument of the same price that I would exchange for it.

Yours, etc.  
H. E. HAMMOND.

UNION, Oct. 9, 1883.

T. F. RANDOLPH—Dear Sir: I have used the Telescope Compass that I bought of you two years ago every week since, and I find it the most perfect and convenient compass that I have ever used in an experience of over thirty years. It is very convenient in transportation.

Your Telescope Compass excels in that it is perfect in its actions on all kinds of ground—over rough or smooth, up hill or down, through the brush or forest, in the valley or out on the plain, it does equally well. It makes no difference where I wish to place the flag-rod, either at long or short range, for by moving the Telescope on its axis I can see distinctly to set the flag-rod, together with all the surroundings. I can see very clearly to set the flag rod at a distance of one mile, and I can see objects distinctly at a distance of two and one-half miles. The compass works to perfection in all its parts. In a word, for ordinary land surveying, your Telescope Compass has no peer—it is the best thing in its line. The needle works first rate in all kinds of weather—its equilibrium is perfect.

I can most cheerfully and heartily recommend it to all practical surveyors as just the instrument that they are looking for.

Yours truly,  
W. A. P. EBERHART.

CONNERSVILLE, IND. Oct. 9, 1883.

MR. T. F. RANDOLPH—Dear Sir: I have used one of your Patent Telescope Compasses about five years, and during that time I have done almost all kinds of work, and over all kinds of surfaces, and in every case I have found the instrument the one needed—it being light, quickly adjusted, and accurate. I can catch a point a mile off with as much ease as I could one forty rods away with slit sights. I have a Theodolite, but I have used it but twice in the last year, preferring your compass on account of convenience of using. For leveling ditches or grading highways it can not be beat. I have loaned mine to several surveyors and each one has expressed himself well pleased with its work.

Yours, truly,  
C. R. WILLIAMS,  
Engineer, Connerville, Ind.

GREENVILLE, OHIO, Oct. 9, 1883.

T. F. RANDOLPH—Dear Sir: The Telescope Compass, with level attachment, I purchased of you last winter has proven very satisfactory to me after thoroughly testing the same in actual practice. The adjustments of the same cause me no trouble, and I have used the instrument in laying out streets, gutters, and even on bridge masonry. I like it because it is light and convenient in brushy and timbered places. Although I own other heavier instruments, I feel as though I could not dispense with the Telescope Compass. I have used it on ditches and turnpikes, taking levels with a Whitehouse self-reading level rod, reading both ways three or four hundred feet from the instrument. I can set a transit rod easily from one-half to three-quarters of a mile from the instrument. It is much superior to the old-fashioned sight compass, and for land surveying it is more useful, in my opinion, than some of the heavier transits.

Yours, respectfully,

JOHN BEERS,  
Corporation Engineer, Greenville, Ohio.

GALLIPOLIS, OHIO, Oct. 9th, 1883.

MR. T. F. RANDOLPH—Dear Sir: Your letter was received yesterday, and in reply would say that I am well pleased with the Patent Telescope Compass which I purchased of you several years ago. I find it very convenient to transport, especially when traveling on horseback or on foot. You want to know how it works in level and hilly country, among bushes and in forests. In answering your question

I will preface it by saying that I have certainly a good opportunity to test it in all the places you have named, for our country is made up of hills and valleys and abundance of brush, and I can say that the instrument works better than I could believe it would before I had given it a thorough test. I can see a flag pole quite a distance in brush, much farther than with the old sight compass.

I can set my flag pole in open country, on a clear day, one mile. I have had opportunities to examine quite a number of instruments of different make, and can say that I have found none with better telescopes than the one I got of you. It is the wonder of everybody that looked through it.

I want to say here that the needle is, in my opinion, superior to any make that I have ever seen. I can turn angles when away from local attractions with surprising accuracy. It is all I want for land surveying.

P. S.—Use what you want of this, if worth anything.

Yours,  
W. R. WHITE, C. S., G. C., O.

LEADVILLE, COL., Oct. 9, 1883.

T. F. RANDOLPH—Sir: After a three years test of your Patent Telescope Compass in the Rocky Mountains, I find I can depend upon it at all times where a needle instrument can be used. I have made a thorough test of mine in mountain and on plain, through the dense forests and underbrush and in open country, and always with great satisfaction. I find it fills a want long felt among engineers for a light portable instrument for long trips on horseback, such as we often have in a new country. The Telescope is clear and well defined and keeps adjustment well, and, in short, I heartily recommend it for all work for which it is intended, and for which you recommend it.

I am, very respectfully yours,

HARRY R. MORRIS,  
U. S. Deputy Mineral Surveyor.

ST. PARIS, OHIO, Oct. 9, 1883.

T. F. RANDOLPH—Dear Sir: I am still using the Telescope Compass I bought of you three years ago; it works well, gives good results in hilly as well as level country; have no trouble to get through bushes and forests. For transportation it is very convenient. In favorable weather I can see to set a flag pole at a distance of one mile. There is no comparison between it and the old style compass.

Very truly yours,

LEVI HOCKMAN.

PARIS, KY., Oct. 10, 1883.

MR. T. F. RANDOLPH—Dear Sir: Being in Kentucky on a visit, I noticed your favor to W. N. Bacon. I have used your Compass in Texas, and it has been used by one of the best surveyors in Williamson County, Texas. When in careful hands it can not be excelled either in close work or at long range. It is almost, if not entirely equal to the transit. Through the brush, over hills and hollows, it does its work as well as on level ground. Have never made any test as how far the Telescope could be used, but it does all right at over a mile.

Yours truly,

OTIS T. BACON.

SHAKOPEE, MINN., Oct. 10, 1883.

T. F. RANDOLPH—My Dear Sir: The R. R. Telescope Compass which I bought of you about two years ago gives good satisfaction. For land surveying, running off roads, ditches, etc., in short, all work in which a needle-reading instrument is needed, I think this instrument has no equal. I can set the lead staff just as far ahead as the rodman can see back to me and understand the signals I give him. I find that the large and varied business which I have, makes it necessary to have several kinds of instruments, and one of those instruments (which it seems now to me to be indispensable) is your Telescope Compass. The very small space which it occupies when packed in the box makes it very easy of transportation, and a great advantage gained by having it is that I save a great deal of wear and tear and danger of accidents by exposure of high-priced instruments. I don't believe I could "keep house" at all without the Telescope Compass.

Yours truly,

H. J. CHEVRE,

C. E. and County Surveyor, Scott Co., Minn.

COLUMBUS, IND., Oct. 10, 1883.

MR. T. F. RANDOLPH—Dear Sir: The six inch needle patent Telescope Compass that I purchased of you in June last, is all that I could wish for accuracy, in every respect. So far as I have been able to discover, it is unsurpassed. It works

well in all kinds of land, broken or level; is easy and convenient of transit, and I can freely recommend it to any person needing one. The manner of boxing them up for transit is excellent, convenient, safe, and handy.

I can sight a flag staff correctly at a distance of a half mile. Wishing you success,  
I remain yours, truly

WM. A. HAYES,  
Surveyor of Bartholomew Co., Ind.,  
and City Engineer for City of Columbus, Ind.

ADAMS STA., MISS., Oct. 10, 1883.

T. F. RANDOLPH, ESQ.—Dear Sir: Your favor of the 6th inst. at hand, and contents noted. I willingly testify to the excellence of your new Telescope Compass. I have been using one of them for nearly three (3) years. For accuracy it is unsurpassed. I have never seen anything that equaled it for convenience in use or transportation. I would readily recommend it to any one wishing to buy. I can, of a clear day, set a flag-staff a half mile with all ease. For running long lines, up and down hills, through brush and undergrowth, it is far superior to the plain sights. On several occasions I ran lines through cornfields, during summer, and found the Telescope to be a great relief to my eyes; in fact, would not do without one if I had to pay double the amount they cost.

Yours, respectfully,

WM. T. COLLINS,  
Co. Surveyor of Hinds Co., Miss.

MARSHFIELD, MO., Oct. 10, 1883.

MR. T. F. RANDOLPH—Dear Sir: The Vernier 6-inch Patent Telescope Compass, which I purchased of you last February, has been thoroughly tried and tested by me in about all particulars, with the possible exception of sighting very long ranges, and I must confess that it gives me genuine satisfaction. Have but little doubts, that in an open prairie country, I could set a flag-pole accurately about as far as would be requisite for all practical purposes. In all ordinary sights I can cut the mathematical line very easily to the small fraction of an inch—a feat that was more or less imperfect with the old slit sights, notwithstanding the fact of my possession of keen eye-sight, etc. Since I have used the Telescope my eye-sight is just as vigorous at the close of a day's work as it was in the morning. I have noticed that some parties claim that a single standard for the Telescope, and the fact of taking it on and off for transportation, etc., is detrimental to the adjustment for the true line of sight; but be that as it may, I have not experienced the slightest difficulty in that respect, so far. I made a remarkable test with my new Needle and Telescope on the first of last June, which can not consistently be ascribed to mere "chance" work, or "just happened so." In surveying out a section (which is located in a hilly and brushy country, some of it very brushy—notably one of my test lines—and the second test line was moderately brushy likewise) I had occasion to run six miles on random the exterior boundaries and the two center lines. In running three of the one-half mile lines on random, I noticed that considerable local attraction existed on those lines, but did not take the requisite amount of pains so as to enable me to run them perfectly true on correction afterward. The results were that when I came to run the correction lines afterward, I missed the corners some 2, 3, and 7 links. Then, in order to show my assistants and on-lookers what I could do, and likewise what virtues were contained in "Randolph's New Vernier 6-inch Needle Patent Telescope Compass," I resolved to do my best on the two last correction lines that I had to run. After setting the Vernier agreeable to all necessary corrections to be made for diurnal variations, etc., I started from the  $\frac{1}{4}$  sec. cor. on south boundary (major portion of line very brushy) and ran on the correction line to the s. e. cor. of the sec., and missed said corner  $\frac{3}{4}$  of an inch. Without waiting longer than to change the Vernier and adjust the compass, I ran out to the  $\frac{1}{4}$  cor. on the east boundary, missing said corner  $1\frac{1}{4}$  inches. Persons that were with me were very much astonished, and, to confess the truth, I was a little surprised myself with the two results. The first job I did with my new Telescope Compass gave me a very good test of its value. I had occasion to make a  $\frac{3}{8}$  of a mile sight from one hill to another, through tree tops, wherein it was impossible for me to see the flagman, flag, or rod, with my naked eye. By looking through the telescope I very readily perceived the rod, whereby I was enabled to place it truly in line. By arranging the compass so as to accommodate my eye and cheek (the compass being level, of course), and reflecting the light of a lamp into the telescope, I can very readily observe the Polar Star at night, thereby obtaining the true meridian. It will thus be perceived that your Telescope Compass will do the same work, in this respect, that a transit or theodolite would. Two

tests that I made on the nights of September 5 and 6 last, deviated only  $\frac{3}{4}$  of an inch from one another, for a distance of 438 feet. The device for manipulating the needle meets with my approbation. As to weight and transportation, your Telescope Compass is just the thing. Summed up in brief, "it's a daisy."

Very respectfully, ALEXANDER SMITH,

County Surveyor, Webster Co., Mo.

PERSONAL: I received your letter this morning. I have given you a *truthful* and *candid* statement in my testimonial, endeavoring neither to flatter you or myself. Could have said more, but was afraid that I might make my article too windy, besides thinking that others would be apt to say what I left unsaid.

A. S.

WINDOM, MINN., Oct. 10, 1883.

T. F. RANDOLPH—Dear Sir: The Patent Telescope Compass, which I bought of you some two years ago, I have used ever since in all work which I have been called to do; such as tracing old lines; subdividing sections; laying out town sites, etc. All the work which I have had to do is in a flat prairie country—no timber or hills to speak of. I consider the compass light, durable, easy to transport and accurate. Needle sensitive and free. Can set a flag any distance that is required—say from  $\frac{1}{2}$  to 2 miles—on a clear day. The Telescope is clear and powerful for its size, but for all kinds of work think I should prefer your R. R. Vernier Telescope Compass. Yours, etc

ORRIN NASON,

Co. Surveyor.

BUFORD, O., Oct. 10, 1883.

MR. T. F. RANDOLPH—Dear Sir: Yours of the 6th inst. received. In answer I would say that the 6-inch Vernier Telescope Compass, which I bought of you just three years ago is still doing as good work as it did the day I got it, and has never cost a cent for repairs. I have never seen anything to equal it in convenience for transportation. It is decidedly superior to the old sight compass, especially in hilly country and on long, level ranges. In short, it is the best and most accurate surveyor's compass that I have ever had any acquaintance with. I am perfectly satisfied with it and would not exchange for any other compass I ever saw.

Yours, respectfully, SAM. H. STORER.

The level attachment which you put on my compass a little over a year ago is also perfectly satisfactory. I believe it is fully as accurate as the larger and more costly instruments.

Yours, etc., S. H. S.

ALAMOSA, COLO., Oct. 10, 1883.

MR. T. F. RANDOLPH—Dear Sir: I am still using your Telescope Compass. I would not part with it for any price if I could not get another, for the following reasons: 1st. It does not weigh more than one-third as much as a transit, and will do everything that a transit will. Works equally well on all kinds of land, whether plain, mountain, timber, or brush. As to the Telescope, I think it can not be beat. My work is in what is known as the San Luis Valley, in Colorado, and I have no trouble to get a back or front sight on the surrounding mountains, sometimes fifteen to twenty-five miles away. If the day is clear I can see to set a flag anywhere, up to a mile, correct. In fact, I tell my flagman to go as far as he can see me. I have been using different instruments for thirty years, and like yours the best of any I have ever used. I have been using it now about three years, and it has not cost me three dollars for repairs. I have no trouble to keep it in adjustment, and have no hesitation in recommending it to my brother craft.

Yours, truly, H. E. EASTERDAY.

THOMASVILLE, GA., Oct. 10, 1883.

Dear Sir: Your favor of 6th ult. to hand, and am glad to be able to express my tire satisfaction with the Patent Telescope Compass we bought of you some years ago. Upon a severe test by triangulation it closed within less than fifteen seconds, one side of the triangle being sixty-seven (67) chains. Since having it in my charge I have made a complete survey of the city of Thomasville, a circle of one mile radius, and the work has given general satisfaction. In open ground I can set a flag about a mile. Its light weight makes it very convenient for transportation, and in our pine forests it works like a charm. I have used various kinds of instruments, but for general work in surveying I prefer the one we bought from you to any one I ever handled. If you wish to refer any one to me I shall be glad to oblige you.

Very truly,

L. S. MACSWAIM, C. E.

Prof. Math., So. Ga. Coll.

BEAUMONT, Tex., Oct. 10, 1883.

TO T. F. RANDOLPH—Dear Sir: In answer to your inquiries, I answer that in prairie, or level untimbered land, I can do more work in one day with your Telescope Compass, than I can with a common sight compass in two. I can and do take sights from a quarter to half a mile (this is a prairie country), and I always have a head rider with flag. I have never used a better instrument than your Telescope Compass for the purpose it is made for. I have been surveyor in S. E. Texas nearly 30 years.

Yours to command,

JAMES INGALLS, SR.

LEITCHFIELD, KY., Oct. 10, 1883.

MR. T. F. RANDOLPH—Dear Sir: For all ordinary work your Telescope Compass is far superior to any other instrument I have ever used or seen. 1st, in compactness for transportation; 2d, in accuracy in setting the rod both at long and short range; and even in the bushes I can accurately set the rod where I could not see it at all if I were using the ordinary sight compass. I have abandoned the use of all the sight compasses.

Yours, truly,

JNO. E. STONE.

ENNIS, TEX., Oct. 9, 1883.

T. F. RANDOLPH—I am still using the 5-inch Vernier Telescope Compass which I bought of you in May, 1882, and would not exchange for any instrument I ever saw or used. It is far superior to the old sight compass on the prairie, or in the brush either. Can take a bearing a mile or more with ease, and as for transportation, it has no equal. All surveyors and judges of mechanism who have examined it, pronounce it a fine instrument in every respect.

Yours, truly,

E. H. ABERNATHY.

ELDORADO, KAN., Oct. 10, 1883.

MR. T. F. RANDOLPH, Esq.—Sir: Your favor of the 6th duly received. In reply will state the R. R. Compass I purchased of you I traded off in Colorado for a heavier R. R. Transit. I was transitman for a preliminary survey at the time, for the U. P. R. R. Co., and the chief engineer wanted me to make the change, and notwithstanding I got a good transit in the trade, I have somewhat regretted it since for the following reasons: First, the convenience of transportation. In this particular, the leather box carrying the instrument is by no means burdensome to carry while at work, over your shoulder, but answers a good purpose to put such day-books or any other things you have about you; but in going to and returning from work, put your compass in the box, and then you only have your tripod to carry, and everything is safe, while with other instruments you have to rack over cliffs and through brush, and the instrument is exposed to danger all the time, not to say anything about the labor of packing it on the tripod; this, in mountain work, is a very important consideration. The working of the instrument was, to me, as satisfactory as any I ever worked with. Suffice it to say, that I did very close work with the needle, and laid off the town site of Anthracite City, embracing one section of land, making all of my angles by the undergraduated cords, my work all closing up satisfactory, or so near that I was satisfied the discrepancies were from the measurement. The Telescope was very good, and as powerful as I supposed was admissible in instruments to prevent instrumental parallax of focus vision. I could see to set a small flag accurately one-half mile, and in Colorado I could plainly see the government monuments from 5 to 10 miles. Now, I have simply said, in my plain way of talking, what I know from actual experience, and, in conclusion, will say every surveyor or engineer needs an instrument adapted to the work he has to do, and any one engaged in ordinary surveying work, in rough, hilly, brushy country, I would cheerfully recommend for such work your instruments.

Yours, etc.,

L. A. HAMLIN.

I would like to have one of your Needles on my transit, and while the needle of my transit works well, still I would like to have one of yours.

L. A. H.

PARIS, KY., Oct. 11, 1881.

T. F. RANDOLPH—Dear Sir: Yours of 6th received and noted. In reply, will say I have used one of your Patent Telescope Compasses for five years. I think it far superior to the ordinary plain compass, and, for farm surveying, I greatly prefer it to a transit, as it is very accurate, and on account of its lightness and compact arrangement for transportation much more convenient. I can set a flag-staff from  $\frac{1}{2}$  to  $\frac{3}{4}$  of a mile without any difficulty. The Telescope is easily kept in adjustment.

Sometimes from a jar, when going horseback, the cross-wires get a little out, but I can adjust them in a few minutes. It is very fine for running long lines through brush and up and down hill. In fact, your Compass is all that any one could wish. It is not one time in a hundred that I have to go over a piece of work, on account of the bearings most always closing to a minute.

Very truly yours,  
R. M. KENNEY.

CHATTANOOGA, TENN., Oct. 11, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: We have, at different times, used several Compasses, and we can truthfully say that your "Patent Telescope Compass" works better in level and hilly country, among bushes, and in forest, also for long, level ranges out of the forest, than any instrument we have ever used. For convenience and transportation it excels them all. Any one who will give your Compass a fair trial, will not only willingly indorse what we have said in regard to its merits, but will proclaim that it is the best and most convenient instrument known.

Yours truly,  
J. T. WILLIAMS, Gen. Manager Soddy Coal Co.

HEDGES, KY., Oct. 11, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: Having been using your Patent Telescope Compass, with others of different manufactures (plain), for past twelve months, I feel no hesitancy in saying that it is the best instrument for rough mountain land surveying we have ever used, and quite equal to any on level or slightly undulating land. Has telescope equal to any sight desired under any ordinary conditions. It is also very desirable on account of its lightness, for convenience, and ease of transportation. Would especially recommend it to any one desiring an instrument for mountain surveys.

Very respectfully,  
WM. McCLOY, Chief Eng'r Ky. Union Railway.

ANDERSON, IND., Oct. 11, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: In reply to your inquiry as to how I like the Telescope Compass purchased from you, I very cheerfully state that it is the best and most convenient Compass I ever used. Its long range in this level country, and the ease with which the telescope can be elevated or depressed for uneven ground, make it very desirable, and the difference in the price of it and the ordinary compass should not be considered. I find it to fill the place of a heavy Y Level for ditches and turnpikes fully, and, with my twenty-two years' experience, can recommend it to all who want an instrument for land surveying and pikes and ditches.

Yours truly,  
W. G. ETHELL.

HARRISON, CLARE CO., MICH., Oct. 11, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: Your 5 in. Vernier Telescope Compass with Level attached I have now had in active use for about nine months. I think it nearly perfect for all uses, except that once in awhile I need an instrument reading to minutes; and were I to purchase again, I should get the R. R. Compass, except for its weight. If my instrument could be made to read to minutes, it would be the *ne plus ultra*. It is portable, light as a shot-gun, and about as easy got through the brush, having no buckhorn sights to catch on any thing. It is very accurate, and in running a mile, if the bearing and variation are known, one would scarcely vary a foot from striking the objective point. It has all the facilities of the transit for taking back sights, and, where there is no timber, I believe a line may be run *absolutely* straight. It works equally well on hill or plain, the axis of the telescope adjusting itself to any incline. The Telescope is very powerful, and a flag-staff can be set much further than the flag-man can see your motions. I did, on one occasion, set the flag  $\frac{3}{4}$  of a mile. The Level, also, I have put to use in surveying ditches, and find it equally accurate. In fact, the Telescope Compass with Level attached, as I said before, only needs the full vernier to make it an instrument that would do all kinds of work that an ordinary surveyor would be called upon to perform. It would take the place of open compass, level, and transit, all combined, and still be less a load than the ordinary open-sight instrument; and a light instrument, in climbing over windfalls, old slashings, through swamps, and intense thickets, is no small consideration with one in buying an instrument.

Yours, etc.,  
J. L. POTTS, County Surveyor of Harrison Post-office,  
Clare County, Michigan.



ELIZABETHTOWN, KY., Oct. 11, 1883.

MR. T. F. RANDOLPH:—I received yours of the 6th. I will say that the Telescope Compass bought of you gives entire satisfaction, and is the thing for hilly country. Can locate a flag from the deepest hollow to the top of the most perpendicular hill, and can set a flag at  $\frac{3}{4}$  of a mile; can locate the telegraph poles on the railroad  $1\frac{1}{4}$  miles from my door. Will say the Compass acts well, and is so light as to be of no inconvenience in surveying, and in traveling from one place to another, is just what a surveyor requires—light, and of small bulk.

Respectfully,  
JAMES A. KINKEAD.

JEWELL CITY, KAN., Oct. 12, 1883.

T. F. RANDOLPH—Sir: After using various kinds of instruments for surveying, for more than thirty years, I can say without hesitation, that for all ordinary surveying that can be done with needle and telescope, I have never found anything superior to your "Telescope Compass," and for convenience and easy transportation, it has no equal. The Telescope, though a small one, is amply sufficient, as I can set my flag-staff much farther than my signals can be seen with the naked eye. All the parts are simple and easily adjusted.

Yours Truly, E. T. BYRAM.

RUSSELL, RUSSELL CO., KAN., Oct. 12, 1883.

MR. T. F. RANDOLPH—Sir: Your Telescope Compass, sold to me in 1880, answers every purpose. First, I consider it far superior to any instrument I ever used. Second, the leather pouch for transporting the instrument on horse-back, in hilly districts, where you can not use a buggy, the advantage is incalculable. Third, the telescope giving the surveyor the advantage of setting a flag a mile away, and with as much accuracy as you could set with the old instrument a flag 40 rods. Fourth, convenience of marking distances with a slight movement of the thumb. Fifth, weight of the T. F. Randolph instrument. I have used W. & L. E. Gurley, and W. J. Young's, but I consider T. F. Randolph far superior to either of above instruments in every respect. I would advise surveyors who are anticipating purchasing an instrument, to be certain to examine T. F. Randolph's instrument before purchasing elsewhere. In my opinion, you will purchase of him. A surveyor can carry the whole kit belonging to T. F. Randolph's instrument without any inconvenience on horse-back. I have used my instrument for 3 years, and would not take \$20 advance on cost price, if I could not get one like it.

Yours, W. T. SHAW.

PIKEVILLE, KY., Oct. 12, 1883.

MR. T. F. RANDOLPH—Dear Sir: I find, after a thorough trial, that the Patent Telescope Compass I bought of you last spring, is a great improvement on the ordinary old style compass. I find it of great value in running lines in a hilly country, either open or among brush, and I can run any kind of a line in any kind of a country with it, with far more accuracy and speed than with a sight compass. The arrangement for safe and convenient transportation is quite complete. The Telescope is a good one; with it I can see a flag-rod at least three miles distant. I am highly pleased with it in every particular.

Very respectfully,  
O. C. BOWLES.

VAN BUREN, ARK., Oct. 12, 1883.

MR. T. F. RANDOLPH—Dear Sir: The Telescope Compass I bought of you about 3 months ago has given me satisfaction so far as I have used it. It is much superior to the old style compass. The Telescope is a great improvement, as I can take a sight as far as a flagman can see my signal. The compass is very convenient to carry, even with jack-staff on the shoulder. I put the case that contains the compass in one side of a pair of saddle-bags, and the chain and tally-pins in the other side. This is the way that I carry it going a distance on horse-back. I prefer using a jack-staff, as the county that I survey in is hilly. I would prefer a tripod on level plains and prairies where there is much wind. I would not be without one of your Telescope Compasses for twice the price that you sell them at. My compass is a 6 inch needle. I think a  $5\frac{1}{2}$  inch needle would be preferable.

D. DICKSON,  
Surveyor of Crawford County, Arkansas.

WARREN, PA., Oct. 13, 1883.

MR. T. F. RANDOLPH—Dear Sir: In reply to yours of the 6th inst. I am happy to say that after over a year's use of one of your Patent Telescopic Compasses, I am

perfectly satisfied with it. It is the most convenient compass I ever saw or used, and have used several kinds. It is very easily transported in a box; works perfectly in hilly as well as level country. A flag-pole is very much easier, and more accurately placed with it in bushes or cleared land, than with the old style of sight compasses. I can set a flag-pole at a distance of from  $\frac{1}{2}$  to  $\frac{3}{4}$  of a mile on a clear day very readily. After using many different styles of needles, I am free to say I consider yours the best, as it is very sensitive, and being so thin at the ends, is very easy to read with the naked eye. In fact, I would not exchange it for any other compass I have as yet seen.

Very Truly,

D. F. A. WHEELOCK, C. E. and Warren County Surveyor.

ANSON, JONES CO., TEX., Oct. 13, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: In reply to your communication without date, which reached me to-day, I have to say that the 5 inch needle Vernier New Telescope Compass which you shipped to me on the 26th of July last, has given perfect satisfaction so far as tried. I have made some extensive surveys with the instrument, and like it better than any instrument that I ever used for land surveying. The telescope is good. I can see to set a flag, in open country, much farther than any flagman can understand my signs. It does well in all kinds of country, both rough and level. It is far superior to the sight compass in broken and hilly country, and I will say that I would not be without it for double its value, as I consider it indispensable.

Truly Yours,

J. K. LITTLE.

GREENVILLE, MISS., Oct. 13, 1883.

T. F. RANDOLPH—Dear Sir: In reply to your favor of the 7th instant, I can say, that after another year's use of your "Patent Telescope Compass," I repeat and confirm all that I said in reference thereto in my letter to you of Sept. 12, 1882.

Yours Truly,

S. W. FERGUSON, Civil Engineer.

PAPILLION, NEB., Oct. 13, 1883.

T. F. RANDOLPH—Dear Sir: The new Telescope R. R. Vernier Compass I bought of you last spring a year ago, has been in almost constant use ever since. I have other instruments, one of which cost me twice as much, but I do all my work with this, as owing to its simplicity and portability, I am able to do one-half more work every month than I could with any other. The needle works to a charm. The telescope is strong enough for all practical purposes. I have frequently set a flag-staff two miles off. The whole instrument is easily cleaned and kept in adjustment, and I can cheerfully recommend it to all surveyors. I would not be without it for twice its cost.

J. D. PATTERSON,

County Surveyor, Sarpy Co., Neb.

POINT PLEASANT, WEST VA., Oct. 14, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: I have been using one of your  $5\frac{1}{2}$  inch needle R. R. Telescope Compasses about eighteen months, and I find it to be a great improvement over the common sight compass, for with the Telescope I can see and set a flag-rod much farther and more accurately, especially in hilly country. I am satisfied I can set a flag-rod  $\frac{3}{4}$  of a mile to a mile on a clear day. I have re-surveyed one town, and laid off quite an addition to another since using it, and find that the graduated limb is very accurate. I do not think it as convenient as the common compass with the jacob-staff, nor is it so easily transported, as it is much heavier with tripod, but it is so much more accurate, and does the work so much better, that it more than makes up for the weight and inconvenience. As I said in the start, it certainly is a great improvement over the common sight compass.

Respectfully,

F. W. SIPON,

Dep. Surveyor, Mason County, West Va.

GREENSBURG, IND., Oct. 15, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: I have used your  $5\frac{1}{2}$  inch needle R. R. Compass two years (or about that time), and for plain surveying it is certainly complete, light, handy, and very accurate. I have not tried to set flag-rod over half a mile, but at that distance can set one very well.

Yours Respectfully,

J. W. CRAIG, County Surveyor, Decatur Co., Indiana.

KOKOMO, IND., Oct. 15, 1883.

MR. T. F. RANDOLPH—Dear Sir: In reply to your communication of the 6th inst., would state I was much pleased with the Railroad Telescope Compass with

"Level Attachment," which I purchased of you in March, 1882. I used it principally in gravel road and ditch work, and I had ample facilities for testing it thoroughly, both as a Surveying and Leveling instrument. With this instrument a flag-rod can be easily located  $1\frac{1}{2}$  miles, and on one occasion I located a flag two miles without any difficulty. The country through which I worked was open and timber land, and both level and hilly, and the instrument did good work on all occasions. There is one feature in your Telescope which I regard as very important to the engineer, namely, being so constructed as to *define objects clearly and distinctly without straining the eye*. I have in use, at present, one complete Transit of an Eastern manufacture, one Y Level of Western make, and one Y Level of your make, which I bought of you last July, and I find the first two very hard on the eye, at all times, while I can use your Level all day and not be troubled, unless it is very dark and cloudy. Any one desiring a light, compact, and reliable instrument, for general work, should purchase one of your Railroad Telescope Compasses, with Level on the Telescope, and Leveling head to Tripod, by all means. I have tested your instruments with those of other reliable makers, and find them equally as good, and sometimes superior to them. I also wish to say that by the manner in which the tripod legs are attached to the head of your tripods (Tripods for fig. 8, 9, and 10), they are much easier adjusted to a level when setting up the instrument, than any tripods I have yet used.

I remain, sir, respectfully yours,  
W. B. RAY, City Eng'r.

ALEXANDRIA, IND., Oct. 15, 1883.

T. F. RANDOLPH: Yours of Oct. 7th received. In answer, the Compass is superior to any needle instrument that I have ever used in *many years' practice*. Its excellencies consist of all its parts; an excellent Needle, Telescope of fine power, single standard sustaining Telescope, the solidity and compactness of the instrument, its fine finish and portability. I have stationed the flag-staff  $1\frac{1}{4}$  miles, and can set a flag at the distance of from one to three miles, owing to the state of the atmosphere. Further, the instrument I purchased from you nearly two years ago, has an excellent leveling attachment, the line of colimation (which in other instruments that I have used, required frequent adjustment) has remained permanent, and is today, after nearly two years' use, in as nice adjustment as on the day the compass left your shop. I use the leveling tripod, and regard it as the best support that can be used. In conclusion, I feel the greatest confidence in recommending it to the profession.

Respectfully Yours,

J. W. THOMAS.

ELIZABETH CITY, N. C., Oct. 15, 1883.

T. F. RANDOLPH, Esq.—My Dear Sir: In reply to yours of the 6th inst. would say, in relation to your Patent Telescope Compass, which I have been using for nearly 2 years: for convenience in transportation it is perfect. For level country (we have no other here), the best I ever saw or have used. The Telescope is very powerful for its size; can see clearly one and one-half miles to set poles or do any angling I want to do. For simplicity and accuracy in all parts "it can't be beat," and for thick growth and bushy woodland it is far superior to any compass I have ever used or seen. I have used it on railroad, canal, and general surveying to my entire satisfaction. It is quickly adjusted, and very steady in a strong wind. I cheerfully recommend it to anybody who wants a good, serviceable instrument, and an "old reliable."

Yours, etc.,

H. T. GREENLEAF.

ALBION, BOONE CO., NEB., Oct. 19, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: I have used your Surveyor's Compass 18 months, and surveyed and subdivided 160 sections of land in that time. I have also surveyed 300 miles of road, and find that your Compass is in harmony with stellar lines and solar lines, and cheerfully say that for common surveying it is reliable and correct, and recommend it as a first-rate instrument. My experience of 50 years in surveying, with all kinds of surveying instruments, enables me to judge accurately of the merits of the instrument. My work has been over hills, ravines, and rivers, and the Compass, with Telescope, merits the award of praise.

To all whom it may concern.

THOS. N. SKINNER,

County Surveyor, Boone Co., Neb.

BEAVER, PIKE CO., OHIO, Oct. 12, 1883.

MR. T. F. RANDOLPH—Dear Sir: After using one of your Telescope Compasses something over two years, on all kinds of land, to say I am well pleased with it, is

putting it very mild. It is by far the best instrument ever made for the purpose of land surveying. I have used several different instruments, but your Patent Telescope Compass lays them all in the shade. It is as near perfection as it is possible to make a compass. My instrument is just as correct to-day as the day it left your office, and if I could not get another of the same kind, money would not buy it. It speaks for itself, and, after once using it, no surveyor will use any other instrument.

Yours Respectfully, B. F. WEST.

MOBEETIE, TEXAS, Oct. 12, 1883.

T. F. RANDOLPH, Esq.—Sir: I am more than pleased with your Telescope Compasses. I have used one in the field, almost constantly, for the past year, and the R. R. Compass I received lately, has been worked over some three hundred miles, giving entire satisfaction. Your instruments are accurate, durable, easily kept in adjustment, well adapted to general use, and far superior to any other make ever used by me. All surveyors who have seen my instruments are pleased with them, and many have procured similar ones. In our clear atmosphere, I have frequently set a flag one and one-half miles, and am convinced that in any climate, during fine weather, a flag can be set accurately at least one mile distant, when the face of the country will permit. I don't think any surveyor in this state, who has seen your Compasses, will buy any other, and I hope you will meet with the success you deserve.

Respectfully, JNO. O. B. STREET,  
Surveyor Wheeler Land District.

HILLSBORO, TEX., Oct. 15, 1883.

T. F. RANDOLPH—Dear Sir: With pleasure I write you in reference to your famous "Telescope Compass." There is no compass made in the United States that equals the Randolph Compass—your "Telescope Compass." So convenient, the whole of it folded up in a little leather case, which you can throw on your shoulder or hang to the horn of your saddle. At first it bothered me a little in timber, by drawing objects so close, but by practice I soon found it more convenient than an ordinary compass, even in timber. It often saves me much work, for with it on our open prairies I can align myself with some distant corner, and know exactly where to find the line, when with ordinary sights, perchance, I would have had to course a mile or more. I can very easily see a flag-pole one mile. I can count the windows in a house ten miles away. I often alight from my pony on some high prairie point, and while he regales himself on our mesquite grass, with my telescope I sweep the prairies for miles around, drawing the surrounding objects up to my feet. There is but one improvement that I can suggest: If you had a little bead and notch on the top of the barrel of your Telescope, like the sights on an ordinary pistol, to enable the eye to more quickly and easily locate the compass in general range with an object, or on a bearing tree near at hand, it would be more convenient. I suggest this, as I want your Compass to approximate perfection as near as possible. I was one of the first surveyors to introduce your Compass into the West. I am still using it, and am more and more pleased with it every day.

Respectfully, W. M. VAUGHAN,  
County Surveyor of Hill Co., Texas.

OFFICE OF CO. SURV., GOLCONDA, ILL., Oct. 15, 1883.

MR. T. F. RANDOLPH—Dear Sir: Having purchased one of your Patent Telescope Compasses, some four years since, and having used the same since that time, I will state that it has given entire satisfaction both to myself and others. I carry it from place to place on horseback, when business requires, with ease and safety.

This country is quite broken and largely covered with timber, which makes surveying more difficult than in an open and level country. I have frequently set the flag-staff from 20 to 40 chains distant without difficulty, when the absence of timber will permit. I am now over sixty years of age, and have been engaged in surveying for thirty years, and have used no instrument with the same ease to my eyes, except for a short time that I used a transit, and for my use I prefer the Compass I now use to the transit.

Yours, truly, J. E. Y. HANNA.

BRECKINRIDGE, TEXAS, Oct. 15, 1883.

T. F. RANDOLPH—Dear Sir: Yours of the 6th inst., to R. A. McNeilly, has been handed to me for reply, Mr. McNeilly having died about the 1st of July, 1882. The Patent Telescope Compass you sold to him I purchased of his wife, and it has been in my possession and use ever since his death. He had used it some time in

making some large surveys in the Pan Handle of Texas, and frequently expressed himself to me as being highly pleased with it; in fact, he said it was the best Compass, for all practical purposes, that he had ever used. He was a fine practical and theoretical surveyor, as well as civil engineer, and was eminently qualified to judge.

I have found the Compass to be all I could wish. I admire it for convenience of transportation, and it works better than any compass I have ever used in level and hilly country, among bushes and in forest. It works admirably in long, level ranges, especially in our level prairies and in hilly sections of country with no forests, and, in fact, it works well everywhere that I have tried it, and that consists in every character of country known to compass surveying, for I have used it constantly for over eighteen months, and I can not see how it could be improved. I find it especially convenient in making "long runs," for it saves time, as I can see a *flag-rod* much further than the flagman can observe my motions. I consider the Compass more than you represent, and I now use it upon all occasions in preference to any other.

Yours, respectfully,  
W. M. McCONNELL,  
Co. Sur., Stephens Co., Texas.

LAMPASAS, TEXAS, Oct. 15, 1883.

T. F. RANDOLPH—Sir: Your letter at hand; in reply will state the Telescope Compass bought by me, from you, is all that is was represented to be. I am fifty-four years old; can see a flag-staff one-half mile. Every part works well; also convenient to carry. Sights would add greatly to the Telescope in taking bearings near the Compass. Is very convenient in hilly or mountainous country, as the Telescope can be adjusted so as to fit the ground.

Very respectfully,  
HARRISON MILLER.

HARRISON, TENN., Oct. 15, 1883.

To whom it may concern: I have used one of T. F. Randolph's Telescope Compasses for two years, and I find it to be much superior to the open sighted compass for either long or short sights. It is very accurate. It works well both in level and hilly country; for long ranges it facilitates the labors of the surveyor very much, especially in taking front and back sights. Where no obstruction intervenes, the surveyor can set his instrument on the centre line of a section, and from there he can set both his outside corners to said section without moving his instrument. The conveniency for carrying this instrument is much superior to the old one. I can freely recommend it to any surveyor who may have use for a compass. Any surveyor having once tried this instrument, they will have no further use for the plain open-sighted compass.

Respectfully yours,

JAMES LAMON,  
Ex-Surveyor of Hamilton Co., Tenn.

FOREST DALE, OHIO, Oct. 15, 1883.

MR. T. F. RANDOLPH—Dear Sir: Having bought of you one of your Patent Telescope Compasses, I find, after having used it nearly two years, that it has proved to be a perfect success, and undoubtedly surpasses all other instruments now in use. It is convenient for transportation, and works like a charm in level and hilly countries; in fact, it is a grand success on any ground. The Telescope is very strong and clear. Can easily set a flag-staff  $\frac{1}{2}$  mile distant.

Yours,  
JNO. D. HATCHER.

CLARKTON, MO., October 15, 1883.

MR. T. F. RANDOLPH—Dear Sir: Have bought one of your Patent Telescope Compasses (6 inch vernier). First, for convenience of transportation, the leather case is very convenient—no danger of hurting the compass; secondly, I am well pleased with it; compass complete, needle works well. It is broad and gives large surface. The Telescope beats all old sight compasses. If any man don't believe it, let him try the Telescope in the hills. The advantage over the sight compass is great. I have tested my compass on all sorts of ground; on the prairie, in the bushes and in the hills, for nearly two years. The more I use it the better I like it. I can see a flag one mile easy, and I am sixty-six years old. My eyes are failing very fast, and I feel proud I got the compass with the telescope attached.

Yours with respect,  
W. C. RAYBURN.

SHELBYVILLE, KY., Oct. 15, 1883.

T. F. RANDOLPH, Cincinnati, Ohio—Dear Sir: I take pleasure in stating that I am still using the six-inch vernier Telescope Compass purchased of you in April,

1882. I am disposed to criticise everything that comes under my observation, but I can find no fault with your Telescope Compass. It is much superior to the old sight compass in point of accuracy and transportation (two points not to be sneezed at). I have used my compass in all sorts of country, and find that it works well anywhere. In point of accuracy it is fully equal to a Transit for general surveying. I can set a flag 2 miles, on a clear day. Would always advise the use of a tripod with the Compass, and would advise you to make the tripods a *little lighter* than the one you sent me. A surveyor's life is hard enough anyway, without carrying extra wood on his shoulder all day.

Respectfully yours,  
C. S. HITE,  
County Surveyor and Civil Engineer.

YELLEVILLE, ARK., Oct. 15, 1883.

T. F. RANDOLPH, Cincinnati, Ohio—Dear Sir: This being an age of improvement in all respects, but, so far as my information extends, there would have been one exception had it not been for the ingenuity of one who has spent many years of his life keeping pace with the times, and finally, it seems, makes complete success of all that is required. That, I think, has been accomplished in what is called the *Telescope Compass*, manufactured by T. F. Randolph, Cincinnati, Ohio. It is convenient for transportation, accurate as can be in observations, and no objection can be made to it in hilly and mountainous country. And a prairie country is a nice place to work with, for a stake can be set  $\frac{1}{2}$  mile with it at all ease. Before I bought one of them, in 1879, and tried it, I supposed it would not be suitable for work in the brush, but I found that I could take observations as quick with it as a sight compass, and with more correctness. Mountains are no objections for working with it, for observations can be taken at any degree with it, which can not be done with the slot compass. It is durable. In fact, I can not find an objection to it, and, after using it two years, I would hardly know how to do without one like it, and, I venture to say, there is not a man that will say that he would make the exchange on any terms. And the price is within the reach of all, for it does not cost any more than the old style compass, and it is not so costly as a Transit and better adapted to work with. No man can appreciate its advantages over all other instruments without giving it a trial, and I do not hesitate in giving it a recommendation for a severe trial by all, feeling that there will be no dissatisfaction by any one that may do so.

I am, Yours, etc.,  
J. W. HARRIS,  
Ex-Co. Surveyor, Marion Co., Ark.

WYOMING, WIS., Oct. 16, 1883.

T. F. RANDOLPH—Dear Sir: The Telescope Compass bought of you last January, gives me perfect satisfaction in every particular. It is beyond comparison the best instrument I have ever seen for land surveying. Although I can not see *through* a tree or *over* a hill, I can come as near to it as I wish. My work has all been in rough, brushy country, and I often leave the axman with the chainman, and with the flagman run through the brush by peeping where the flag would be invisible to the unaided eye.

I have recommended the compass to all my surveying friends, two of whom—Robt. Wilson, the present County Surveyor of this county, and J. T. Morris, of Liberty, Neb.—have purchased instruments precisely like mine. I would not recommend any one to use a jacob-staff with it, except for hasty work where accuracy is not required. I can set a flag-staff  $1\frac{1}{4}$  inches square exact, one mile, and have seen my flag distinctly four miles. My eyes never get tired any more, and in running parallels  $\frac{1}{4}$  mile apart across a section, I can detect errors in chaining the section line.

It is easily transported and is every way a desirable instrument.

Yours truly,  
R. L. JOINER.

ST. HELENA, NAPA CO., CAL., Oct. 16, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: Yours of the 5th inst. at hand, and I cheerfully reassure you of the superiority of the Patent Telescope Compass I purchased of you some  $2\frac{1}{2}$  years since. I have had it in constant use in all sorts of places; in the mountains and in the valleys, but as to how far I could set a flag-rod with the Telescope, I have never found it at fault either in that particular, or in any other; and, as for convenience in transportation, on horseback or in any other way, I find it altogether the most convenient instrument I have ever used during an experience of more than 40 years.

Yours truly,  
J. A. HOPKINS,  
Civil Engr. and Surveyor.

CRIVITS, MARRINETT Co., Wis., Oct. 17, 1883.

T. F. RANDOLPH—Dear Sir: Yours in regard to the Telescope Compass I bought of you, is at hand. I think it is a good combined instrument. As a transit it can't be exceeded. I have used it more for subdividing sections than otherwise, and by the flagman using a telescope, can set a flag at least one mile. As a level I have not given it a thorough trial. I think it would be a decided improvement to make the arms higher, and by a little additional expense an arc of elevation and depression could then be added, which would make it a complete combined instrument. The Telescope is one of the best of its length I have ever seen. I have shown the instrument to several engineers. They think it a decided improvement.

Yours respectfully, W. W. DELANE.

ROCK PORT, MO., Oct. 17, 1883.

T. F. RANDOLPH: I have been using your 5-inch Telescope Compass for three years, and so far am satisfied that for the purpose intended it has no superior. I have made some severe tests with it, with more than expected exactness, and far better than I could have done with any ordinary "sight" compass.

I can only mention one improvement that could be made on my instrument, and that is the *spindle clamp* and slow motion tangent screw (for observation adjustment), which I see by your circular has been added (or supplied) to more recent manufacture of the compass. With the last named improvement I can freely recommend its introduction and use by all practitioners, especially county surveyors, as a very convenient, light and correct instrument.

Very truly,

S. S. HUGHES,

Co. Sur. and C. Eng.

TAYLOR, TEX., Oct. 17, 1883.

T. F. RANDOLPH—Dear Sir: Having bought one of your Telescope Compasses and used it for more than a year, I can say that I like it much better than any other I ever used. It being so convenient for transportation is a great advantage for country work, and works well in level or hilly country and better in brush and timber than the old style compass. In level or hilly country, without timber or brush, I can easily place the flag-staff as far as the bearer can distinguish the motions. Could place a man on the line three miles off, having frequently noticed objects at that distance. I consider it all that a surveyor could desire.

Respectfully,

J. B. WRIGHT.

WAUSAU, WIS., Oct. 18, 1883.

T. F. RANDOLPH—Dear Sir: I am still using one of your Patent Telescope Compasses, and it gives entire satisfaction. It is the "boss" thing in timbered lands. A flag can be easily picked out with it among the brush where it would be invisible to the naked eye.

Truly yours,

W. N. ALLEN,

Marathon Co. Surveyor.

STILLWATER, MINN., Oct. 18, 1883.

MR. T. F. RANDOLPH—Dear Sir: Your favor of the 6th inst. is at hand. In reply would state that I have used the Telescope Compass ever since purchasing it, and am very well pleased with it. It works like a charm. Can easily set a flag-pole one mile and a half. It works splendid in hilly and brushy country, and is easier handled than any I have used.

Yours respectfully,

JOHN A. CAMPBELL.

ROSETTA, BRECKINRIDGE Co., Ky., Oct. 18, 1883.

MR. T. F. RANDOLPH—Sir: I would say, in reply to your enquiry, that the Telescope Compass purchased of you April the 6th, 1881, has been in use by me ever since and I have never yet had the least cause to regret the purchase, and I would not to-day be without it for twice its cost, if thereby I would have to resort to the old-time plain sight compass. I would say that after an experience of about twenty years in surveying, during which time I have used quite a number of different makes, that I have not found one to compare with yours, for several reasons: First, it is the most compact instrument (without destroying any of its usefulness) I ever saw; second, it seems to be the nearest perfect in adjustment. I would here remark that during the time I have had it in use, nearly three years, it has never been out of adjustment in the least. Third, for work in field or forest, hill or vale, it is far superior to the old sight compass; in fact, I think it bears about the same status to the old time compass that the *Oliver Chilled Plow* does to the old *Cary*.

Yours respectfully,

J. B. BOARD,

Surveyor and C. E.

CORPUS CHRISTI, TEXAS, Oct. 18, 1883.

MR. T. F. RANDOLPH—Dear Sir: In reply to your communication to my late father, Lafayette Caldwell, I have the following to say:

The Patent Telescope Compass sent us fulfilled its mission in every respect. I used the instrument for nearly three years, and found it remarkably accurate. During this period my work included prairie, hilly and rough country, consequently I had a splendid opportunity to test its efficiency, and I cheerfully recommend it for field work when the needle is used.

Very truly,

J. C. CALDWELL,

Surveyor, Engineer, &amp;c.

LAKEPORT, CAL., Oct. 18, 1883.

MR. T. F. RANDOLPH—My Dear Sir: The Patent Telescope Compass bought of you is superior to any I ever used. For convenience in transportation I never saw its equal.

It works like a charm both in level and hilly country.

I can set a flag with perfect accuracy half a mile distant, and have taken objects a mile distant accurately.

I am so well pleased with it that I would not part with it unless I was very certain that I could procure a duplicate thereof.

Yours truly,

GEORGE TUCKER,

Co. Surveyor, Lake Co., Cal.

RED KEY, JAY CO., IND., Oct. 19, 1883.

MR. T. F. RANDOLPH: The instrument I purchased of you in '82 is the best I ever used. For a hilly country it cannot be beat and on level country it is just the thing long wanted, and for leveling it is just grand.

Yours truly,

GRANT CURRENT.

WALAKA, FLA., Oct. 19, 1883.

MR. T. F. RANDOLPH—Dear Sir: Your letter asking my opinion of your Telescope Compass to hand. In reply I will say I have been using one for four years and it is still in perfect working order. And for accurate work it far surpasses the old slit sight compass, while its neat and substantial case makes it easily carried on foot or horseback. It works equally well in level and hilly country, and a flag-rod can be readily distinguished and accurately set at a distance that you could not see the rod at all with the naked eye or through the slit sight compass, thus making finer sights on long lines and thereby insuring greater accuracy. I have easily set a flag-rod at a distance of half a mile. Have never had an opportunity to try setting one at a greater distance. And the telescope bringing everything closer, as it does, a rod is more easily seen, and is more accurately set by the cross-hairs, in brush, than with the slit sight. And 'tis a wonder that the telescope was not long ago applied to the compass, for besides the convenience, accuracy and general utility, it makes a much more handsome instrument. And I want to say for your needles, that the one I have is one of the best and most sensitive that I ever used. And I have used instruments of the best makers, both in America and England.

Yours truly,

CHAS. M. BOULDEN, B. A. Sc.

WARSAW, IND., Oct. 19, 1883.

T. F. RANDOLPH—Dear Sir: The Patent Telescope Compass which I purchased of you some time since has been in constant use and I like it splendid. I think it is the best instrument I ever saw. I can set a flag at a distance of a mile on a clear day. For convenience and transportation it cannot be surpassed. I can do three times the work I could do with the old sight compass. As to the level on my telescope, I have made some very long levels for ditches, and they prove to be very correct.

Yours respectfully,

CALEB HUGHES,

Surveyor of Kosciusko Co. for 20 years.

HUNTSVILLE, ALA., Oct. 19, 1883.

T. F. RANDOLPH—Dear Sir: I take the liberty of saying to you: The Railroad Compass I purchased of you two years ago is, for all intents and purposes, the most convenient of any instrument I ever saw. Mine has a small level attached, consequently I can practically do with it what can be done with a theodolite; yet it is as light and convenient as a common sight compass. The telescope can be put on and taken off and ready for work as soon as sights on the common compass. Then I have a double vernier to full circle, also a variation vernier. With these



attachments the civil engineer has a full outfit in a leather box, five inches deep by eight square. Can take it off his neck and be ready for work in five minutes. Can set a flag-pole a mile off—a great advantage in a hilly country—more so in timber. I have located a line four miles at one sight. With the divided circle to correct the diurnal variations, there will be no curved lines where straight lines are intended.

Yours truly,

JOHN HERZLER.

MORROW, OHIO, Oct. 19, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: I have not given it sufficient test to pronounce all its perfections and imperfections as I should desire, but enough to state the following: The more I use it the better I like it. I have seen nothing, from observation (having seen the instruments of the principal manufacturers of this country), that excels it for convenience of transportation. When I first saw it I had great doubts of the little telescope on it, fearing it would fail to perform what I wanted; but from experience I find that I can easily set a flag the distance of a mile on a clear day, which is as far as any one has general use for. This would require several observations from an ordinary compass and be much more liable to mistakes. It works equally well in level or rough country, and from its lightness of transportation is especially adapted to a hilly country. I have heard surveyors say telescopes are of no advantage in bushes and thick forests, but with this instrument, as a general thing, I can take a distance with one observation that would require several without a telescope, with a great saving of time. I find it very convenient for taking off-sets that surveyors frequently meet with along streams and inaccessible points.

Yours, etc.,

JAS. IRELAND.

EASONVILLE, ST. CLAIR CO., ALA., Oct. 20, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: The Patent Telescope Compass purchased of you some time ago, came to hand all O. K. It works perfectly satisfactorily, even better by far than you recommended in your circular. Before ordering I was a little afraid the Telescope would not work well in the woods, but my first trial of it was in a very dense thicket of undergrowth, where I could not have seen at all with a plain sight compass, without a great deal of clearing, but with my Telescope I could see to set the flag where I could not even distinguish it from the bushes except through Telescope. Another grand advantage is, in going up or down hills, I can raise or lower the telescope, which, of course, can not be done with plain sights.

I have never yet had an opportunity of testing its range fully, as my work has all been among hills. I have a few times set my flag a half mile off, and could easily see to set one mile on a clear day, if I could get that long a level. I can also see to work when it is too dark to work with plain sights. I also derive great benefit from the vernier. My work is all in dividing sections of land, and I frequently find sections where no two of the lines run parallel or at right angles. Then I find a use for my vernier. In fact, could not work accurately without it. I could go on all day enumerating its points of excellence and advantage, and then not get through, but hope the above will suffice. The greatest advantages gained by its use are in going through forests and up and down hills. I could not do without it.

Respectfully,

S. E. McCLELEN,

County Surveyor.

PALO PINTO, TEXAS, Oct. 20, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: Having purchased one of your 5-inch Needle Vernier Telescope Compasses, in the month of October, 1881, and having used it constantly since that time, I must say that it is the most completely arranged for transportation and convenience of any compass that I have ever seen or used. I have used the Compass in as thick brush and over as rough, broken country as the great state of Texas affords. Have also used it on the widest, most level and smoothest plains in Texas, and find no trouble in setting a flag-staff one mile. I would not lay the compass aside to take up any other make for more accurate field work. Hoping those in need of a good compass will try one of your make,

I remain, respectfully,

D. L. CUNNINGHAM.

CRAB ORCHARD, KY., Oct. 20, 1883.

MR. T. F. RANDOLPH—Dear Sir: I am finely pleased with the new Telescope Compass purchased of you recently; I have tried it on level, open land, and it acts well. I will commence, Monday next, to run out 10,000 acres of land, principally in the brush, and after doing this I will let you know what I think of the instru-

ment. I am perfectly satisfied it is the best instrument I ever used in land surveying, so far as tested, and I think it will stand well any reasonable test.

Very respectfully,

JAS. F. WALLIN.

CEDAR MILL, OREGON, Oct. 21, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: I have just received your letter asking me how I like the Telescope Compass I purchased of you three years ago.

In reply I will say that during three years' hard usage on a rough, mountainous country, full of deep canons, swamps, underbrush, logs, etc., the Telescope Compass, for correctness, lightness, durability and ease of transportation, excels any needle instrument with which I am acquainted.

Any one living in a comparatively level country, like the Western States, can have no just conception of the tall timber, deep canons, large logs, swamps, underbrush, etc., the surveyor has to encounter here, and an instrument that is light, correct, durable, easily manipulated and convenient for transportation, are matters of deep concern to the surveyor in this country.

All these qualities are combined in your Telescope Compass, and I take pleasure in recommending it to other surveyors. In taking long ranges on the prairie, I find the Telescope Compass all that can be claimed for it. I can set a flag with perfect accuracy at a distance of one mile on a clear day. In fact, I have seen the buttons on a man's coat thirty-five chains distant.

The instrument—after three years of usage, as above described—is still in perfect adjustment in all its parts

I am well pleased with it.

Yours, etc., J. C. HALL

HARVEYSBURG, O., Oct. 22, 1883.

T. F. RANDOLPH—Dear Sir: Having used the 6-inch Vernier Telescope Compass purchased of you last March, can cheerfully recommend it to all surveyors for general use. In an undulating country like this, it has superior advantages over the ordinary instruments. Can take a bearing on an ordinary flag one mile with ease, and, as for ease of transportation, it has no equal. I pronounce it a *first-class* instrument, and one any surveyor should be proud of.

Respectfully yours,

O. C. McCUNE, Surveyor.

EDWARDSVILLE, ALA., Oct. 22, 1883.

MR. T. F. RANDOLPH—Dear Sir: I am still using the Telescope Compass bought of you in October, 1880, and would say that for convenience in work and transportation, on level or hilly land, in open or brushy territory, it is superior to any compass I ever saw or used; and I heartily endorse all that I have said about it heretofore.

Very respectfully,

W. B. FERGUSON, Co. Sur., Cleburn Co., Ala.

VIRGINIA, ILL., Oct. 22, 1883.

T. F. RANDOLPH—Dear Sir: Having purchased one of your Patent Telescope Compasses, I have been using it for a year past, and think I have fully tested its merits as a surveying instrument. I have simply set my sight compass to one side, having no further use for it. I believe your Telescope Compass is the best instrument now in use for land surveying. With your patent sole leather case, the compass can be conveniently and safely carried about. I can not compare it with the sight compass for work over hilly ground. It simply works where the sight compass does not, for you can elevate or depress the telescope to any angle you wish. You can set a flag a distance of half a mile, and I have produced lines by sighting back to an object one mile in distance. Through bushes and forests a flag-pole can be seen a greater distance. The key for operating the different parts of the compass is a great improvement over the milled screw of other instruments, as it prevents those who are meddlesome—or inclined to be so—from interfering with the adjustments.

Taking it all in all, I am *well* pleased with my investment, and would say to all brother surveyors needing a complete surveying instrument, try one of Randolph's Patent Telescope Compasses, and my word for it, you will never regret the investment.

Respectfully yours,

J. S. LYNCH, Co. Sur., Cass Co., Ill.

GLADE HILL, VA., Oct. 22, 1883.

MR. T. F. RANDOLPH—Dear Sir: I reply to your enquiries in regard to the Telescope Compass sold me in the fall of 1880, I answer that I am still using it. Have used it constantly since January, 1881; have used but one other instrument—

a railroad compass that cost more than one hundred dollars, double what mine cost, and I can say truly that the Telescope Compass is far superior in the following particulars: It is more convenient to carry, is lighter, the needle settles much quicker, (a matter of much importance when one has a long line to run and night is about to overtake him). The needle-settler I consider a great improvement. One of the greatest improvements over the old sight compass is the telescope arrangement. You can elevate or depress to catch an object on the top of a mountain or the foot of a mountain from the top, so that you can make a long run either up or down a mountain. With the old instruments it was impossible to do this. I appreciate this as much as any point about the compass. In thick undergrowth the bushes appear so much alike that one can not tell what particular bush he has set upon, without looking along the top of the telescope. I always have a flagman in making surveys of lands covered with thick undergrowth, then I have no trouble. Can see a flag-staff where there is the least opening. I don't remember to have set upon a flag-staff more than one mile; can set it easily that distance. A flag-staff could probably be set two miles with it. This is a hilly country, with some mountains, pretty tall. I have had some beautiful views from the top of the Blue Ridge mountains. Residences 5 or 6 miles away, that can scarcely be seen with the naked eye, appear perfectly distinct when viewed through the telescope. Last year, myself and the county surveyor of Roanoke county, which joins this county, were called upon to make a large survey in the mountains, and the surveyor from Roanoke considered my compass so much superior to his (a new plain compass, 6-inch needle, of W. & L. E. Surley's make), that he did not set his at all. I run every line. The objection to his instrument was, his needle was too long setting. The way mine worked seemed to astonish him. To sum up all, I will say that your Telescope Compass is the best instrument for land surveying I have ever seen. Anyhow, I want no better, nor do I expect to use any other, so long as I survey land in this section. I am satisfied it would be a good thing in prairie country.

Yours truly, WM. H. HUTCHINSON.

SAN ANTONIO, TEX., Oct. 22, 1883.

MR. T. F. RANDOLPH—Dear Sir: Having given your Patent Telescope Compass a thorough test, I desire to say that it has given perfect satisfaction.

I have tried it in mountainous country and find it excellent for sighting up and down steep mountains, having the convenience of a transit without the extra weight.

I have used it on the prairies, and can easily set a rod  $\frac{1}{2}$  mile distant. I find it very convenient, also, in brush and timber.

In completeness, correctness, and convenience, I think your instrument is without an equal.

Very respectfully, M. M. BRIGHT,  
Surveyor and Land Agent.

EMINENCE, SHANNON Co., Mo., Oct. 23, 1883.

T. F. RANDOLPH—Dear Sir: Last March I purchased one of your Patent Telescope Compasses.

I have before this used three different makes of compasses.

I am well pleased with the compass and would not exchange it for any other compass I ever saw.

I have set a rod (1 inch) very easily at 60 chains. Our country is very rough and mountainous, as well as being covered by a heavy forest, and I have never had a chance to take a longer sight, still I am confident that I could set a flag as far again, and perhaps two miles. I have tried looking at mountains, trees and other objects, at long distances. I will give one example:

There is a mountain which is, on a straight line, 9 miles from town. On a clear day this looks like a *blue* bank of clouds on the horizon; by the aid of my telescope I could see the different trees and could distinguish the difference between the oak and pine very plainly, while the leaves were on both.

The needle is a curiosity to me. It will settle in less than half the time that any other needle I ever saw requires. It is true that the needle is of a different shape from any I have seen, but why it should settle so quickly and *always* at the right place, is the mystery.

I can cheerfully recommend your instrument to any man who is desirous of having a good one, and one with which he can work with ease to the eyes and pleasure to himself.

Yours truly, L. L. MUNSELL,  
Co. Sur., Shannon Co., Mo.

GATESVILLE, TEX., Oct. 23, 1883.

MR. T. F. RANDOLPH—Dear Sir: Yours of recent date received, in which you ask me to state my opinion of your Telescope Compass. I will simply say that I consider it the best Compass in use. I don't think I have ever seen a slit sight compass, that had been in use a month, that the sights were not somewhat battered, which you know causes a variation in taking reverse courses; while if your compass does not reverse correctly, you have only to regulate the cross-wires a little, which is easily done when once learned; and your instructions are so plain that any one can understand them. I believe this is all that I think of at present.

Yours truly,  
R. T. WILSON.

RED WING, Oct. 23, 1883.

MR. RANDOLPH—Dear Sir: I have used the Patent Telescope Compass you sold me last March. I like it very much. It works well both on hilly and level land. I can set a stake with ease one mile distant.

I have not used it enough in brush or timber to know how I would like it there.

S. A. HART, Co. Sur., Goodhue Co., Minn.

TERRELL, TEX., Oct. 23, 1883.

MR. T. F. RANDOLPH—Dear Sir: The 6-inch Vernier Telescope Compass I received from you last January, gives entire satisfaction in every respect. The telescope is far superior to sights. I can set a flag more accurately on level or hilly land, and at so much greater distance. I can see to set one further than the flagman can see my motion.

Yours very respectfully,  
W. H. H. SIMPSON.

MONROE, WIS., Oct. 24, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: I have used your Railroad Vernier Compass since May, 1881, and find it nice, compact and convenient to use, and easy of transportation, and when put up in the leather case, is as handy as a hand satchel to carry. Can set a  $\frac{3}{4}$  inch flag-staff at a mile distance (if your flagman can see you); can set a No. 8 wire measuring pin  $\frac{1}{4}$  of a mile. The glass is much clearer than those used by Messrs. Gurley in their transits, for I have compared it with several. I am much pleased with the simplicity and accuracy of the long level as attached, and would not do without it, for with little trouble can at any time ascertain the relative position of localities, and can establish grades and do all other ordinary city work. As to use in the brush, it is good, for you can always be sure of your flag, and with practice can readily catch the Poll. I am well pleased with the instrument, and do not think I could replace the instrument for the money from any other manufacturer in the States.

Yours truly,  
A. C. STUNTZ,  
County Surveyor.

KNOXVILLE, TENN, Oct. 24, 1883.

MR. T. F. RANDOLPH—Dear Sir: The "Patent Telescope Compass" purchased of you by me, gave entire satisfaction, and came up to the representations made by you in every particular. For convenience and transportation it can not be beat, and works splendidly in the hills and forests of East Tennessee.

Respectfully,  
W. A. GALBRAITH.

WOODVILLE, WILKINSON Co., MISS., Oct. 24, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: I have used your Patent Telescope Compass for the last four years and find it supplies every want of the land surveyor.

The telescope is beyond all comparison superior to the slit sights, in any kind of country. I do not think I have ever reached the limit of its magnifying power, never having had occasion to set the flag-rod quite half a mile, but it has always been equal to the occasion. The Compass is convenient to use and to carry.

Yours truly,  
JAS. B. OLIVER, Co. Sur.

WILLIAMSTOWN, W. VA., Oct. 24, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: Absence from home and pressure of business have prevented me from replying sooner to your enquiry about my R. R. Compass. I bought it in March, 1882, and have used it in level, hilly, cleared and wood land, giving me satisfaction. And I know of no better instrument for a land surveyor, though I have used other kinds. It is accurate beyond any common compass; simple, and certainly far more easily transported than any transit which would do the same work.

Yours truly,  
H. C. HENDERSON.

CHATHAM, VA., Oct. 25, 1883.

T. F. RANDOLPH: I have used one of your Telescope Compasses several years. I am more than pleased with it, as it is the most convenient and handy instrument I ever used for surveying or preliminary R. R. work. Nearly one-half the time is consumed, on preliminary surveys, in setting the transit with level screws. With this instrument, which has vernier and socket, double the amount of work can be done with an experienced hand, and I speak in bounds when I say more than twice the amount of work can be done with this instrument by an ordinary transitman—and they are generally ordinary—sent by some influential director. In surveying it is vastly superior to the old slit compass in broken or level country, as a sight can be taken twice as far and with more accuracy. With my instrument I can set a flag very accurately one-half mile, and do twice the amount of work in a day that I can with the old style compass.

Yours respectfully,  
BERKELEY WARD, Civil Engineer.

MENTOR, O., Oct. 26, 1883.

T. F. RANDOLPH, Esq.—Dear Sir: I have used your Patent Telescope Compass nearly two years. I am free to say *I like it*. Ease, accuracy and satisfaction are guaranteed. Comparing the vexation and unsatisfactory results from trying to look through the open sights of old compasses, and the comfort and real satisfaction now at each trial, I only blame myself for not getting a Patent Telescope Compass sooner.

Now, with a good light, I can see to set a flag-pole a mile distant. The vertical motion of Telescope is of great assistance in taking ranges in a hilly country.

On no consideration would I return to the use of open sight compass.

Very truly,  
H. N. MUNSON, Co. Sur., Lake Co., O.

SWEET WINE, O., Oct., 26, 1883.

MR. T. F. RANDOLPH—Dear Sir: I purchased one of your Patent Telescope Compasses and have used it on all kinds of land, up and down hills, and find it the best instrument I ever used, and especially in thickets; being easily adjusted, its compactness and power of the telescope makes it especially efficient; in short, it is without a fault.

Respectfully yours,  
C. P. AYER.

FRANKFORT, IND., Oct. 27, 1883.

MR. T. F. RANDOLPH—Dear Sir: I bought one of your Telescope Compasses, with level attached, about three years ago, and have been using it ever since for surveying land and leveling ditches, and think it the handiest and best instrument for such work that I know of. I have leveled about two hundred and fifty miles of public ditches with it and given general satisfaction. I use a "self-reading" rod of my own make, and can readily get 40 rods at one set, which I consider good enough.

Very truly yours,  
JOHN H. SCHOLL,  
Sur., Clinton Co., Ind.

P. S.—I thought the test of reading a level-rod the best I could give, as every surveyor who has a leveling head to his tripod will get a level attached to the instrument he has to use most, even if he owns a Y level. My ditch leveling brings me in ten times as much money as land surveying.

J. H. S.

BRADFORDSVILLE, KY., Oct. 28, 1883.

T. F. RANDOLPH: Yours of the — received. Would say, in regard to the Telescope Compass bought of you, that I am *very well* pleased. I have used it on all kinds of land and have engineered several turnpikes with it. Several engineers and surveyors have said that it is the *best compass* in the country.

I have used several and know it is the best I have ever had.

Respectfully,  
F. G. PHILLIPS.

LEESBURG, FLA., Oct. 29, 1883.

T. F. RANDOLPH—Dear Sir: I find the Telescope Compass, with adjustable tripod and leveling screws, combines all the qualities of the transit as used in ordinary surveying. Its lightness alone would cause me to prefer it to the old style transit. Only those who have strolled o'er hill and dale with a 36-pound transit on their shoulders, can fully appreciate this feature. This being a thickly wooded country, I have had no opportunity to test the telescope on long distances, three-quarters of a mile being the greatest distance at which I have ever set a flag-rod with it.

H. R. SMITH,  
Dep. Co. Sur., Sumter Co., Fla.

EAST TAWAS, MICH., Oct. 29, 1883.

T. F. RANDOLPH—Dear Sir: The Telescope Compass I bought of you last Spring, has given perfect satisfaction. It has been in use almost constantly since I got it. It works well in woods or plain, hills or level country. Will do more and better work in woods and rough country, than the ordinary sight compass, and is much more convenient. I find no trouble in using it in thickly wooded places, by reason of the very excellent Telescope. I can set a flag-staff at a much greater distance on rough ground, than can be done with the best open sight compass. I have never tested the power of the Telescope, but find no difficulty in setting an ordinary 2-inch flag-staff at a distance of one mile, in clear weather, and I know it will reach to a much greater distance. It also works well as a leveling instrument. My work is mostly in the timbered lands, and I use the jacob-staff more than I do the tripod. I have used several instruments of the best makes, but for accuracy, lightness and convenience, your Telescope Compass beats them all. I can cheerfully recommend it to all land surveyors as the best instrument for all kinds of work I have ever seen; or, in backwoods parlance, it works to a charm and is a perfect daisy.

Yours truly,

D. E. GUILLEY,

Sur. for Iosco Co.

LANCASTER, OHIO, October 30, 1883.

MR. RANDOLPH—Sir: Since I saw you I lost my health. At one time my physician said: "You will never be able to do any more surveying." In view of this I allowed my little Compass to be sold, but while I used it it proved to be all and more than you claimed for it. On several occasions I loaned it to an old ex-county surveyor of this county. He says it was the best instrument he ever handled. For farm surveying there never was a better Telescope made, or a compass quicker adjusted. It traversed perfect, and in all kinds of country it never failed me. I could see to set a flag five miles off, in ordinary weather. Had I it again, I would not exchange it for any compass I ever saw, and so soon as I reach it, I will have another.

Yours truly,

WALTER S. APPLGATE.

MILAN, MO., Nov. 1, 1883.

T. F. RANDOLPH—Dear Sir: I have used the Patent Telescope Compass purchased of you last February, almost constantly ever since, on level prairie, in heavy timber, thick underbrush and open hilly country, and everywhere it is far ahead of the common Compass. In thick brush, where I feared it would fail, it works best. The advantage of sighting up or down the slope of a steep hill, from bottom to top or *vice versa*, is worth the price of the instrument to any surveyor who desires to do accurate work. For laying off towns, cemeteries, etc., it can not be excelled. If a flagman does not hold his flag-staff straight, the wire in telescope detects it at once, thereby doing away with the greatest source of error in surveying. The needle is much better than on any make of instrument I have ever seen. The workmanship is first-class. The Telescope is invaluable to those who value their eyesight. I have seen distinctly the sash in the window of a house nine miles away. I could hardly survey without mine, and think it can not be too highly recommended.

Respectfully yours,

J. L. ALKIRE,

Co. Sur., Sullivan Co., Mo.

SARATOGA, CAL., Nov. 1, 1883.

T. F. RANDOLPH—Dear Sir: I regard your Telescope Compass as the most complete instrument of the kind ever manufactured. For convenience in carrying it is unexcelled, and for accuracy it is equaled only by the theodolite or transit. I have found that the Telescope Compass works well on the most hilly land, being far superior to the common compass. For work among bushes or timber, the Telescope is always superior to the "slit" sights, as with it I can set a flag with perfect accuracy at any distance from a few feet to one mile (the latter, of course, under favorable conditions, such as clear atmosphere, etc.).

I can cheerfully recommend the Telescope Compass to all who are in need of a convenient, simple and perfectly accurate instrument.

Yours respectfully,

C. P. BOLLMAN, Ex-Co. Sur.

CASEYVILLE, KY., Nov. 2, 1883.

T. F. RANDOLPH—Dear Sir: The "Telescope Compass" purchased from you, has been used exclusively for *inside work* in the mines. It has given perfect satisfaction in every particular.

Yours truly,

P. G. KELSEY,

Secy and Gen'l Manager, Ohio Valley Railroad and Mining Co.

# REFERENCES

TO A FEW LOCAL ENGINEERS, WHO HAVE  
BOUGHT THE INSTRUMENTS NAMED,  
AT VARIOUS TIMES.

A. HICKMAN, EX-CITY ENGINEER. Four *Transits*, one *Refracting Level*.

JACOB WOLFE, EX-CITY ENGINEER. Three *Transits*, and two *Levels*.

R. C. PHIPPS, EX-CITY ENGINEER and Superintendent of City Water Works. Two *Theodolites*, *Level*, *Compass* and *Transit*.

A. W. GIBBINS, EX-CITY ENGINEER, EX-SURVEYOR ENGINEER. Three *Transits*, three *Levels*.

JAMES B. BELL, EX-CITY ENGINEER, EX-SURVEYOR and Engineer of Hamilton County. *Theodolite*, and *Level*.

JUSTIN W. GILBERT, EX-COUNTY SURVEYOR and Engineer of Hamilton County. *Theodolite*, *Transit* and *Level*.

E. F. LEWIS, EX-COUNTY SURVEYOR. One *Theodolite*.

S. W. IRVIN, EX-CITY ENGINEER and Superintendent of City Water Works. *Transit*.

C. S. KINNEY, AS-SISTANT SURVEYOR of Hamilton County. *Level*.

THOMAS J. HARRIS, ENGINEER. *Level*.

J. ERNSTRAW, ENGINEER. *Level*, and *Level*.

SAMUEL J. WHITMAN, ENGINEER. *Level*, and *Level*.

GEO. A. YATES, ENGINEER. *Level*, *Level*, and *Level*.

J. S. BINGHAM, DAYTON, OHIO. Two *Transits*, and *Level*.

FRANCIS SMITH, DAYTON, OHIO. *Transit*, and *Level*, and *Theodolite*.

SAMUEL J. SMITH, DAYTON, OHIO. *Level*.

CITY of Hamilton, Ohio. Two *Transits*.

P. N. JONES, EX-ASSISTANT CITY ENG. *Theodolite* and *Level*.

WILLIAM WELLS, EX-ASSISTANT CITY ENGINEER. *Transit*.

CINCINNATI SOUTHERN RAILROAD. 2 *Theodolites*, a *Transit*, and *Level*.

S. A. HEDMAN, EX-ASSISTANT CITY ENG. *Theodolite*.

CINCINNATI GAS & COKE CO. *Theodolite* and *Level*.

CINCINNATI WATER WORKS. *Theodolite*, and *Level*.

ESTABLISHED 1853.

ILLUSTRATED PRICE LIST,

FOR

1884.

T. F. RANDOLPH,

Manufacturer, Importer and Dealer in

Surveyors' & Engineers'

**INSTRUMENTS,**

SOLE MANUFACTURER OF

*Randolph's New Patent Telescope Compass,*

*Patent Telescope Attachment for Common Compasses,*

*Patent Quick Leveling Tripod,*

*And Patent Sole Leather Boxes,*

No. 51 W. Fourth Street,

ROOM 24, GARLISLE BUILDING,

CINCINNATI, O.

WORKS RUN BY STEAM.