W. C. HUEBNER.

APPARATUS FOR LAYING OUT AND CHECKING PRINTING WORK AND FOR OTHER PURPOSES.

APPLICATION FILED JULY 9, 1914.

1,182,487.

Patented May 9, 1916.

7 SHEETS—SHEET 1.

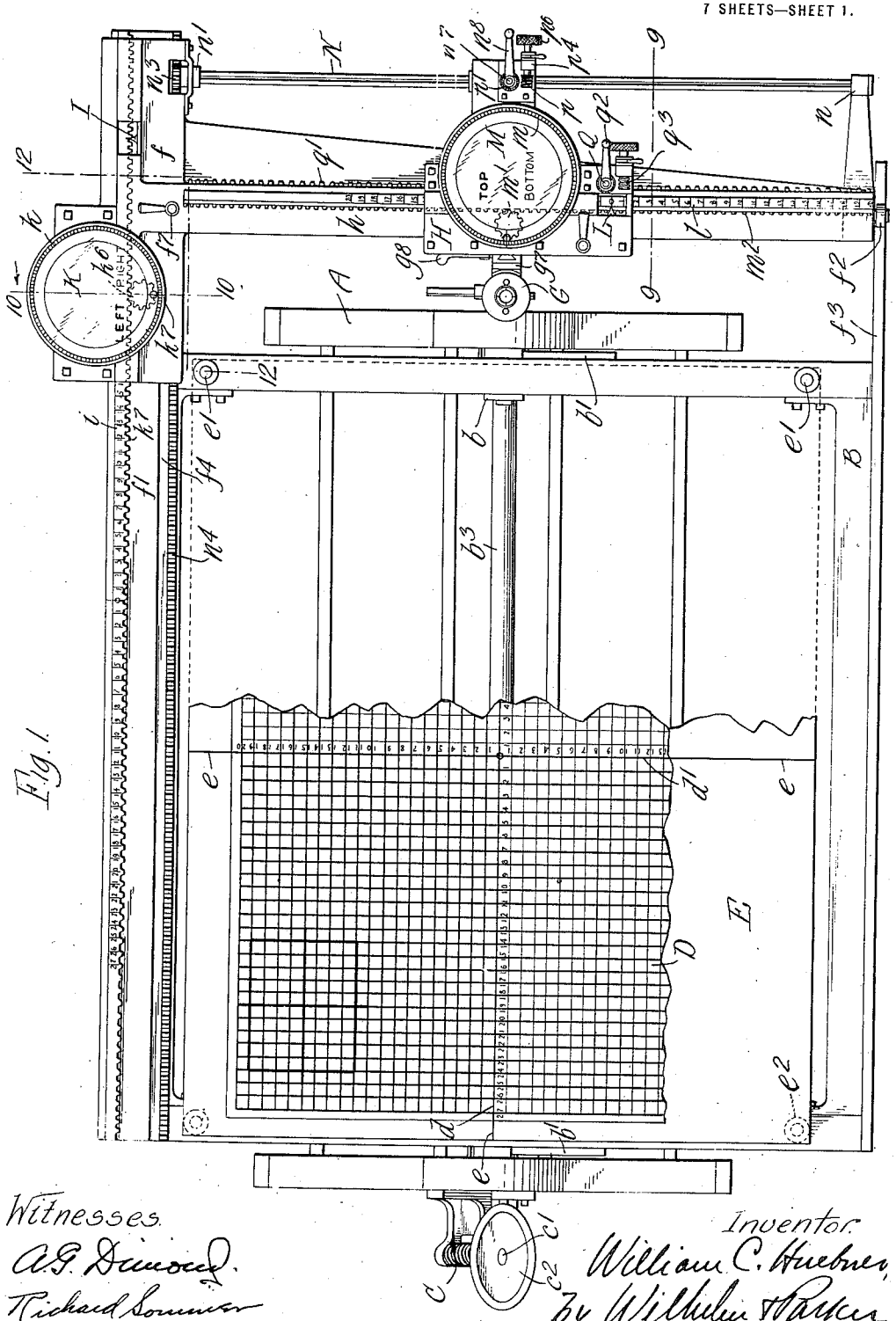


Fig. 1.

Witnesses.
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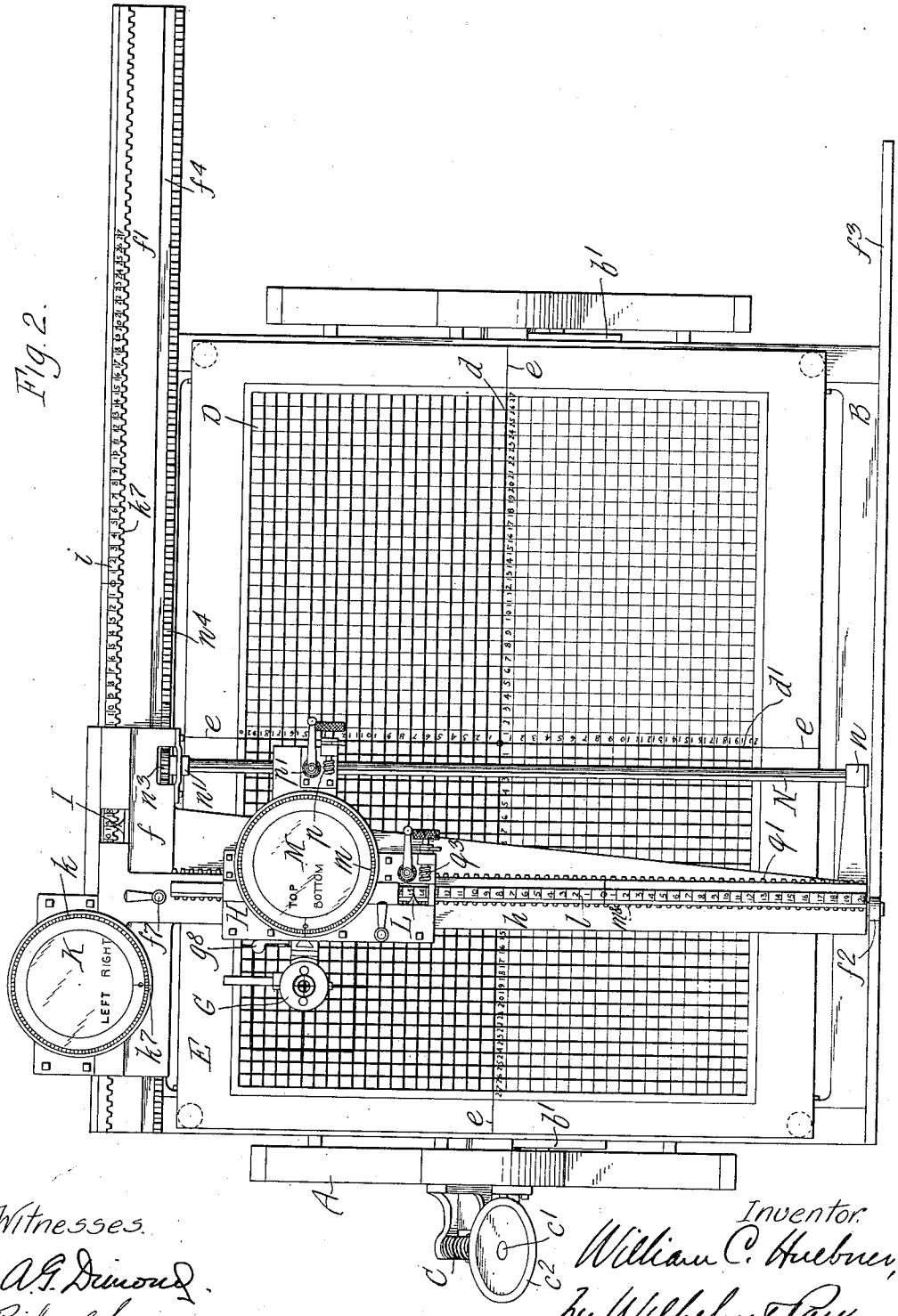
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7 SHEETS—SHEET 2.

Fig. 2.



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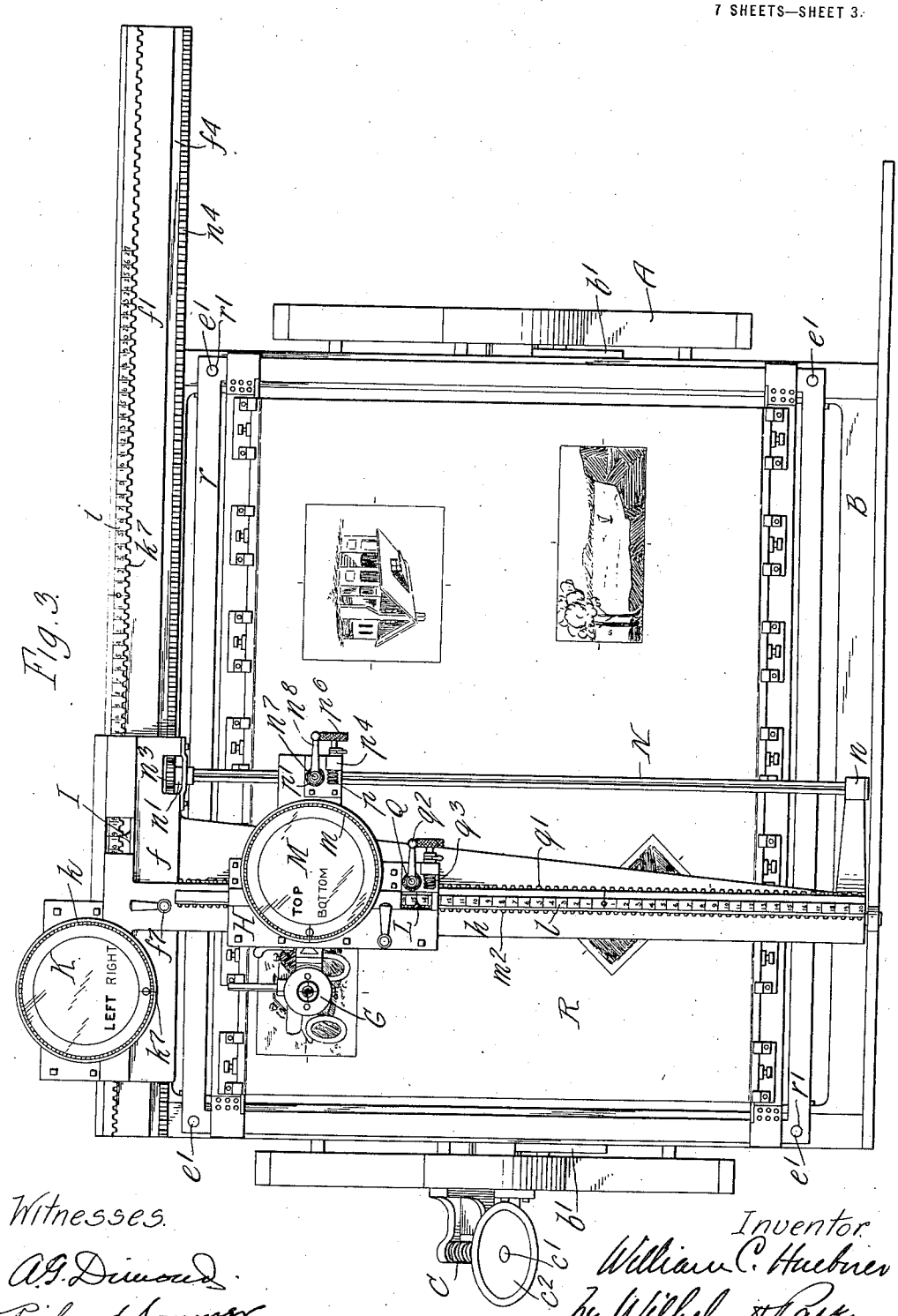
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7 SHEETS—SHEET 3.

Fig. 3.



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7 SHEETS—SHEET 4.

Fig. 4.

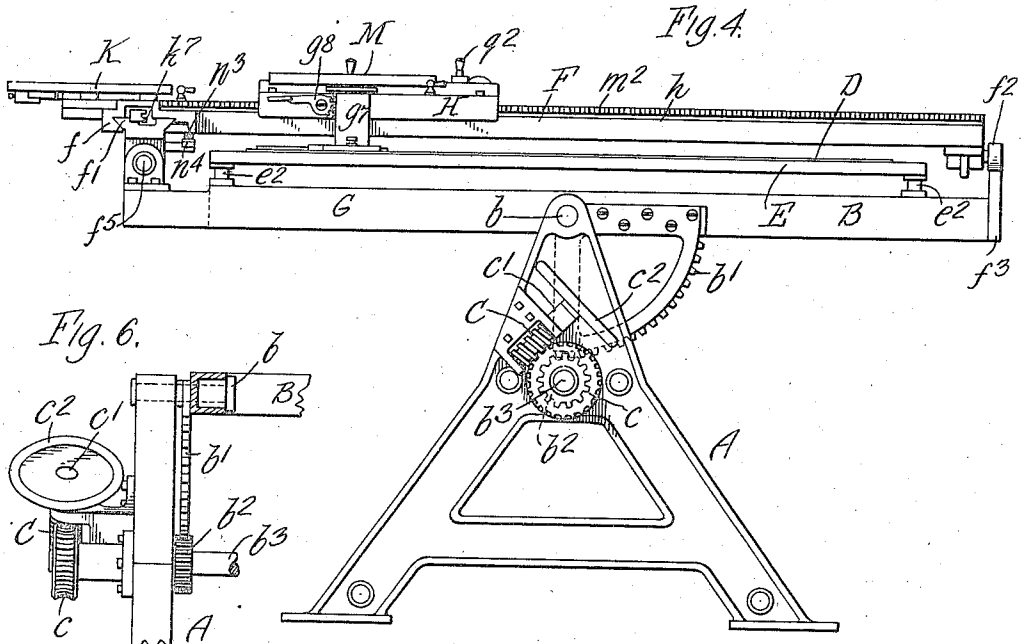
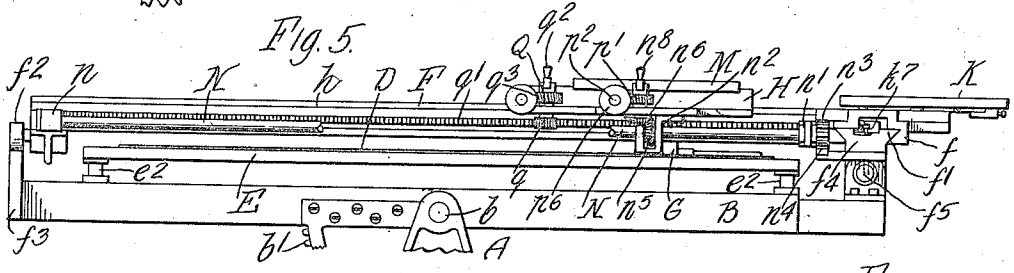


Fig. 6.

Fig. 5.



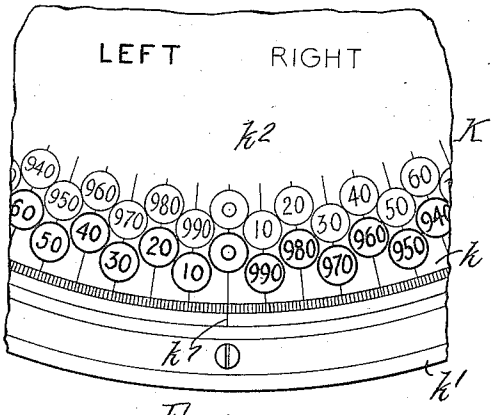
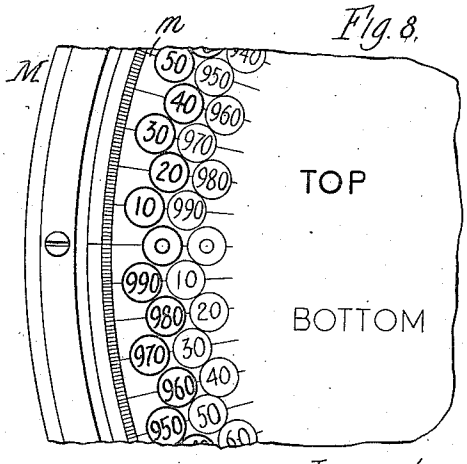


Fig. 7.

Fig. 8.



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7 SHEETS—SHEET 5.

Fig. 9

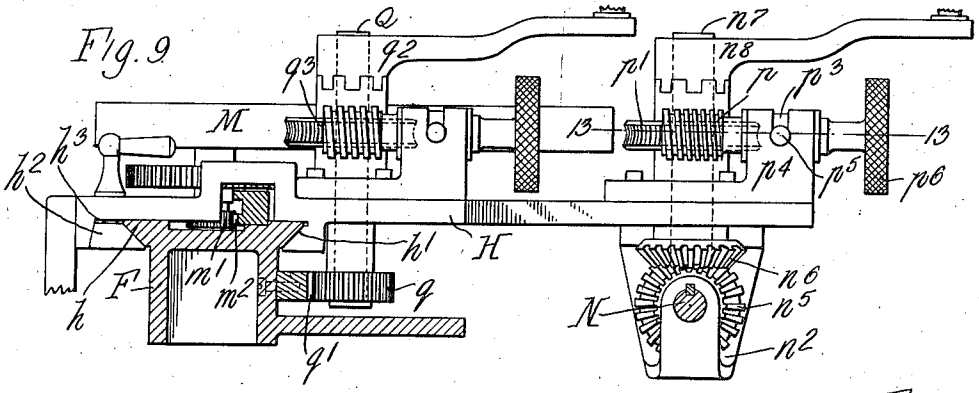


Fig. 11.

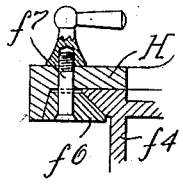


Fig. 10.

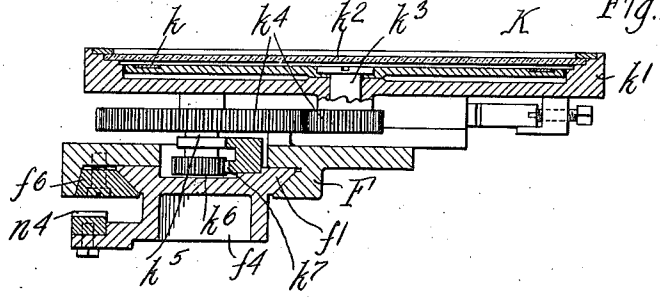


Fig. 12.

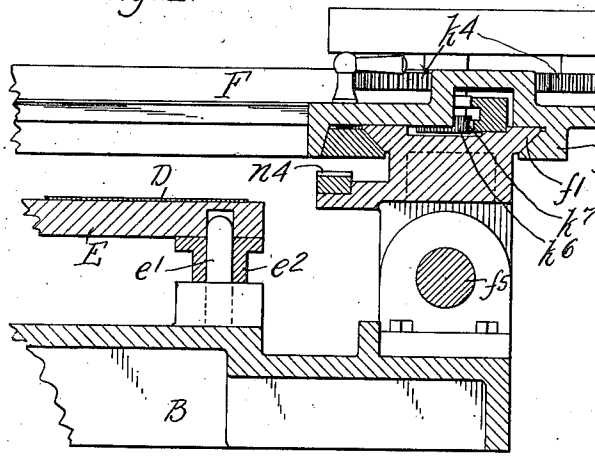


Fig. 13.

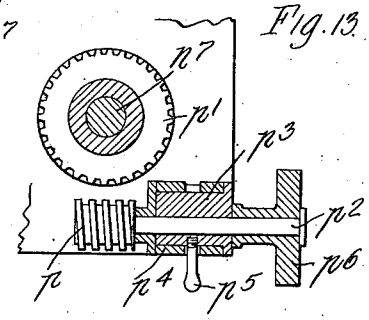
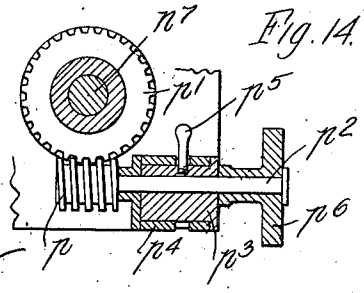


Fig. 14.



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7 SHEETS—SHEET 6.

Fig. 15.

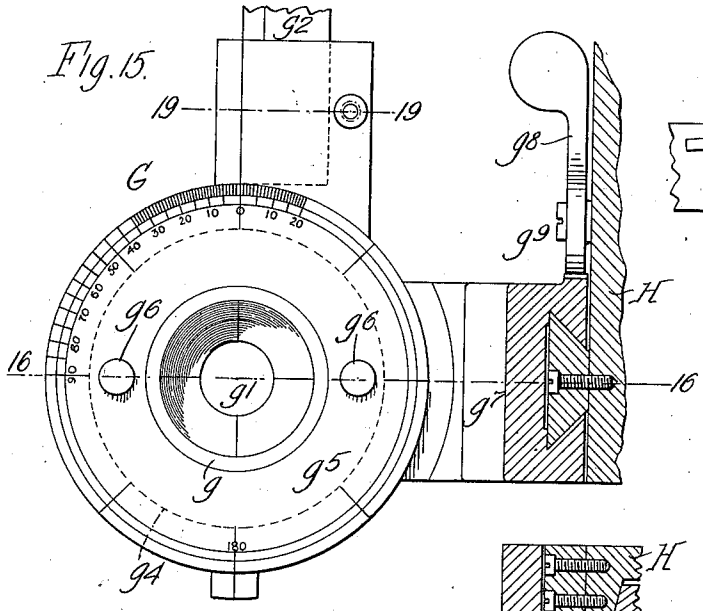


Fig. 17.

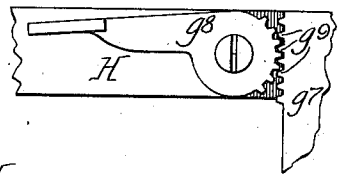


Fig. 18.

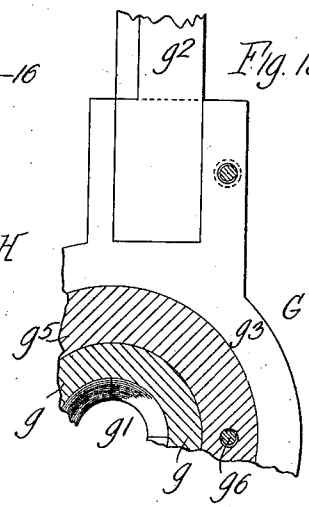
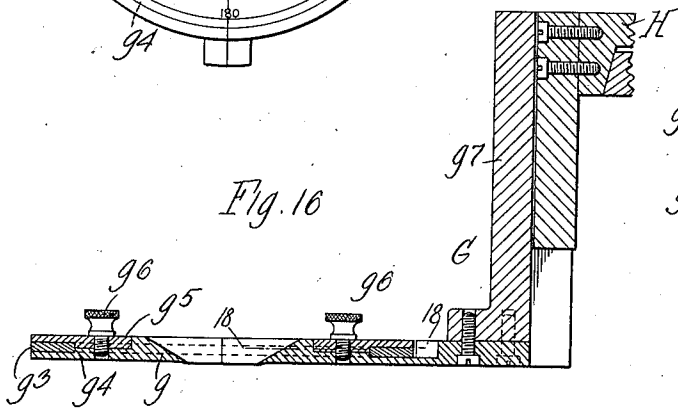


Fig. 16



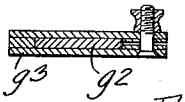


Fig. 19.

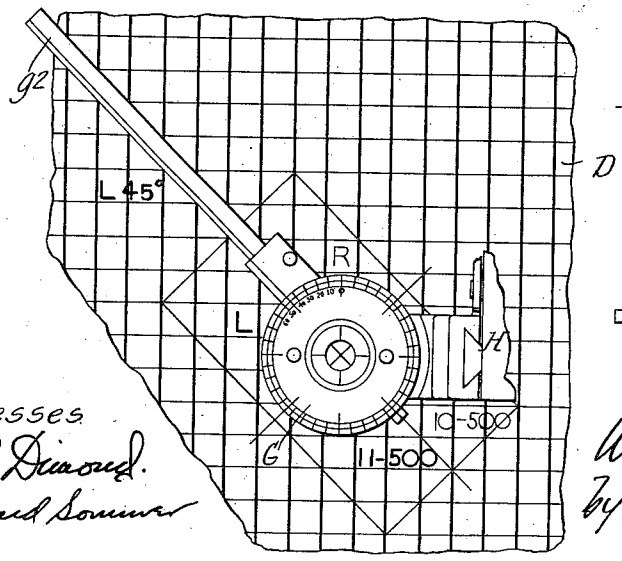
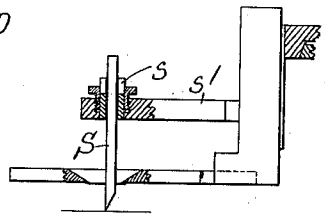


Fig. 20.

Fig. 20a.



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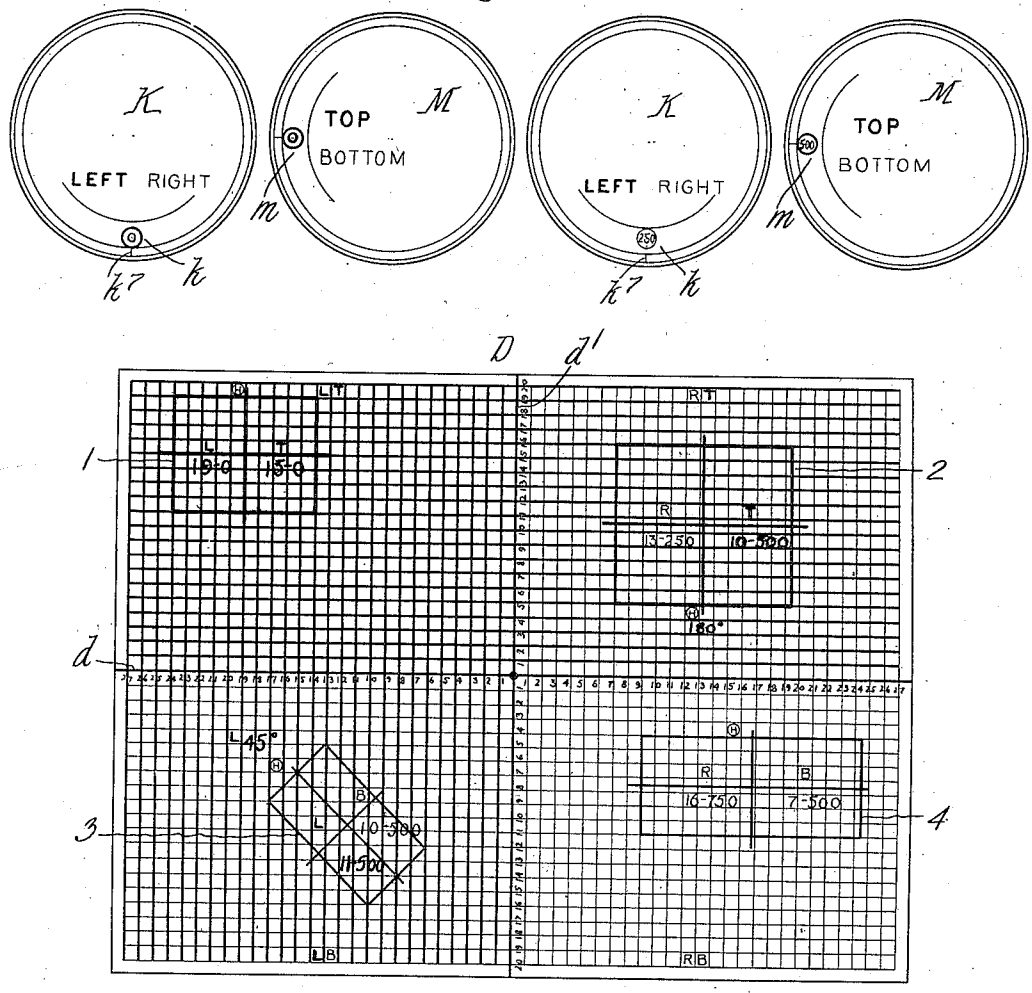
APPLICATION FILED JULY 9, 1914.

1,182,487.

Patented May 9, 1916.

7 SHEETS—SHEET 7.

Fig. 21.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR LAYING OUT AND CHECKING PRINTING-WORK AND FOR OTHER PURPOSES.

1,182,487. Specification of Letters Patent. Patented May 9, 1916.

Application filed July 9, 1914. Serial No. 849,934.

To all whom it may concern:

Be it known that I, WILLIAM C. HUEBNER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Apparatus for Laying Out and Checking Printing-Work and for other Purposes, of which the following is a specification.

This inventiotn relates more particularly to apparatus for use in printing for laying out and checking up the work, and for various other purposes.

In photographic printing apparatus of the sort disclosed for example in my copending application Serial No. 839,997, filed May 21, 1914, the transparent photographic printing plate or negative and the sensitized plate on which the prints are to be made are arranged opposite each other on holders which are relatively adjustable in a plane parallel with the sensitized surface to enable the prints to be made in any desired position or relative arrangement on the sensitized plate, provision being made to enable the adjustable part to be adjusted with great precision.

One purpose of the present invention is to provide a practical and efficient apparatus primarily intended for use in conjunction with such photographic printing apparatus whereby the operative can plot or lay out on a lay-out sheet the desired locations and relative arrangement of all of the prints to be made on a printing plate, and quickly and easily determine the precise location of the several subjects with reference to fixed lines or points on the lay-out sheet, so that by following the data thus obtained the photographic printing apparatus can be adjusted to make the prints in exactly corresponding positions on the sensitized printing plate; and whereby, after the prints have been made on the sensitized printing plate, the same can be quickly checked up to ascertain if they are in exactly the intended positions. The apparatus is, however, useful for various other purposes in connection with the art of printing. For instance, in multicolor printing the expansion or contraction of the paper, after one or more colors have been printed thereon, necessitates a slight variation in the position of the subjects on the successive printing plates to insure perfect registration of the different colors. This required difference in position of the subjects can be readily determined with precision by this apparatus. The apparatus is also desirable for measuring negatives, placing register marks accurately upon the printing plates and copies, squaring or marking margin lines, etc., on printing plates and copies.

Other objects of the invention are to provide a lay-out sheet and measurement indicating devices of novel character or construction such as to more readily indicate to the eye the location of the subjects on the sheet and reduce to the minimum the possibility of a mistake in determining and indicating the adjustments; and also to improve the apparatus in the other respects hereinafter described and set forth in the claims.

Briefly stated, the apparatus comprises a support or frame on which a holder carrying a lay-out sheet is removably secured, and a gage device which is adapted to be moved over the lay-out sheet parallel with the plane thereof in directions at right angles to each other, and is provided with indicators for determining with precision the longitudinal and lateral position of a subject preferably with reference to transverse and longitudinal median lines on the lay-out sheet. Preferably the indicators are adapted to indicate the position in inches or other units of measure and micrometer fractions thereof, and the gage also includes a protractor for determining the angular position of the subject and a marking device. When the position of each subject has been determined by means of the gage the figures representing the measurements are written on the lay-out sheet adjacent to the subject, and when the sheet is completed the operative adjusts the photographic printing apparatus in accordance with the data on the lay-out sheet. After the prints have been made on the sensitized printing plate the holder carrying the plate is placed in the lay-out apparatus, in the same position that the holder for the lay-out sheet occupied, and the gage device is manipulated to ascertain whether the prints occupy precisely the intended positions.

In the accompanying drawings, consisting

of seven sheets: Figure 1 is a plan view of a lay-out and checking apparatus embodying the invention, a portion of the lay-out sheet and the holder therefor being broken away to disclose the underlying parts of the apparatus. Fig. 2 is a similar view showing the gage device placed to indicate the position of a subject on the lay-out sheet. Fig. 3 is a similar view showing the printing plate in position in the apparatus for checking up the positions of the prints on the printing plate. Fig. 4 is an elevation of one end of the apparatus. Fig. 5 is a fragmentary elevation of the opposite end of the apparatus. Fig. 6 is a sectional elevation of the frame adjusting means. Fig. 7 is a fragmentary plan view of the micrometer indicator for determining the longitudinal measurements. Fig. 8 is a similar view of the micrometer indicator for determining the transverse or lateral measurements. Fig. 9 is a sectional elevation of the gage device, on an enlarged scale, in line 9—9, Fig. 1. Fig. 10 is a sectional elevation of the micrometer indicator in line 10—10, Fig. 1. Fig. 11 is a sectional elevation, on an enlarged scale, of one of the gage clamps. Fig. 12 is a sectional elevation of the apparatus on an enlarged scale, on line 12—12, Fig. 1. Fig. 13 is a sectional elevation of the fine adjusting gearing for the gage in line 13—13, Fig. 9. Fig. 14 is a similar view showing the fine adjusting gears in operative engagement. Fig. 15 is a plan view, partly in section, of the finder or protractor. Fig. 16 is a sectional elevation thereof, in line 16—16, Fig. 15. Fig. 17 is an elevation of the device for raising and lowering the finder or protractor. Fig. 18 is a fragmentary sectional plan view of the protractor in line 18—18, Fig. 16. Fig. 19 is a sectional elevation thereof in line 19—19, Fig. 15. Fig. 20 is a diagrammatic view illustrating the use of the protractor. Fig. 20^a is a fragmentary sectional elevation of the protractor provided with a marking device. Fig. 21 is a diagram of the lay-out sheet and the micrometer indicators showing the adjustments of the latter to indicate the positions of the subjects represented on the lay-out sheet.

The frame of the apparatus preferably comprises a stationary stand or support A of any suitable construction, and a frame B, preferably rectangular in shape, which is pivotally mounted on the stand A so that it can be secured in a horizontal, inclined or other position, as may be most convenient for the operative in using the apparatus. As shown, the frame B is provided with end trunnions b seated in bearings in the ends of the stand A, and with toothed segments b' at its ends which mesh with pinions b^2 on a horizontal shaft b^3. This shaft is suitably journaled in the stand A and is provided at one end with a worm wheel c with which meshes a worm C which is secured to an operating shaft c' which is suitably journaled on one end of the stand A and is provided with a hand wheel c^2 for turning it to adjust the frame B to the desired position. The pivotally mounted frame B is desirable because it can be readily adjusted to the most convenient position for use, but an adjustable or stationary frame or support of any other suitable kind could be employed.

D represents the lay-out sheet which is secured on a board or holder E which is adapted to be removably secured in place on the frame B in any convenient manner adapting the holder to be readily placed in a predetermined position upon and removed from the frame B. The lay-out sheet is preferably ruled as shown in Figs. 1, 2 and 21, to provide longitudinal and transverse median lines d and d' respectively, from which the measurements are made; and with longitudinal and transverse cross-section lines hereinafter more particularly described.

The holder E for the lay-out sheet shown in the drawings consists of a flat board or table on which the lay-out sheet is tacked or otherwise fastened in register with register marks e on the holder, and which is removably retained in position on the frame B by vertical studs e' at the corners of the frame which enter sockets e^2, see Figs. 1, 4 and 12, on the underside of the holder E, at the corners thereof. The holder for the lay-out sheet can thus be quickly placed in proper position on the frame by engaging the sockets thereof over the studs on the frame, and it can be easily removed.

The gage shown comprises a frame or carriage mounted to move in one direction, for instance longitudinally, on the main frame over the holder for the lay-out sheet parallel with the plane of the lay-out sheet, and a finder or protractor which is mounted to slide laterally or transversely of the lay-out sheet on the gage carriage to place it in register with any desired point on the lay-out sheet, and the gage is provided with indicators which show respectively the longitudinal and lateral adjustment of the finder or protractor. In the construction shown, the gage carriage F is of substantially T-shape and the head f thereof is provided on its underside with a dove-tailed groove which slidably embraces a longitudinal dove-tailed guide f', see Figs. 1, 5 and 12, at the rear portion of the main frame B, while the opposite end of the carriage F is supported by a roller f^2 thereon adapted to travel on a horizontal track f^3 at the front edge of the main frame. The guide f' for the carriage is preferably formed on a rail f^4 which is hinged at its ends and intermediate portion

on a longitudinal hinge rod f^5 secured on the rear portion of the main frame. By this construction the gage carriage is adapted to slide freely longitudinally over the holder for the lay-out sheet, and the hinged guide rail permits a sufficient vertical pivotal movement of the carriage to enable it to accommodate itself to any inequalities in the front guide on the main frame and thus prevent the binding of the carriage on its guides. The hinge connection also enables the gage carriage with the parts mounted thereon to be swung upwardly out of the way from its normal position over the holder for the lay-out sheet. f^6, Figs. 10 and 11, represents an adjustable gib for preventing looseness in the carriage guide, and f^7 is a screw by which the gib can be clamped against the guide f' for securing the carriage in any position to which it may be adjusted. The carriage could be constructed and slidably mounted in any other suitable way.

G represents the finder or protractor which is placed in register with the point to be located on the lay-out sheet, and which is mounted on a slide H arranged to slide transversely or laterally relative to the lay-out sheet on the gage carriage F. The finder or protractor shown, see Figs. 15–19 consists of a horizontal base plate g provided with a bevel-edged hole g' through which the point on the lay-out sheet to be located can be seen, and a straight edge or bar g^2 secured to a ring g^3 which is arranged to turn about a raised circular shoulder g^4 on the plate g concentric with the center of the hole g'. The ring is confined between the base plate g and a circular clamping plate g^5 which is secured to the plate g by thumb screws g^6. By tightening the screws the ring g^3 can be clamped to secure the straight edge in any position to which it may be swung. The beveled edge of the hole g' is provided with cross marks to enable the center of the protractor to be placed in register with the desired point on the lay-out sheet, and the clamping plate g^5 is provided with degree graduations to indicate the angle to which the straight edge is swung. The base plate g of the protractor is preferably secured to a block g^7 which is arranged to slide on an upright guide on the slide H and is adapted to be raised and lowered by a lever g^8 pivoted on the slide H and having a toothed segment meshing with rack teeth g^9 on the block g^7. The protractor can thus be raised so as not to contact with the lay-out sheet when moving the gage over the same, and it can be lowered into contact with the sheet to insure the exact registration of a desired point on the lay-out sheet with the center of the protractor.

The slide H is slidably mounted on the gage carriage F, for instance by means of a dove-tailed guide rib h on the carriage engaging in a dove-tailed groove h' in the underside of the slide H. An adjustable gib h^2 and a clamping screw h^3 are preferably provided for stationarily clamping the slide H in position when adjusted. A protractor or finder of any other suitable form and mounted in any other suitable way on the gage carriage could be employed.

I, Fig. 1, represents an index or pointer secured to or formed on the head of the gage carriage and coöperating with a graduated scale i extending along the guide rail f^4 to indicate in inches, or other units of measure, the longitudinal adjustment of the finder. This scale is preferably provided with division numbers reading in opposite directions from a common zero mark for indicating respectively measurements to the right or to the left of the transverse median line d' on the lay out sheet. A micrometer indicator K is also provided on the gage carriage for indicating the longitudinal adjustment in thousandths of an inch, or other minute fractions of the units of measure represented by the scale i. This micrometer indicator, see Figs. 1, 7 and 10, preferably consists of a graduated dial k inclosed in a circular casing k', which is suitably secured on the gage carriage and has a glass top plate k^2 through which the dial can be seen. The dial is secured to a central shaft k^3 which is suitably journaled in the casing k and is connected by gear wheels k^4 to a drive shaft k^5 provided with a pinion k^6 which meshes with a toothed rack k^7 secured to or formed on the guide rail f^4 for the carriage. When the gage carriage is moved longitudinally the pinion k^6 is revolved by the toothed rack and drives the gears k^4 which are so proportioned that the dial k is caused to turn one complete revolution during the travel of the gage carriage through a distance equal to one of the inch divisions of the scale i. The dial k is provided with small graduations each representing one one-thousandth of an inch. Preferably the indicator dial is provided with two series of numbers starting at a common zero mark and reading from 0 to 990 in opposite directions around the dial, and the two series of numbers are printed in contrasting colors, as for example, black and red, to facilitate the reading of the micrometer measurements in opposite directions. When the gage is moved longitudinally to the left from the middle of the lay-out sheet, the number on the scale i opposite the pointer I and the black number on the dial k opposite an index mark k^7 on the dial casing, indicate in inches and thousandths of an inch the movement of the finger G to the left from the transverse median line on the layout sheet. When the gage is moved to the right from the middle

of the lay-out sheet the distance is indicated by the number on the scale i opposite the index I and the red number on the dial opposite the index mark k^7.

The indicator for determining the lateral or transverse measurements comprises an index or pointer L formed on or secured to the slide H which coöperates with a graduated scale l on the gage carriage, and a micrometer indicator M having a rotary dial m which is geared to a pinion m' that meshes with a toothed rack m^2 formed on or secured to the gage carriage, see Figs. 1 and 9, so that the dial is caused to rotate when the indicator is moved laterally or transversely on the gage carriage. This micrometer indicator is preferably constructed and operates in a manner similar to the micrometer indicator K and the operator can, by observing the position of the index L and the dial m, ascertain, in inches and thousandths of an inch, the adjustment of the gage finder above or below the longitudinal median line d on the lay-out sheet.

The gage carriage can be adjusted or moved longitudinally on the main frame and the protractor moved laterally by any suitable mechanism. The following mechanism is shown for this purpose: N represents a shaft which extends parallel with the body of the gage carriage and is journaled at its ends in suitable bearing n and n' on the carriage. This shaft also extends loosely through a guide or bearing n^2 depending from the protractor slide H. The shaft is provided at its rear end with a pinion n^3 which meshes with a toothed rack n^4 formed on or secured to the guide rail for the carriage F, so that by turning the shaft the pinion is rotated and moves the gage carriage. The shaft is connected by beveled pinions n^5 n^6, Figs. 5 and 9, to an operating shaft n^7 which is journaled on the slide H. The wheel n^5 is splined or otherwise connected to the shaft N to turn therewith while being adapted to slide along the shaft with the slide H in the transverse adjustments of the latter. The operating shaft n^7 is adapted to be turned by a handle or wrench n^8 of any suitable sort applied to its upper end. The gage can be quickly adjusted longitudinally approximately to the desired position by turning the handle n^8. In order to enable a fine or accurate adjustment of the gage, a fine adjusting mechanism is provided, comprising, for instance, a worm p, which is adapted to mesh with a worm wheel p' on the operating shaft n^7 for turning this shaft. This worm p is movably mounted so that it can be moved into and out of mesh with the worm wheel, for which purpose it is secured to a shaft p^2 journaled eccentrically in a cylindrical bushing p^3 which is rotatably mounted in a bearing p^4 on the slide H. The bushing is provided with a handle p^5 extending through a slot in the bearing for turning the bushing. The worm is normally out of mesh with the worm wheel, as indicated in Figs. 1 and 13. By turning the bushing to the position shown in Fig. 14 the worm is thrown into mesh with the worm wheel. Then by turning the worm by means of the thumb wheel or handle p^6 at the outer end of the worm shaft, the operating shaft n^7 can be turned a small fraction of a revolution for effecting an accurate adjustment of the gage.

The protractor slide H is adjusted on the gage carriage by a vertical shaft Q which is suitably journaled on the slide, and is provided at its lower end with a pinion q which meshes with a toothed rack q' formed on or secured to the gage carriage. The adjusting shaft is provided at its upper end with a handle or wrench q^2 for turning it, and a fine adjusting worm gearing q^3, similar to that above described, is also preferably provided for turning the shaft Q a portion of a revolution to effect a fine adjustment of the protractor slide on the gage carriage.

In adjusting the gage the finder is moved longitudinally and transversely approximately to the desired point by turning the operating shafts n^7 and Q. The fine adjusting worms are then moved into mesh with their coöperating worm wheels and the finder adjusted into accurate register with the point to be located. The described mechanisms for adjusting the gage are desirable as they enable a quick and yet a very accurate adjustment. The invention is not, however, restricted to adjusting mechanisms of this construction.

The operation of the apparatus is as follows: The holder for the lay-out sheet being placed in the apparatus with the lay-out sheet in position thereon, the space for each subject is marked on the lay-out sheet and cross diametrical lines drawn to show the center of the subject, as shown, for example, in the upper left hand corner of the sheet in Figs. 1 and 2. The gage is then adjusted as explained until the center of the hole in the protractor or finder registers exactly with the center point of the subject, and the distances of this point longitudinally and laterally from the transverse and longitudinal median lines d' and d of the sheet are written in the space occupied by the subject. For example, the designation "L 19—0, T 15—0" on the subject 1, in the upper left hand quadrant of the sheet, in Fig. 21, indicates that the center point thereof is 19 inches to the left (L) of the median line d' and 15 inches above or toward the top (T) of the sheet from the longitudinal median line d. The designation "R 13—250, T 10—500," on the subject 2, in the upper right hand quadrant of the sheet,

indicates that it is 13 and 250 thousandths inches to the right (R) of and 10 and 500 thousandths inches above the center of the sheet. The designations on the other subjects 3 and 4 at the bottom of the sheet similarly indicate their respective positions below and to the left or to the right of the center of the sheet. The characters (H) in Fig. 21 show the location of the heads or tops of the subjects. The subject 3 occupies an angular position and the designation "L 45°" indicates the angularity of 45° to the left of the vertical as determined by the protractor. When the lay-out sheet has been thus furnished with the data for all of the subjects as shown in Fig. 21, the sheet is removed from the apparatus and the photographic printing apparatus is adjusted in accordance with this data so as to make the prints in corresponding locations and positions on the sensitized printing plate.

When the prints have been made on the printing plate, which is shown at R in Fig. 3, the holder r carrying the printing plate is placed on the main frame B and the positions of the prints checked up by measuring with the gage in the same manner as in determining the data for the lay-out sheet. The printing plate holder r has holes r' in its corners to receive the studs e' on the frame B so that this holder is retained in exactly the same position on the main frame B as the holder for the lay-out sheet.

The lay-out sheet is preferably ruled with cross lines in a novel manner, that is, the longitudinal lines on the upper half of the sheet and the transverse lines on the left-hand half of the sheet are in one color, for instance black, while the longitudinal lines on the lower half of the sheet and the transverse lines on the right-hand half of the sheet are in a contrasting color, as red. The appearance of each quadrant of the sheet is therefore in contrast to the others and the operative perceives at once by the appearance of the sheet in which quadrant a subject is located. These lines are spaced one inch apart so that the longitudinal distances to the left of the center and the transverse distances above the center of the sheet are shown in inches by black lines, while the longitudinal distances to the right of the center and the transverse distances below the center are shown by red lines. Similarly, in writing the measurements on the sheet the longitudinal measurements to the left and the transverse measurements above the center are written on the sheet in black, while the longitudinal measurements to the right and the transverse measurements below the center are written in red. The contrasting colors are indicated in the drawings by heavy and light lines. The different combinations of colors in the different quadrants of the sheet thus apprise the operative at once of the portion of the sheet in which the subject is located and greatly minimize the chances for making mistakes in placing the prints on the sensitized printing plate. This results in the saving of a great deal of time with a consequent reduction in the cost of production of the printing plates.

As before mentioned, the two series of numbers on the dial of each of the micrometers K and M are printed in the same contrasting colors as the lines on the lay-out sheet, and this further reduces the possibility of mistake, since the longitudinal measurements to the left and to the right, made with the micrometer K, are shown respectively in black and red, while the transverse measurements toward the top and toward the bottom made with the other micrometer M are shown respectively in black and red. The positions of the micrometer dials showing the readings for each subject on the lay-out sheet are indicated in the diagram Fig. 21 by the two micrometers adjacent to each subject.

S, Fig. 20[a], represents a marking device mounted on the gage in position to extend centrally through the hole g' in the protractor for making marks or lines on the underlying sheet or plate. This device may consist of a pen, scriber, or other tool, depending upon the character of the mark or line to be made and of the surface on which it is to be made, and it can be adjustably mounted in any suitable way, as, for instance, in a clamping sleeve s on an arm or bracket s' secured to the supporting block of the protractor. By adjusting the marking device to engage the surface of the underlying sheet or plate at the center of the hole g' in the protractor and moving the latter by its adjusting means in the manner before explained, straight lines can be ruled on the surface at right angles to each other at precisely the desired points. The marking device is thus useful for marking register lines on the printing plates and sheets, and for squaring up or ruling margin lines on the plates or copies. The marking device constitutes in effect a pointer and could also be used as a finder instead of the protractor with the bevel-edged holes.

I claim as my invention:

1. In an apparatus of the character described, the combination of a holder for a plate or sheet, a main frame on which said holder is retained in predetermined position, a finder which is movable over said holder and the plate or sheet thereon both longitudinally and laterally with reference to the plate or sheet to place the finder in register with a desired point on the sheet, said finder being constructed to leave the surface of the plate or sheet exposed for

placing the finder in register with said point, and means for indicating the longitudinal and lateral adjustments of said finder with reference to fixed points on said plate or sheet.

2. In an apparatus of the character described, the combination of a holder for a plate or sheet, a main frame on which said holder is retained in predetermined position, a finder which is movable over said holder and the plate or sheet thereon both longitudinally and laterally with reference to the plate or sheet to place the finder in register with a desired point on the plate or sheet, said finder being constructed to leave the surface of the plate or sheet exposed for placing the finder in register with said point, and separate means for determining the longitudinal and lateral adjustments of said finder each comprising units and micrometer indicating devices.

3. In an apparatus of the character described, the combination of a holder for a plate or sheet, a main frame on which said holder is retained in predetermined position, a gage carriage which is movable in one direction over and relative to said plate or sheet, a finder which is movable on said carriage over said plate or sheet in a direction at right angles to the direction of movement of said carriage, said finder being constructed to leave the surface of the plate or sheet exposed for placing the finder in register with a desired point on the surface, units and micrometer indicating means for determining the movement of said carriage, and units and micrometer indicating means for determining the movement of said finder on said carriage.

4. In an apparatus of the character described, the combination of a holder for a flat object, a main frame on which said holder is retained in predetermined position, a protractor which is movable parallel with the plane of said object both longitudinally and laterally relative to the object to place the same in register with a point on the object and which is also adjustable angularly to indicate the angularity of a subject on the surface of said object, and means for indicating the longitudinal and lateral adjustments of said protractor with reference to fixed points on said object.

5. In an apparatus of the character described, the combination of a holder for a flat object, a gage which is movable longitudinally with reference to said object and has a finder which is movable with said gage and also laterally over said object with reference thereto, said finder being constructed to leave the surface of the object exposed for placing the finder in register with a desired point on the surface, and means for indicating the longitudinal and lateral adjustments of said finder in opposite directions from predetermined points, said indicating means including a micrometer indicator which is movable in opposite directions.

6. In an apparatus of the character described, the combination of a holder for a flat object, a gage which is movable longitudinally with reference to said object and has a finder which is movable laterally also with reference to said object, means for indicating in units of measure the longitudinal and lateral adjustments of said finder in opposite directions from predetermined points, a micrometer indicator which is rotatable in opposite directions for indicating longitudinal adjustments of said finder in opposite directions, and a micrometer indicator which is rotatable in opposite directions for indicating lateral adjustments of said finder in opposite directions.

7. In an apparatus of the character described, the combination of a holder for a lay-out sheet, a gage which is movable longitudinally with reference to said sheet and has a finder which is movable laterally also with reference to said sheet, and longitudinal and lateral adjustment indicating means for said finder including a micrometer indicator which is rotated in opposite directions by opposite movements of said finder and is provided with measurement indicators which read in opposite directions.

8. In an apparatus of the character described, the combination of a lay-out sheet provided with longitudinal and lateral median lines, a holder for said sheet, a gage which is movable longitudinally with reference to said sheet and has a finder which is movable laterally also with reference to said sheet, and means for indicating the longitudinal and lateral adjustments of said finder in opposite directions from said lateral and longitudinal median lines respectively.

9. In an apparatus of the character described, the combination of a lay-out sheet provided with longitudinal and lateral median lines, a holder for said sheet, a gage which is movable longitudinally with reference to said sheet and has a finder which is movable laterally also with reference to said sheet, and means for indicating the longitudinal and lateral adjustments of said finder in opposite directions from said lateral and longitudinal median lines respectively, said indicating means including a micrometer indicator which is rotatable in opposite directions and has measurement indications which read in opposite directions.

10. In an apparatus of the character described, the combination of a holder for a flat object, a main frame on which said holder is retained in predetermined position, a finder which is movable over said holder both longitudinally and laterally

with reference to the object to place the same in register with a desired point on the object, means for indicating the longitudinal and lateral adjustments of said finder, and independently operable coarse and fine adjusting means for said finder.

11. In an apparatus of the character described, the combination of a holder for a plate or sheet, a gage which is movable longitudinally with reference to said sheet and has a finder which is movable laterally also with reference to said sheet, independently operable coarse and fine adjusting means for moving said gage longitudinally, independently operable coarse and fine adjusting means for moving said finder laterally, and means for indicating the longitudinal and lateral adjustments of said finder.

12. In an apparatus of the character described, the combination of a holder for a plate or sheet, a main frame on which said holder is retained in predetermined position, a finder which is movable over the plane of said sheet parallel therewith both longitudinally and laterally relative to the sheet, said finder being constructed to leave the surface of the plate or sheet exposed for placing the finder in register with a desired point on the surface, means for moving said finder toward and from the sheet, and means for indicating the longitudinal and lateral adjustments of said finder.

13. In an apparatus of the character described, the combination of a holder for a lay-out sheet, a main frame on which said holder is retained in predetermined position, a gage carriage which is movable on said main frame longitudinally with reference to said lay-out sheet, a finder which is movable on said carriage laterally with reference to said lay-out sheet, a longitudinal adjustment indicator, a lateral adjustment indicator, drive gearing for said longitudinal indicator including a toothed rack on said main frame, and drive gearing for said lateral indicator including a toothed rack on said gage carriage.

14. In an apparatus of the character described, the combination of a holder for a lay-out sheet, a gage which is movable in different directions over said holder, and an adjustment indicator for said gage which is movable in different directions and is provided with different sets of measurement indications which are of contrasting appearance and read in different directions.

15. In an apparatus of the character described, the combination of a holder for a lay-out sheet, a gage which is movable in opposite directions over said holder, and an adjustment indicator for said gage which is rotatable in opposite directions and is provided with different sets of measurement indications which are of contrasting appearance and read in opposite directions.

16. In an apparatus of the character described, the combination of a lay-out sheet provided with lines of contrasting appearance on different portions thereof, and a measurement indicator which coöperates with said lay-out sheet and is movable in different directions and is provided with different sets of measurement indications which are of contrasting appearance and read in different directions.

17. In an apparatus of the character described, a lay-out sheet provided with intersecting cross-section lines of contrasting appearance which make different portions of the sheet of contrasting appearance.

18. In an apparatus of the character described, a lay-out sheet provided with cross-section lines, the longitudinal lines on the upper half of the sheet and the transverse lines on the left-hand half of the sheet contrasting in appearance with the longitudinal and transverse lines on the remaining portions of the sheet.

19. In an apparatus of the character described, the combination of a holder for a plate or sheet, a gage which is movable parallel with the plane of said holder in directions at an angle to each other, said gage being constructed to leave the surface of the plate or sheet exposed for placing a part of the gage in register with a desired point on the surface, guiding means for the gage, adjustment indicators for determining the different adjustments of said gage, and a marking device movable with said gage for ruling marks on said plate or sheet.

Witness my hand this 6th day of July, 1914.

WILLIAM C. HUEBNER.

Witnesses:
C. W. PARKER,
A. L. MCGEE.