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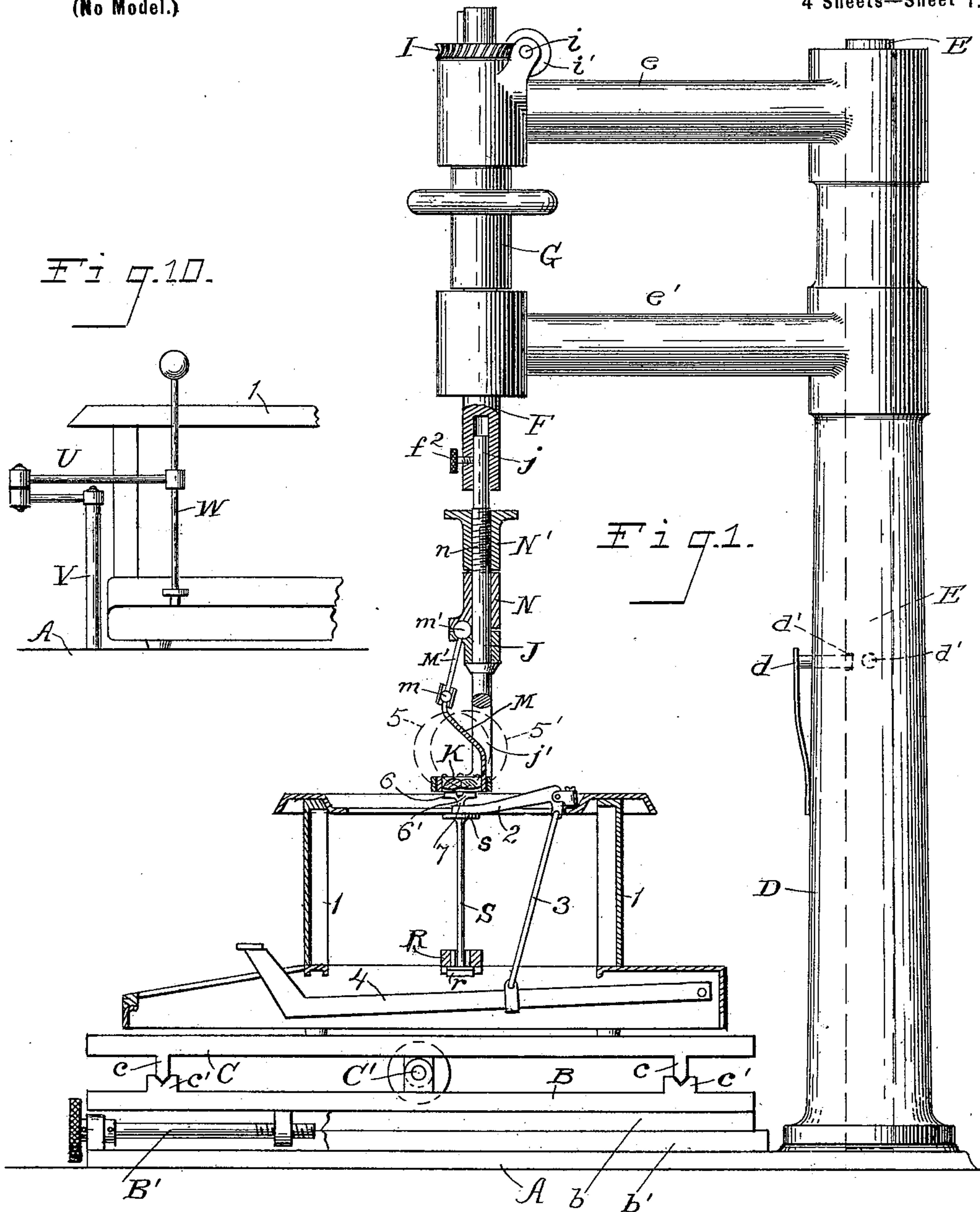
Patented Aug. 15, 1899.

J. V. HULSE.
ALINING AND LEVELING DEVICE AND METHOD.

(Application filed Jan. 24, 1899.)

(No Model.)

4 Sheets—Sheet 1.



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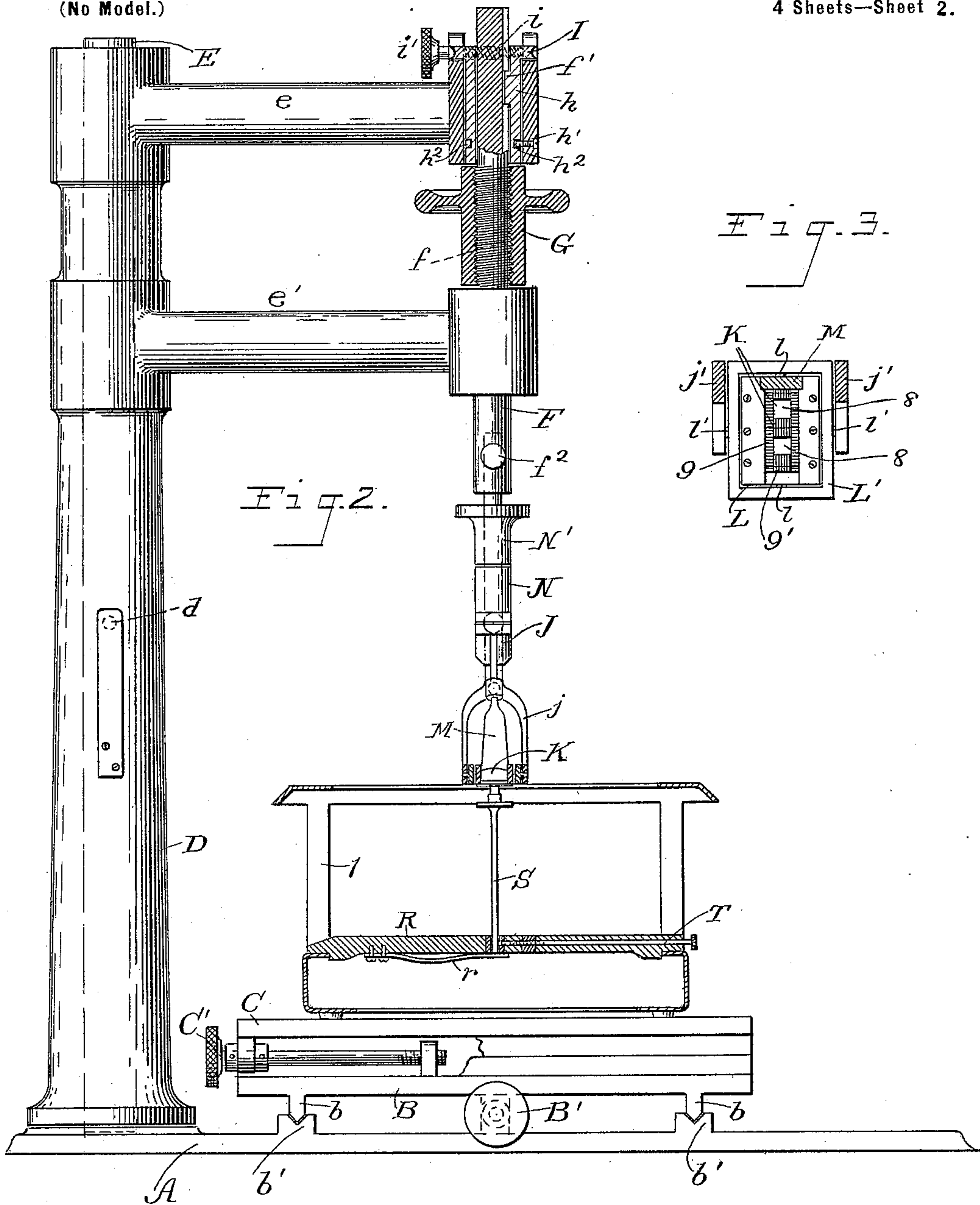
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4 Sheets—Sheet 2.



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Fig. 4.

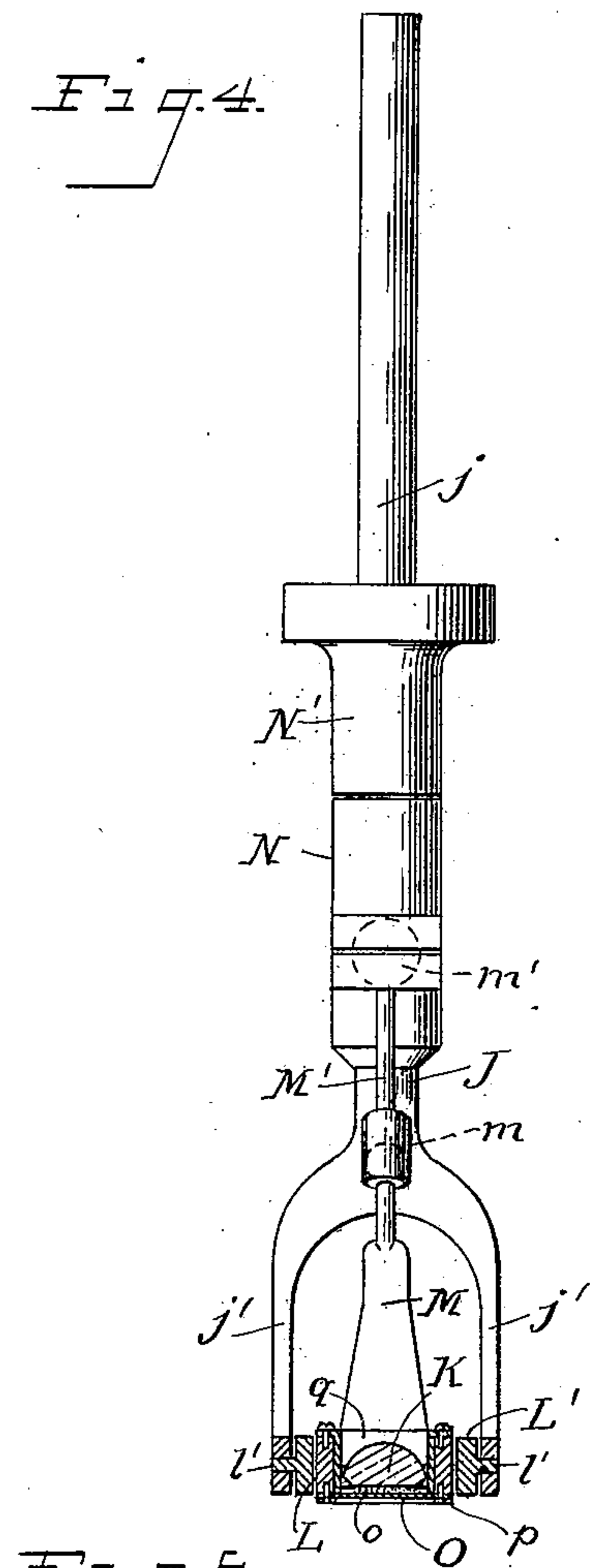


Fig. 6.

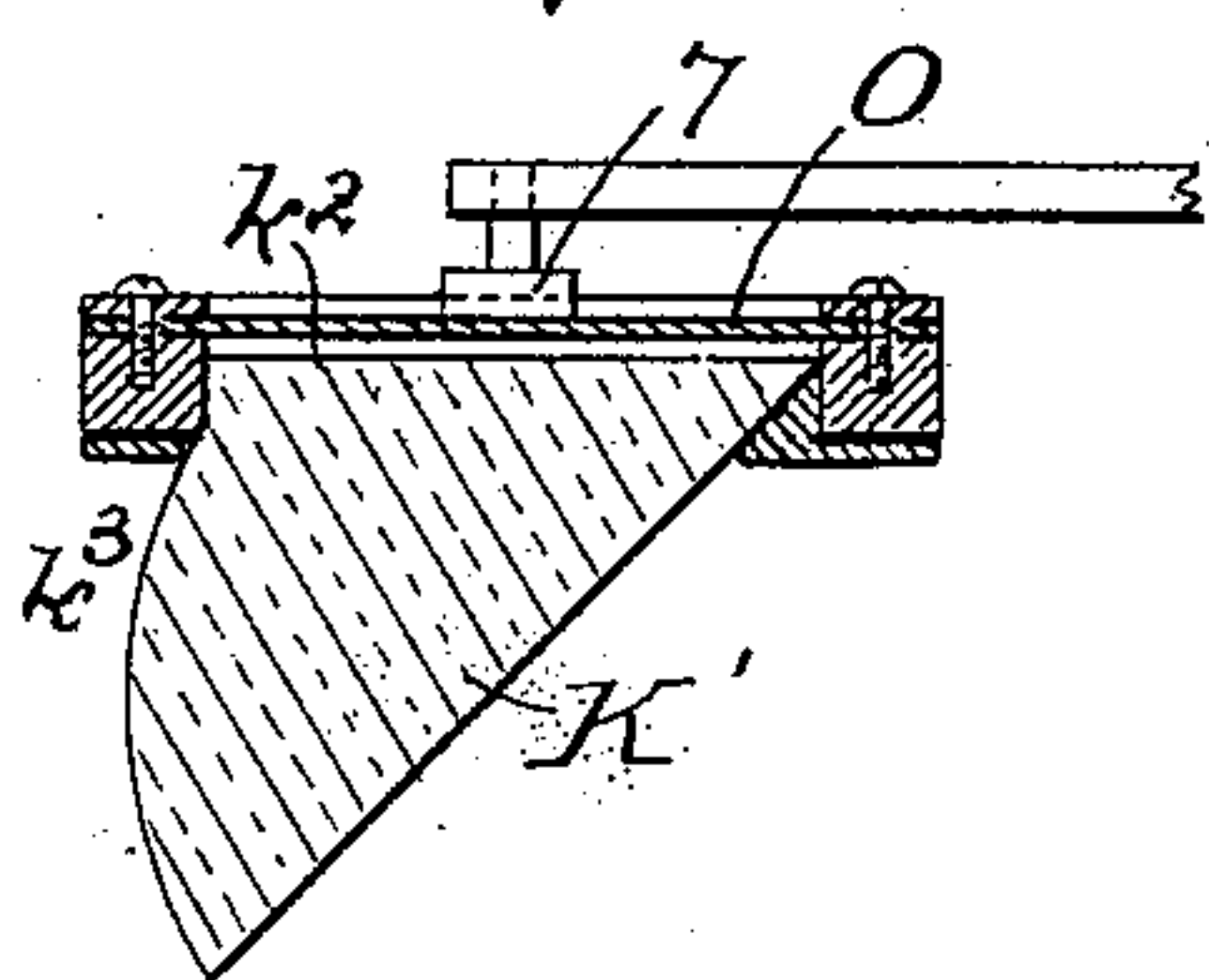


Fig. 5.

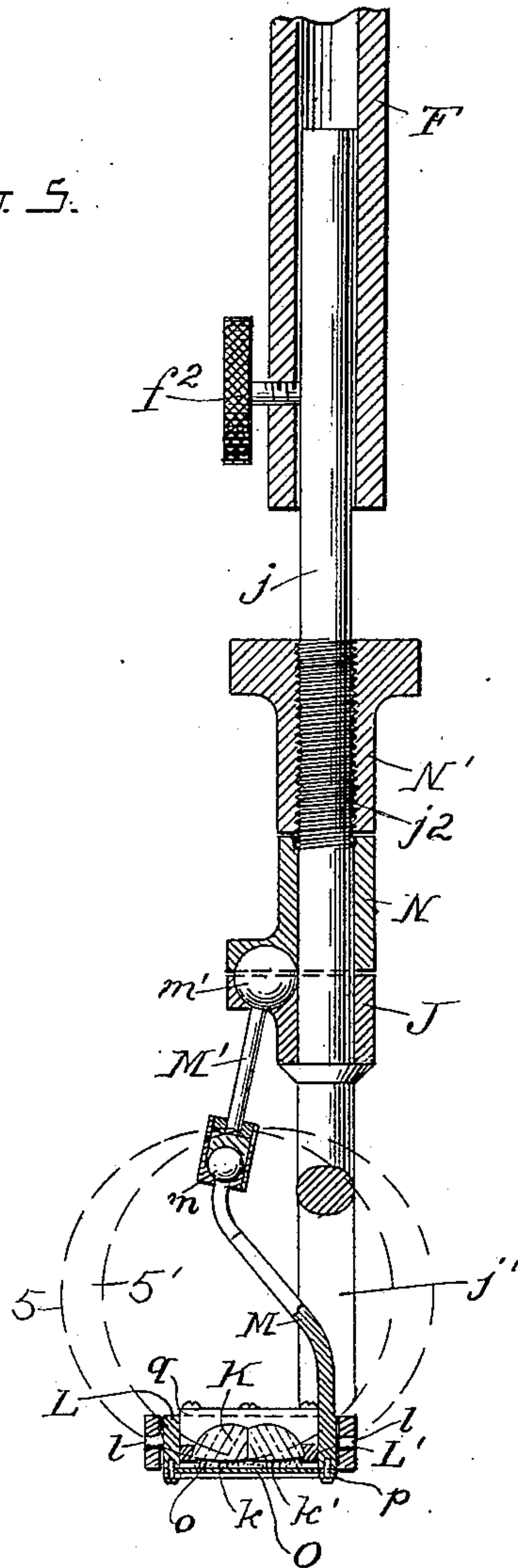
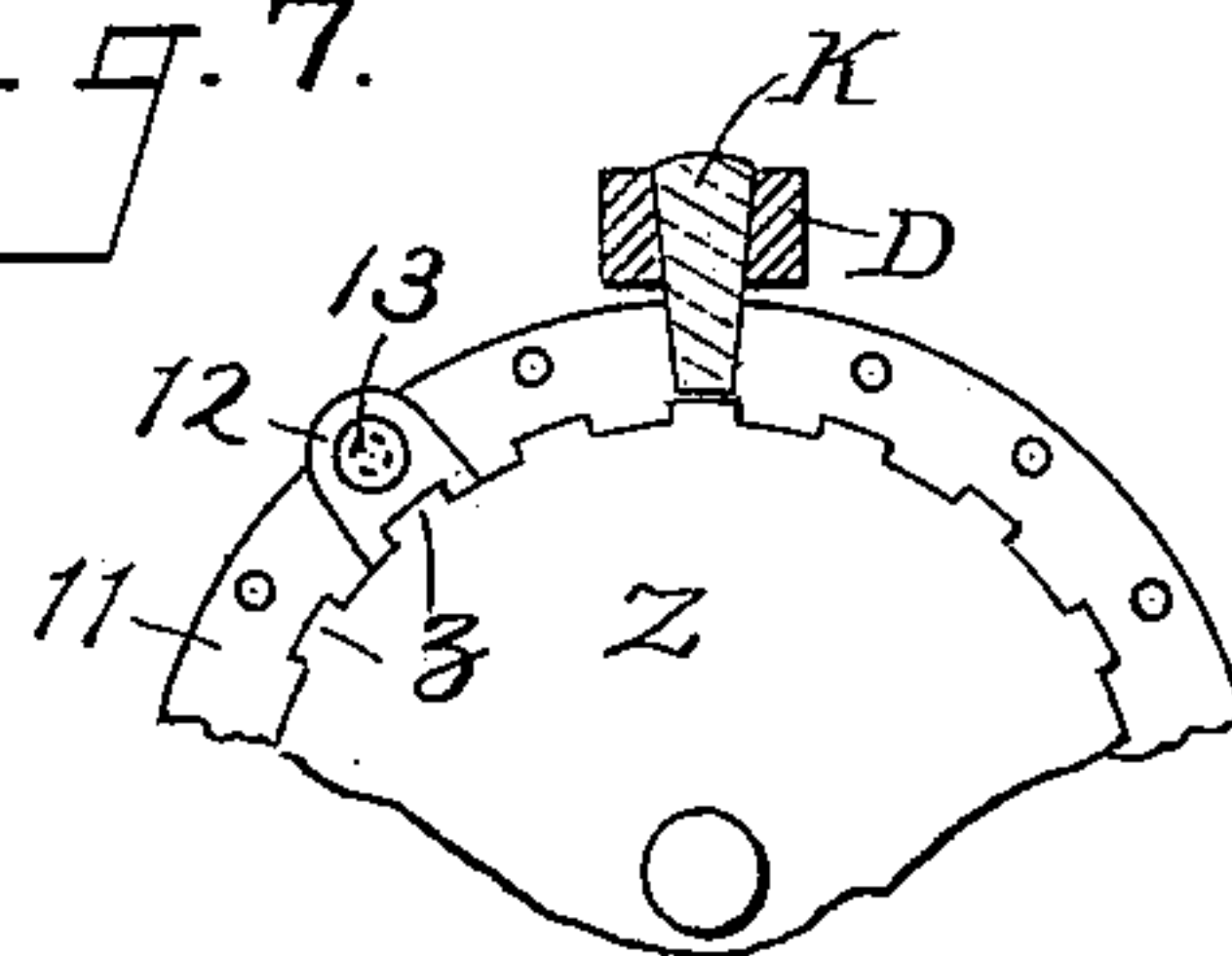


Fig. 7.



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4 Sheets—Sheet 4.

Fig. 8.

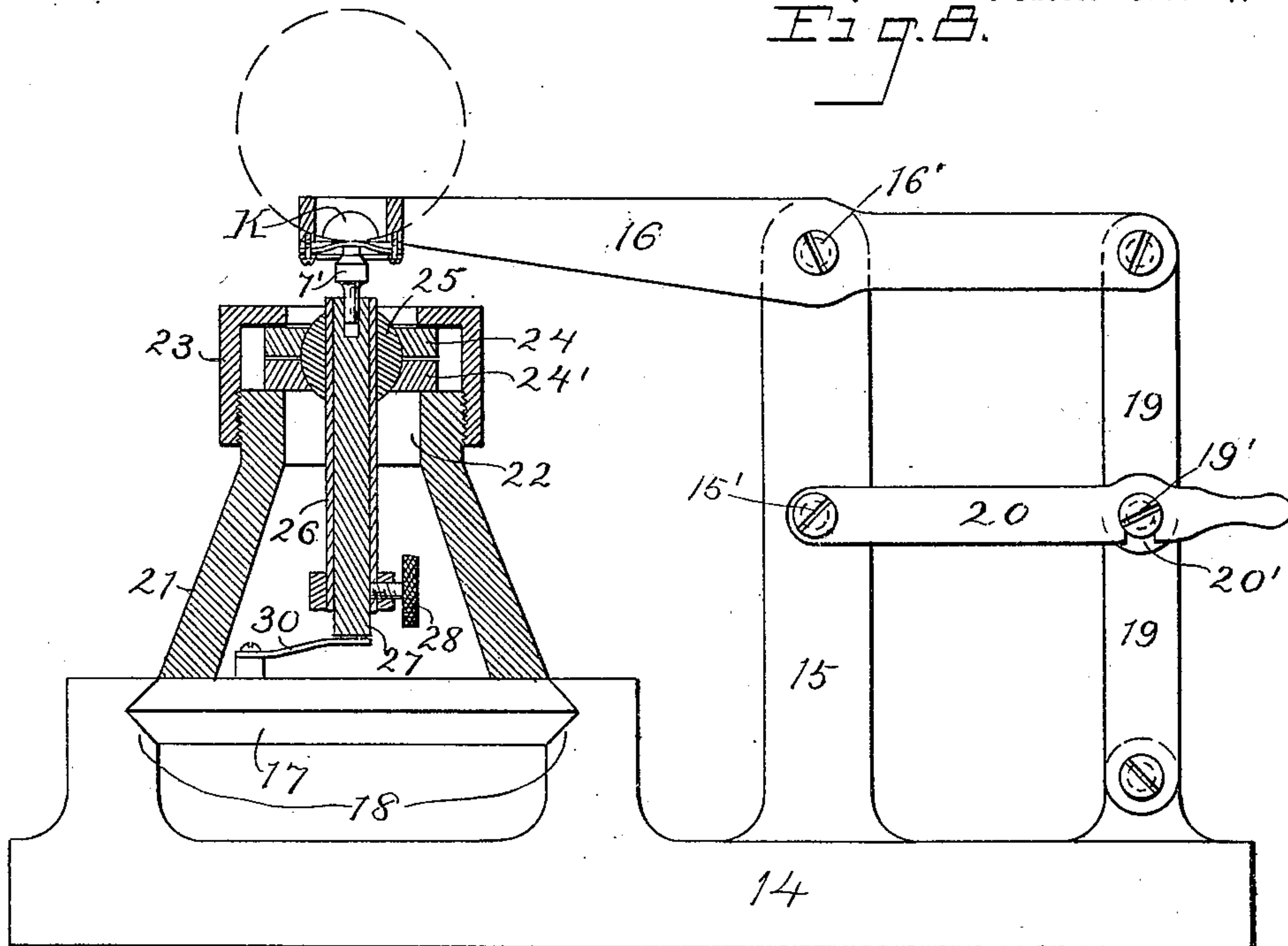
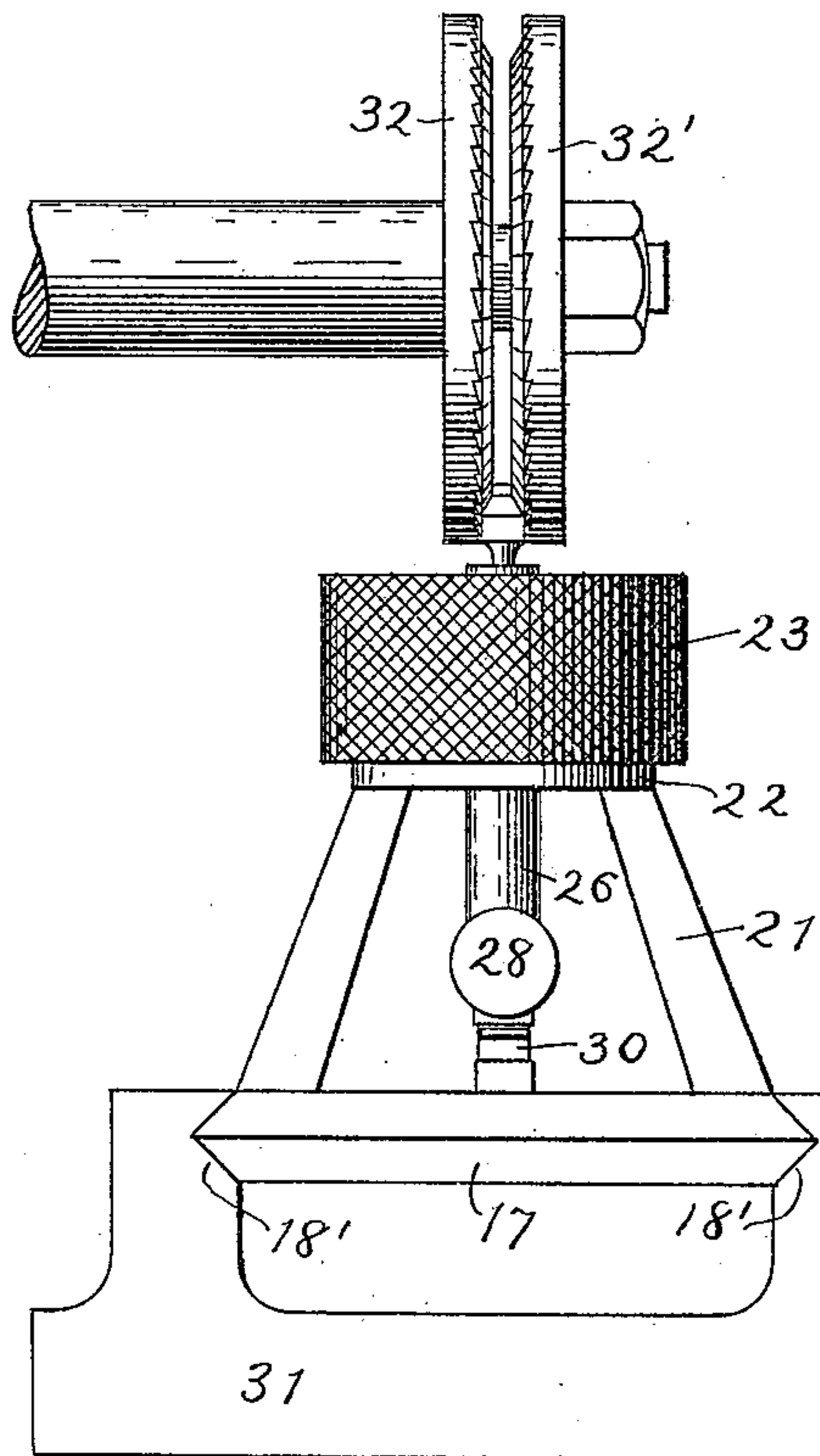


Fig. 9.



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UNITED STATES PATENT OFFICE.

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ALINING AND LEVELING DEVICE AND METHOD.

SPECIFICATION forming part of Letters Patent No. 631,114, dated August 15, 1899.

Application filed January 24, 1899. Serial No. 703,218. (No model.)

To all whom it may concern:

Be it known that I, JAMES V. HULSE, a citizen of the United States, residing at New York, (Brooklyn,) in the county of Kings and State of New York, have invented certain new and useful Improvements in Alining and Leveling Methods and Devices, of which the following is a specification.

This invention relates to improvements in type alining and leveling devices, the main object of the invention being to facilitate the alinement and level adjustment of the type of a type-writer, the invention being particularly applicable to bar type-writers. When so used, the purpose of the invention is to insure accurate adjustment of the type-bars, so that each type will be brought up in exactly correct position not only as regards its lateral and longitudinal adjustment in a horizontal plane, but as to the exact coincidence of the face of the type with the face of the platen. Any tipping of the type in any direction from the correct position would prevent such coincidence, and it is therefore necessary to adjust the type by a leveling adjustment as well as an alining adjustment. My invention relates particularly to means for facilitating this leveling adjustment. My improved leveling and alining means is, however, capable of other uses in connection with the adjustment of type. Thus it may be used to set type-blocks for machines of the "center-guide" class in such manner that they are held in a holder in definite relation to the face of the type, so that the edges or corners of said blocks may be ground off accurately to the proper positions and angles for insuring correct impression.

My invention may also be used in leveling the type on type-wheels of type-writers of the index-wheel class, as hereinafter described, and in general the invention may be used in the adjustment to any desired angular position of any face of a body of any kind or in setting a body into conformity with a fixed gage of corresponding form. I have, moreover, found that when the device is thus used it will detect at the same time any abnormal depressions or elevations on the face of the type or other body. Thus if the obscuring medium be lighter in color than the type-face any scratches or pits will show as

light lines or spots, while any raised places will show in corresponding dark outlines. Looked at in a broad sense, therefore, the invention may be regarded as a means for inspecting a surface to ascertain or determine any departure of such surface from conformity with a standard or gage surface, whether such departure be due to defects of the configuration of the said face or to angular deviation of such face as a whole.

This invention, in fact, is generally applicable to any case where it is desired to adjust a body to a given position or to adjust a gage to correspond to a given object.

An important feature of my invention is a transparent gage-plate, which in the side toward the type has a displaceable, reducible, or translucent obscuring film or medium for determining whether the type-face conforms to the face of the gage. For this purpose such medium is adapted to normally obscure the type, but to permit of the type-face being seen or at least brought into evidence either by the penetration of such medium by the type or by alteration of the position of the medium by the type, or, in the case of a translucent medium, by reason of the property possessed by such medium of permitting objects to be perceived through same only when in direct contact therewith.

Another feature of my invention relates to forming the leveling-face of the gage to coincide or be identical with the face of the platen. Thus with the usual cylindrical platen the face of the gage against which the type is to be placed in leveling is according to my invention made of a cylindro-segmental shape to represent or correspond to a portion of the face of the platen at the printing-point. The object of this is to enable such gage-surface to fit or conform to the printing-faces of the types, which in such case are concavely curved to conform to cylindrical face of the platen. Furthermore, to enable the same gage to adjust itself to both or all the type of a double-shift or multiple-shift type-writer I form the face against which the type is alined and leveled with a number of cylindro-segmental face portions corresponding in shape and position to the different working positions of the platen-face.

My invention further relates to means for

adjustably supporting the type-writer frame and the gage and to other details of construction, as hereinafter set forth.

In the accompanying drawings, Figure 1 is a partly-sectional side elevation of an alining and leveling apparatus embodying my invention, with a type-writing machine shown diagrammatically in the position assumed in setting the gage. Fig. 2 is a partly-sectional front elevation of the apparatus shown in Fig. 1. Figs. 3, 4, and 5 are respectively top, longitudinal, and transverse sections of the gage and its holder. Fig. 6 is a vertical section of my gage adapted to a type-writer of the "visible-writing" class, where a mirror is required to enable the operator to look through the gage at the type. Fig. 7 shows the application of a gage comprising one feature of my invention to the leveling of the type on the type-wheel of an index-wheel type-writer. Fig. 8 is a side view of a device wherein my invention is utilized in setting type in proper position in a holder preparatory to dressing same. Fig. 9 is a side view of the dressing apparatus with type-holder in position for dressing. Fig. 10 shows an auxiliary device for maintaining the type-bars in convenient position for alinement.

Referring to Figs. 1 and 2, I have therein shown my invention applied to the alinement of a bar type-writer, whose frame is indicated at 1 and one of whose type-bars is indicated at 2, 3 being the link and 4 the key-lever corresponding to such type-bar. The type-writer in question is assumed to be a double-shift type-writer, the two positions of the platen being indicated in dotted lines in Fig. 1 at 5 5', and the two type or characters 6 6' on the type-block 7 are curved and positioned to conform to these two positions of the platen, as usual.

A represents a bed-plate, on which I prefer to support both the type-writer and the alining devices. On this bed-plate slides a frame B, resting by its slide-rails *b* on grooved supports *b'* on bed-plate A, and a frame C is mounted by its sliding rails *c* and grooved supports *c'* so as to be movable transversely to the motion of the frame B. Screws B' and C' serve to adjust the respective frames B and C in their slides. The type-writer is placed on the upper frame C, and by adjustment of the frames B C can be adjusted longitudinally and transversely. On the bed-plate A is also fixed a standard D, in which is rotatably mounted a vertical pivot-post E, which, with its projecting arms *e e'*, forms a bracket for supporting the gage, such bracket swinging horizontally on its pivot-post E as a center and being held in position over or away from the type-writer, as desired, by a spring-pin *d* engaging in one of the notches *d'* in the pivot-post. A vertical spindle F is mounted in the outer ends of arms *e e'*, so as to be movable vertically and rotatably therein, and has a screw-threaded portion *f* engaging in a threaded sleeve or nut G, embraced between

the upper and lower arms *e e'* of the bracket. A sleeve *h* is interposed between the spindle F and the bearing or bracket-arm *e* and is splined to said spindle, as indicated at *f'*, and is restrained from vertical movement by a pin *h'* working in annular groove *h²* in said sleeve. This sleeve carries a worm-wheel I, with which engages a worm *i*, provided with handle *i'* for manual adjustment. By adjustment of nut G the spindle F may be adjusted vertically, and by adjustment of the worm *i* the said spindle may be adjusted rotatively in a horizontal plane. This spindle at its lower end is bored to receive the shank *j* of the gage-holder J, which is secured therein by a set-screw *f²*.

The gage-holder J supports the gage K by a gimbal or universal joint, preferably of the form shown, the gage being fixed in a frame L, which is pivoted at *l l* on a frame L', pivoted at *l' l'* in arms *j'* of the holder *j*, the axis *l' l'* being at right angles to axis *l l*, so that the gage is capable of tilting in any direction. To the gage-frame L is attached an arm M, engaging by a ball-joint *m* with an arm M', provided at its other end with a ball *m'*, fitting in a socket formed partly in the body of holder J and partly in a collar N, which slides on shank *j* and is engaged by a nut N', screwing on a threaded portion *j²* of said shank *j*. When this nut is screwed upwardly, the ball-joint *m'* is loose, and the arms M M' consequently permit free tilting of the gage-frame in any direction. By screwing the nut N down tight the ball *m'* and arms M M' may be held rigidly, and thus the gage-frame L may be held to any desired position.

The gage above referred to consists, essentially, of a transparent gage-plate K, preferably formed of glass in one or any desired number of pieces, the term "plate" indicating only that it is mechanically an integral rigid element. This gage-plate is provided with a clear or transparent portion 8, corresponding to the limits within which the type characters are to be alined, and surrounding same colored or obscured portions I I', preferably of different colors on different sides, (indicated by difference in the direction of the shade-lines,) so as to make the respective vertical and horizontal limits more apparent. The lower surface of this gage-plate, which I term the "leveling-surface," is formed with two cylindro-segmental portions *k k'*, whose curvature is the same as that of the platen of the type-writer to be alined and whose relative positions—that is, the distance between their centers of curvature—are the same as the relative portions or the distances between the two working portions of the platen, as indicated by dotted lines 5 5' in Figs. 1 and 5, and when the gage is set to proper position its curved surfaces aforesaid coincide with the positions that would be occupied by the platen in its two working positions, the platen being, however, removed or swung back out of the way when the gage is put in place. On the

under side of the gage-plate is provided an obscuring means for permitting the type to come into full visibility only when the type-face is in direct, full, and even contact with the gage-face or with such obscuring means. This means may consist of a translucent film on the bottom of the glass gage-plate, formed either by grinding the glass to roughen it or by a translucent coating; but I prefer to employ an obscuring means comprising a viscous opaque or translucent paint or paste, which is displaceable under the pressure of the type-face, so as to allow the type-face to become visible. This paint or paste (indicated at *o* in Figs. 4 and 5) I prefer to cover with a flexible and reducible shield or film *O* of soft rubber, which is held to the frame *L* by an open clamp-frame *p*. The rubber being elastic and also reducible or displaceable, it permits the type-face to effect the displacement of the paste, and thus enable the type-face to become visible through the gage, when said type-face is pressed into direct and full contact with the rubber and in perfect parallelism with the surface of the gage-plate. The glass gage-plate *K* is held in its frame *L* by any suitable bezel or clamp-frame *q*, and the upper face of the gage is preferably formed as a lens or a plurality of lenses to magnify the face of the type as seen through same.

The first operation in the use of my alining and leveling device is to set a certain one of the types of the type-writer in correct printing position, so that the gage may be set in conformity thereto. The type referred to is called the "master-type" and is the type indicated at 6' in Fig. 1, being, for example, the type carrying the characters *N n*. For thus setting the master-type I use an auxiliary device (shown in Figs. 1 and 2) comprising a cross-bar or frame *R*, in which a vertical rod *S* is detachably mounted so as to slide freely, being pressed up by a spring *r*, and a set-screw *T* being provided to enable the rod to be clamped in any desired vertical position. In using this device the type-writer platen, with its carriage, is first swung back out of the way. The bar *R* is inserted within and through the "basket" or assembly of type-bars, so as to rest on the frame *l* on each side of the machine. The rod *S* is then inserted in the vertical hole in the center of said bar and the master-type is placed on the top of said rod *S*, preferably enlarged, as at *s*, to form a more secure support. The spring *r* now presses the rod *R* and the master-type upwardly, and the platen being brought down on top of the master-type the latter is brought to exact vertical adjustment, its face corresponding or conforming to the platen-face, as indicated in Fig. 1. The rod *R* is then locked in position by set-screw *T*. It will be understood that the master-type has already been adjusted to proper alinement and also to proper angular position or level, so as to make a full and even impression against the platen, this having been effected by the usual method

of trial impressions, in conjunction with manual adjustment of the type-bar and its support, in a well-known manner. Therefore when the master-type has been set as above described it is only necessary to bring the gage to conformity and alinement therewith and then to aline and level the remaining type by such gage. To set the gage in this manner, the type-writer platen is removed or swung back out of the way and the gage-supporting bracket is swung around so as to bring the gage-holder over the master-type. The operator then proceeds to adjust the type-writer in horizontal, longitudinal, and transverse directions by means of adjusting-screws *B' C'* and to adjust the gage-holder in vertical and rotative adjustment by nut *G* and worm *i* until the gage and master-type are brought into alinement and close proximity or contact, the nut *N* being meanwhile maintained loose, so as to allow the gage to adapt itself freely to the face of the type. In this operation the gage is watched and when the type comes at any point in contact with the obscuring medium below the gage-plate it will at once become apparent, any parts, however, of the type-face that remain below the proper level being either still invisible or more or less obscured. By manipulating the gage it is, however, evident that it can be brought into exact coincidence or conformity with the master-type, inasmuch as they are universally adjustable relatively to one another. At the same time the gage is brought into exact alinement with such master-type by observation of the position of the type characters within the clear spaces *S*. The differently-colored boundaries on different sides of this clear space facilitate the accurate alinement of the type. Having thus been correctly alined and leveled, the gage is locked in that position by screwing tight the clamp-nut *N*. The master-type-supporting devices may now be removed and then the operator may proceed to aline and level the other type characters by bringing them into alinement with and conformity to the gage-plate. In so doing the type-bars are adjusted in the well-known manner by bending the type-bars and adjusting their supports, their condition as to alinement being determined by observation of the position of the type relatively to the differently-colored boundaries of the clear-glass space of the gage, and the condition as to leveling being indicated by the extent or degree of visibility of the type-face through the obscuring-film. In order to facilitate the adjustment of the remaining type-bars, I prefer to employ means for maintaining the type against or in proximity to the gage-plate, so as to avoid the necessity of the operator pressing the corresponding type-key continuously or repeatedly. For this purpose an adjustable extensible bracket *U*, (see Fig. 10,) swinging on a standard *V*, carries at its free end a weighted rod *W*, which is adapted to rest on any one of the keys, said

rod being movable vertically in the bracket U. This rod may be quickly shifted from key to key, but is held from accidental lateral displacement by the slight frictional resistance of bracket U.

The obscuring medium for the transparent gage-plate may be variously modified without departing from the essential feature of my invention—namely, a medium preventing or obscuring full visibility until the type-face is in direct and full contact therewith. Thus fairly good results can be obtained with the rubber film alone without the viscous obscuring-film, and, on the other hand, the rubber film may be omitted, so as to allow the type-face to come into direct contact with the viscous film and to penetrate same, so as to become visible when it comes in contact with the gage-surface, or both these may be omitted and the lower or leveling surface of the glass gage-plate may be simply grained or roughened, so that it is translucent, but not transparent. In fact, any obscuring film or medium that is either translucent or is penetrable, displaceable, or reducible under the pressure of the type-face will serve the purpose. As examples of such obscuring media I may also cite Iceland spar, tourmalin, and similar bodies, which do not permit visibility except when the object is in direct contact therewith. Such embodiment of my invention is more particularly and specifically set forth and claimed in my application Serial No. 723,442, filed July 11, 1899. Furthermore, the flexible sheet O in Fig. 1 instead of being rubber may be of a fabric of contrasting color to the coating of paint—for example, of black silk, if white paint be used—so that normally this fabric does not appear, but being pressed against the glass by the type-face it is displayed along the line of the type-face, thus showing contact of the type-face without such type-face being directly visible. In my application Serial No. 723,441, filed July 11, 1899, I have described and claimed an embodiment of my invention involving this principle which is not specifically claimed herein.

In applying my invention to machines wherein the type strike downwardly or away from the operator in order to give a visible impression it is necessary to provide a mirror to reflect back to the operator the view of the type-face as seen through the transparent gage-plate. Such a device is shown in Fig. 6, where a glass prism K' is used as a total internal reflector, one face k^2 thereof being used as the alining and leveling face and the other face k^3 being formed as a lens which transmits a reflected image of the type-face to the operator in front of the machine. O represents the rubber obscuring-film, and 7 the type.

Fig. 7 shows the application of my invention to leveling the type of an index-wheel type-writer. Z represents the type-wheel,

carrying type Z and mounted on a suitable axis, with means, such as a fixed perforated disk 11, arm 12 on the type-wheel carrier, and a set-pin 13, to adjust the type-wheel to bring any of its type under the gage. Such gage comprises a lens K, mounted in a suitable support D'. To level the type, they, or the bottom of the gage, are coated with a viscous paste or paint, and the body of the type-wheel is then pricked by a hot pin in the usual manner at points adjacent to the depressed parts of the type, so as to raise such parts, the condition as to level adjustment being determined, as above described, by the visibility of the type-face through the obscuring-film formed by the viscous paint.

An important application of my invention is in the dressing of type for center-guide machines. Such type have to be dressed accurately at the sides, ends, and upper corners to fit into the center guide and be properly alined and leveled thereby. Fig. 8 shows a device for setting the type in a holder in proper position for such dressing, such device comprising a base 14, a standard 15 thereon, a lever 16, pivoted to said standard at 16' and carrying the gage K, and a support 17, slidable on guides 18 on the base 14 and detachable from said guides. A toggle connection 19 19 between the lever 16 and the base 14 enables the lever to be raised out of the way or lowered to proper position, in which position it may be locked by an arm 20, pivoted at 15' to the standard 15 and engaging by its notch 20' with the hinge-pin 19' of the toggle connection 19 19. The support 17 carries on a standard 21 a screw-ring 22, on which screws a screw-cap 23, between which and the top of ring 22 are arranged plates 24 24', embracing a spherical collar 25 on a tube 26. A rod 27 slides vertically in the tube 26 and may be clamped therein by a set-screw 28, said rod being pressed upwardly by a spring 30 and carrying the type 7' at its top. The gage, which is constructed, as above described, to conform to the type-surface, the curvature of the gage being coincident with the platen-circumference (indicated at 5 in dotted lines) is brought down and locked in position on the type after the support 17 has been slid in place, and the screw-cap 23 being lowered the type is adjusted angularly by the ball-joint 25, horizontally by plates 24 24', sliding on the top of the ring 22, and vertically and rotatively by the rod 27, sliding in tube 26, the vertical adjustment being effected by the spring 29. The type having been thus alined and leveled to the gage, its holder is locked in position by screwing tight the set-screw 28 and the screw-cap 23. The support 17 is then slid out of the guides in base 14 and slid into similar guides 18' on a base 31 on the dressing apparatus, (shown in Fig. 9,) on which it is carried between the cutters 32 32' of a suitable milling-cutter, which dresses the sides and corners thereof in obvious manner.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The method of inspecting a face of a body to determine conformity thereof to a standard face, which consists in placing in proximity to such face of said body a surface of a transparent gage, conformable to such face of said body, bringing said face toward such surface and interposing between such face and the gage a displaceable obscuring medium preventing complete visibility of such face through the gage, and causing the said face while approximating said gage-surface, to displace the said obscuring medium and thus give visible evidence through the transparent gage, of the proximity and conformity of the said face to the said gage.

2. Means for inspecting the face of a type or other body for departure from conformity to a standard surface, consisting of a transparent gage having a surface formed to constitute a standard gage-surface, and provided with a displaceable obscuring medium, whereby the pressure of such face of said body against such obscuring medium will cause displacement of same and give visible evidence through the transparent gage, of any departure from conformity of the said face to the gage-surface.

3. Means for bringing a face of a body to a desired angular position, consisting of a transparent gage having a surface formed to correspond to such face of the said body, and provided with a displaceable obscuring medium, whereby the pressure of such face of said body against such obscuring medium will cause displacement of same and give visible evidence through the transparent gage, of the proximity and parallelism of the said face to the gage-surface.

4. In a type-leveling device for type-writers, a transparent gage-plate having a face shaped to correspond with the face of the platen at the printing-point.

5. A type alining and leveling device for bar type-writers comprising a transparent gage-plate, having a face identical in shape to the face of the type-writer platen at the printing-point, and means for supporting said transparent gage in such position that its face aforesaid corresponds with a working position of the platen-face.

6. A type alining and leveling device comprising a transparent gage having a plurality of face portions corresponding in shape to the face of the type-writer platen and relatively positioned to correspond to different positions of the platen.

7. A type alining and leveling device for bar type-writers with cylindrical platen, comprising a transparent gage-plate having a cylindro-segmental face corresponding to the face of the platen.

8. A type alining and leveling device for bar type-writers with multiple-character type-bars and cylindrical platen shiftable to dif-

ferent transverse positions, comprising a transparent gage-plate having a plurality of cylindro-segmental face portions corresponding in shape and relative position to the face of the platen in its different positions.

9. The combination with a bar type-writer having multiple-character type-bars and cylindrical platen transversely shiftable to different positions, of an alining and leveling device comprising a transparent gage-plate having face portions shaped to correspond with the face of the platen in its different positions, and means for supporting said gage-plate in position to bring such face portions thereof into coincidence with the different positions occupied by the platen.

10. A leveling device for types comprising a transparent gage-plate, having a leveling-face corresponding in shape to the printing-face of the type, and provided on such leveling-face with an obscuring medium responsive to pressure from the type-face to give visible evidence of such pressure.

11. A leveling device for type-writer type, comprising a transparent gage-plate having a leveling-face with an obscuring-film not normally transparent, but becoming transparent on pressure of the type thereon.

12. A leveling device for type-writer type, comprising a transparent gage-plate with an obscuring-film for its leveling-face through which the type is only visible when in contact therewith.

13. A leveling device for type-writer type, comprising a transparent gage-plate with an obscuring-film for its leveling-face consisting of a material displaceable under pressure.

14. In a leveling device for type-writer type, a transparent gage-plate with an obscuring means for its leveling-surface, comprising a coating of viscous obscuring material, such as a non-drying paint.

15. In a leveling device for type-writer type, a transparent gage-plate with an obscuring means for its leveling-surface, comprising a sheet of elastic obscuring material, such as soft rubber.

16. In a leveling device for type-writer type, a transparent gage-plate with an obscuring means for its leveling-surface, comprising a layer of viscous obscuring material, and a sheet of flexible material, such as soft rubber, covering same.

17. In a leveling device for type-writer type, a transparent gage-plate with a translucent obscuring medium for its leveling-surface.

18. An alining device for type-writers comprising a gage-plate with a transparent space corresponding to the size of the type and bounded by surfaces of different color on different sides.

19. In an alining and leveling device for type-writers, a transparent gage-plate formed as a lens, substantially as and for the purpose set forth.

20. In an alining and leveling device for types, the combination with a type and a gage

conforming thereto, of means for adjusting said elements relatively to one another in a universal manner, means for pressing said elements toward one another, and locking means adapted to engage with one of such elements in any adjusted position thereof to lock same in such position.

21. The combination with a type-writer and its platen of means for setting a master-type thereof, comprising a movable adjustable support for pressing the said type against the type-writer platen, and means for holding said movable support in adjusted position.

22. Means for setting a master-type of a type-writer, comprising a support for engaging with the type and movable toward and away from the platen, a spring for pressing said support toward the platen, and a locking device for locking said support in position.

23. Means for setting a master-type of a type-writer, comprising a cross-frame insertible and removable in the type-writer frame, a support for the type sliding vertically in said cross-frame, a spring engaging with said support to press same upwardly, and a set-screw for locking said support in position.

24. In an alining device for bar type-writers, the combination of a support for holding a master-type at a point where its face coincides with a working position of the platen-face, a transparent gage and means for adjustably supporting said gage to enable it to be brought to position to conform to the printing-face of the master-type, and means for locking said gage in this position.

25. An alining and leveling device for type-writers comprising means for supporting a master-type in the printing position, a transparent gage and a support for same comprising a universal joint to enable the gage to be adjusted to the face of the master-type, and means for clamping said joint to fix the gage in such position.

26. An alining and leveling device for type-writers comprising a transparent gage, and a support therefor consisting of a supporting-frame, a bracket supported on said frame in fixed horizontal position, a spindle movable vertically and rotatively in said bracket, worm-gearing connected to said spindle for setting it in rotative position, and a nut screw-

ing on said spindle and engaging with the bracket to set the spindle in vertical position, and a gage-holder carried by said spindle.

27. In an alining and leveling device for type-writers, the combination with the transparent gage, of a gage-holder having a gimbal-joint support for said gage, and a clamp for locking said gimbal-joint to hold the gage in position.

28. In an alining device for type-writers, means for holding the type-bars to position for alinement, comprising a weight adapted to rest on the key-levers of the type-writer, and means for adjustably supporting said weight against horizontal displacement, while permitting vertical movement thereof.

29. Means for holding down a key-lever of a type-writing machine, so as to facilitate alinement of the type thereon, comprising a supporting-frame, an adjustable bracket supported thereon and adjustable in both directions in a horizontal plane, and a weight guided by and sliding vertically with relation to said bracket, substantially as and for the purpose set forth.

30. The method of adjusting the position of a face of a body which consists in setting in proximity to the desired position a surface of a transparent gage, bringing said face toward such surface and interposing between such face and the gage, a displaceable obscuring medium preventing complete visibility of such face through the gage, and causing the said face while approximating said gage-surface, to displace the said obscuring medium and thus give visible evidence through the transparent gage, of the proximity of the said face to the said gage.

31. Means for bringing a face of a body to a desired position, consisting of a transparent gage having a surface provided with a displaceable obscuring medium, whereby the pressure of such face of said body against such obscuring medium will cause displacement of same and give visible evidence through the transparent gage, of the proximity of the said face to the gage-surface.

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Witnesses:

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