

T. B. Dill, 5. Sheets, Sheet. 1.

Manf. Watch Cases.

No. 106,561.

Patented Aug. 23. 1870.

Fig. 1.

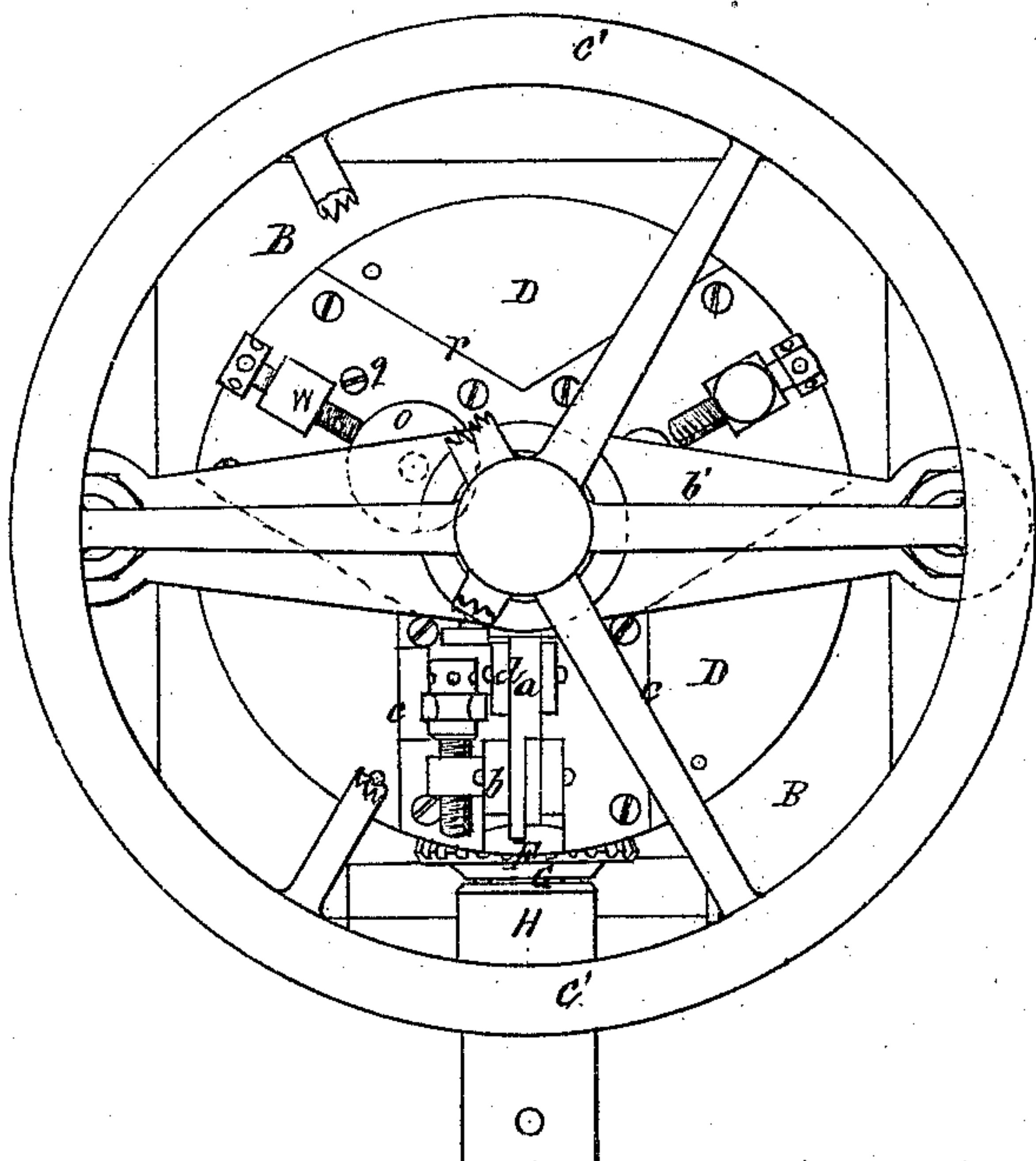


Fig. 7.
Magnified.

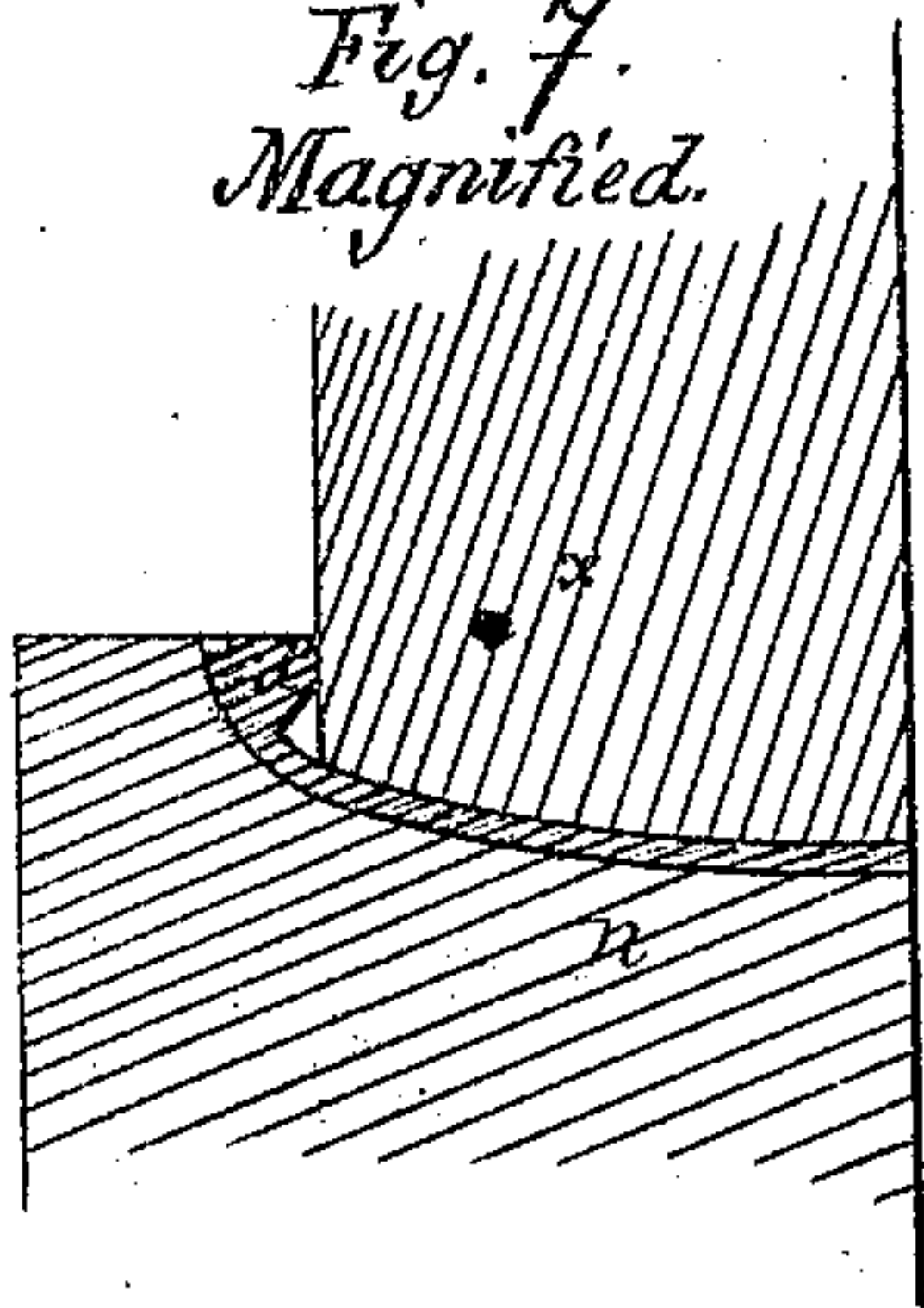
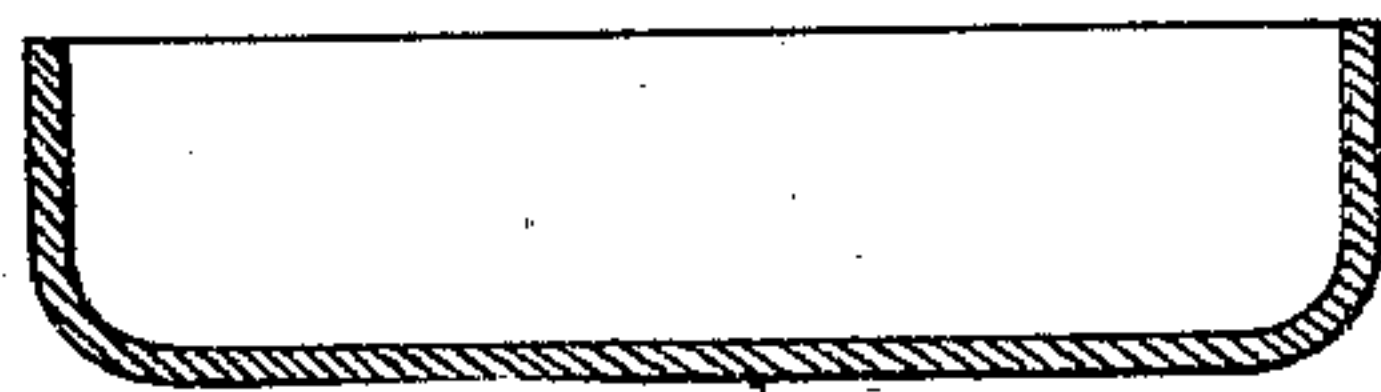


Fig. 6.
Magnified.



Witnesses.

G. A. Loring.
Edward Griffith.

Thomas Bradford Dill.

by his Attorney.
Frederick Curtis.

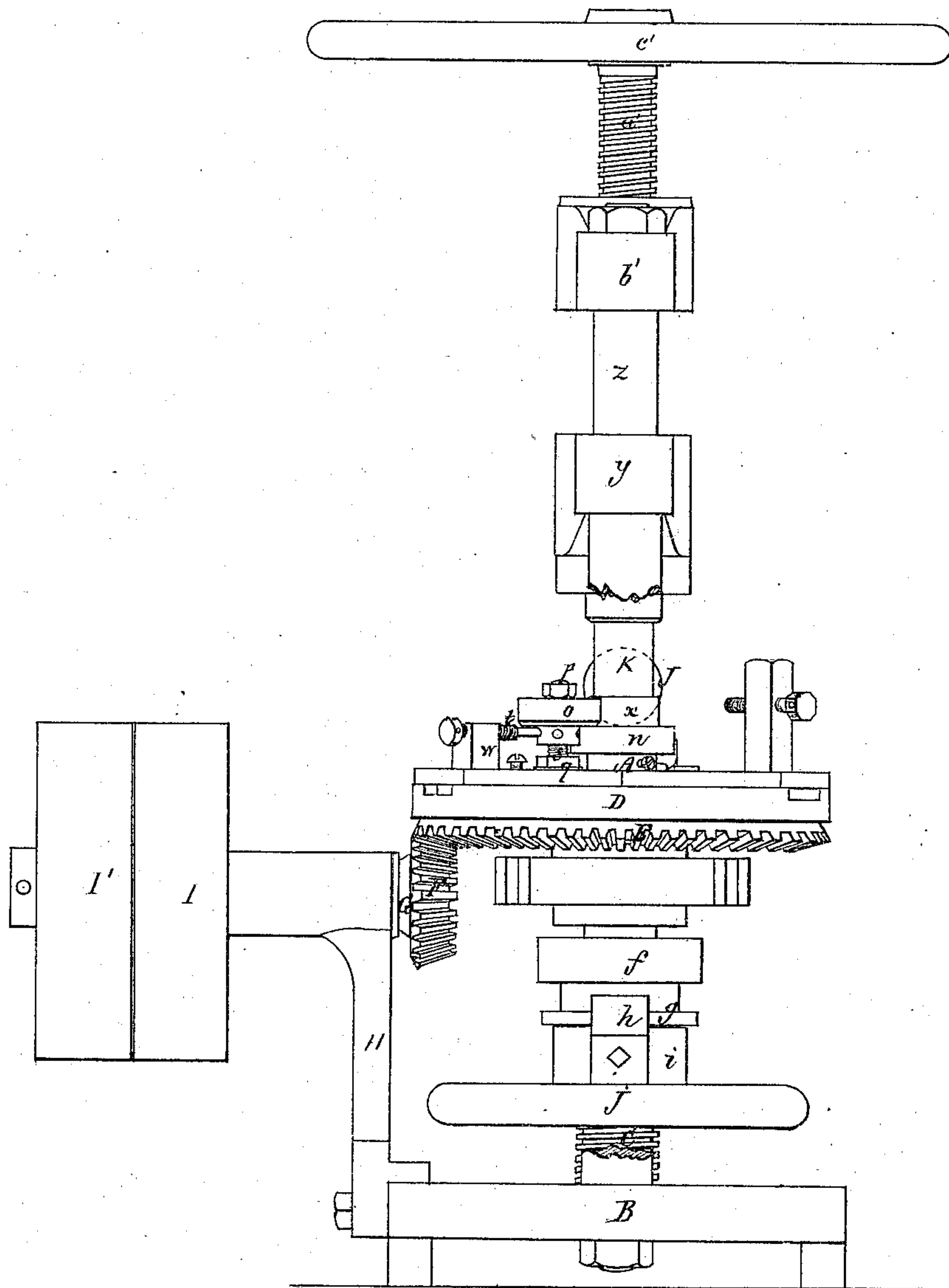
T. B. Will, 5. Sheets. Sheet. 2.

Manf. Watch Cases.

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Patented Aug. 23. 1870.

Fig. 2.



Witnesses.

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T.B. Mill,

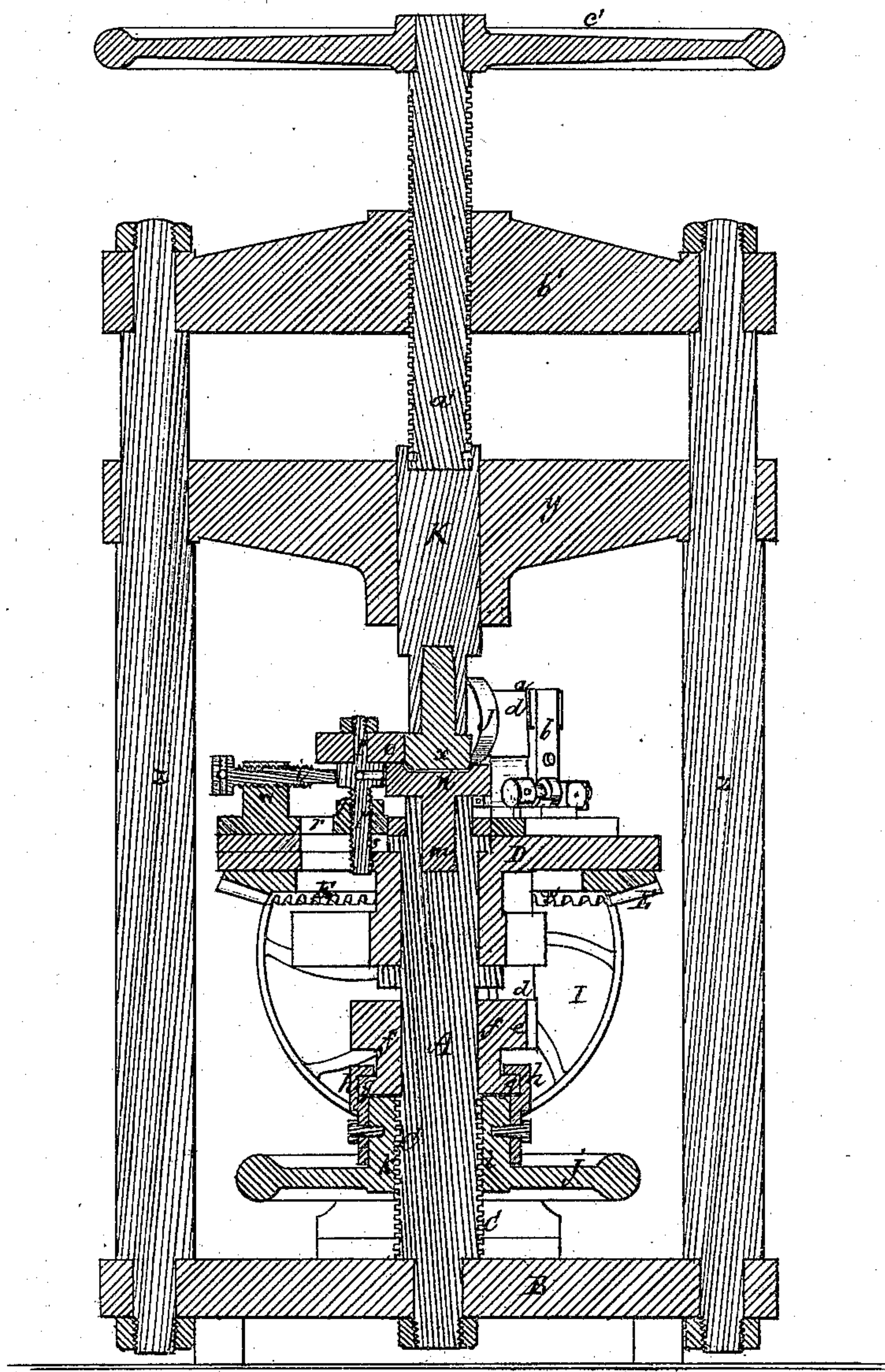
5. Sheets. Sheet 3

Manf. Watch Cases.

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Fig. 3.



Witnesses,

G. A. Loring,
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T. B. Mill,

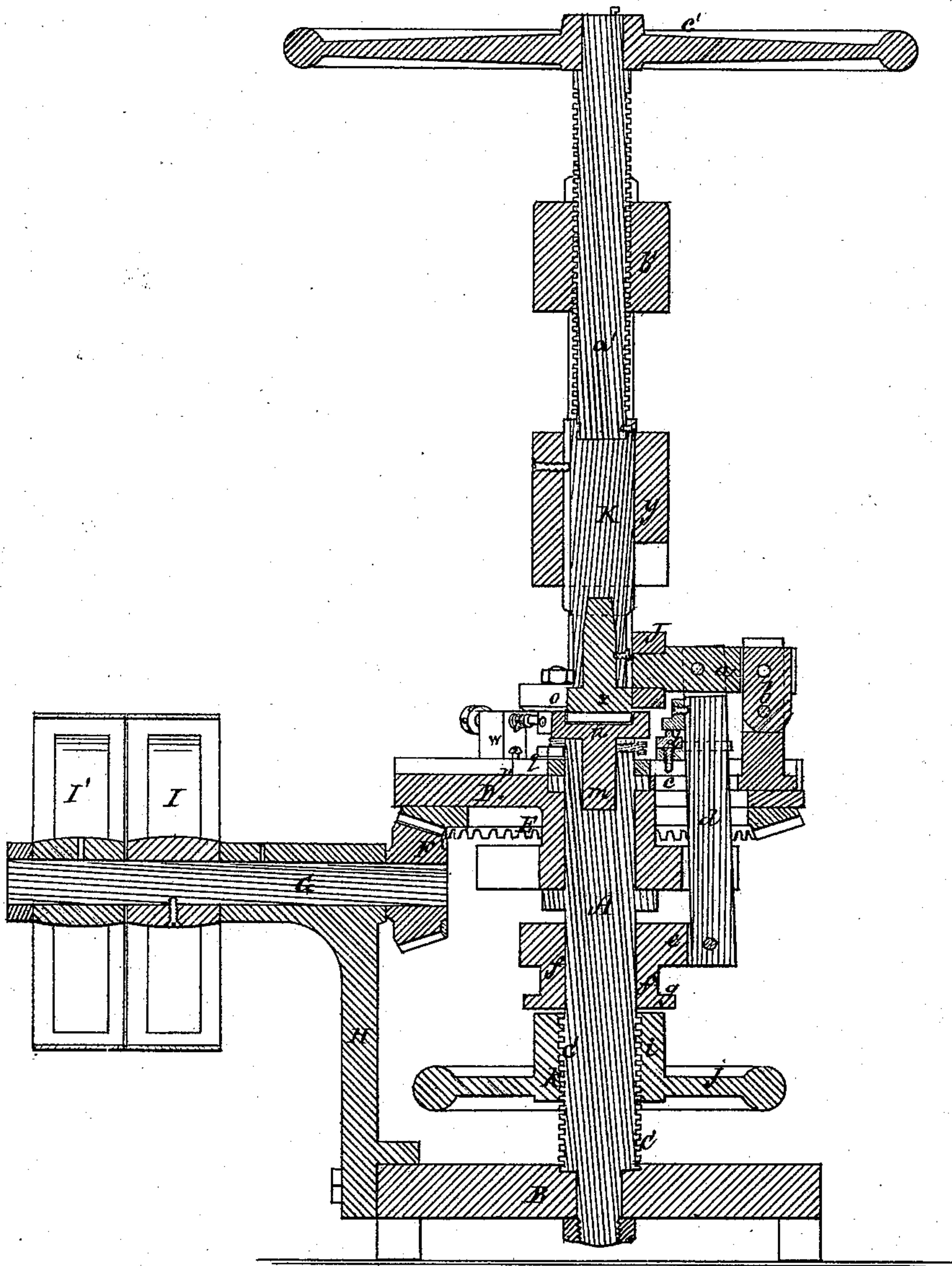
5. Sheets, Sheet. 4.

Manuf. Watch Cases.

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Fig. 4



Witnesses.

Geo. A. Haring.
Edward Griffith.

Thomas Bradford Dill.

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T.B. Dill,

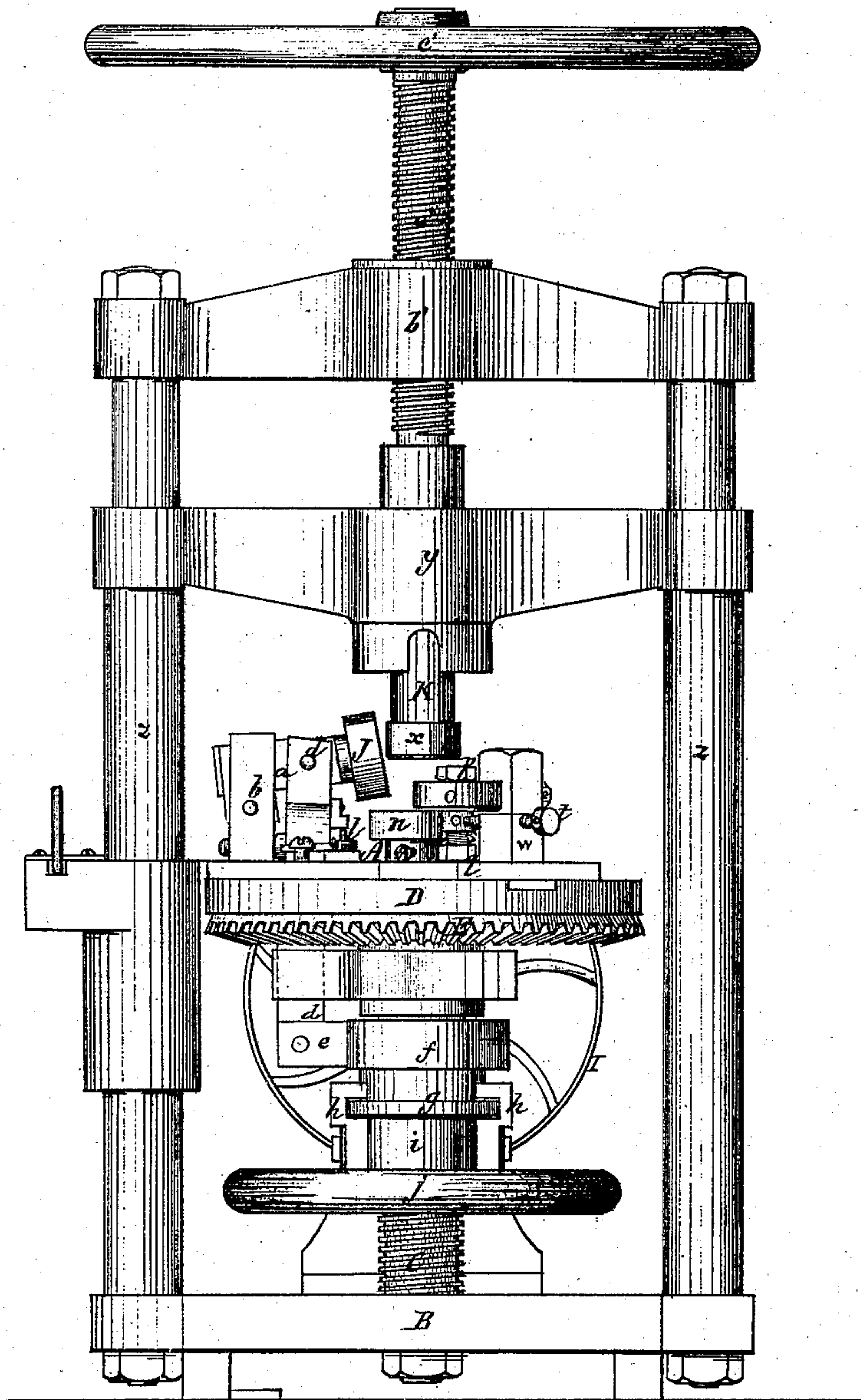
5, Sheets. Sheet 5.

Manuf. Watch Cases.

No. 106561,

Patented Aug. 23. 1870.

Fig. 5.



Witnesses.

G. A. Loring.

Edward Griffith.

Thomas Bradford Dill.

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Frederick Curtis.

United States Patent Office.

THOMAS BRADFORD DILL, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 106,561, dated August 23, 1870.

IMPROVEMENT IN MACHINES FOR MANUFACTURING WATCH-CASES.

The Schedule referred to in these Letters Patent and making part of the same.

To all to whom these presents shall come :

Be it known that I, THOMAS BRADFORD DILL, of Boston, in the county of Suffolk and State of Massachusetts, have made an invention of a new and useful Machine for Producing Watch-Cases, or details thereof; and do hereby declare the following to be a full, clear, and exact description thereof, due reference being had to the accompanying drawing making part of this specification, and in which—

Figure 1 is a plan;

Figure 2, a side elevation;

Figures 3 and 4 are vertical sections; and

Figure 5, a front elevation of a machine embodying my invention.

The machine in which my invention is embodied contains a matrix or die, suitably supported in a horizontal position, and operated by instrumentalities hereinafter explained, while in combination with such dies I employ two reducing-rollers or revolving swages, mounted upon spindles or arbors situated in immediate proximity to the matrix, and traveling in unison about its upper surface, one roller revolving in a vertical, and the other in a horizontal path of motion with respect thereto, the former being susceptible of vertical movements toward or from the matrix, and being intended for depressing and condensing the metal "blank" into the sinuosities or cavities of the matrix, and the office of the latter being to prevent lateral distension and fracture of the blank, which, but for it, or an analogous device, would ensue from the compression of the metal under the action of the first-mentioned roller, a further component part of the primary features of the mechanism of this invention being the adoption of a cylindrical plungex, moving in a perpendicular path, and serving not only to confine the metal blank to the matrix during the operation of the machine, but to act as a support to the sides of the same, and to preserve the proper cylindrical form of such sides, and also to constitute the inner wall of the annular die, into which the portion of the blank that projects above the face of the matrix or female die is to be compressed.

As the sheet-metal blank introduced within the matrix receives the exact impress of the latter, it results that for the different portions of a watch-case different matrices or dies are to be provided, but, thus provided, the general action and results of the machine become identical under varying conditions of service.

It might be well at this, the initial point of this description, to state that the greater portion of the area of a blank, whether it be the center portion of a cover, or the middle and waste portion of a "center" of a case, is forced directly upon the matrix, and shaped

thereto by the plunger before mentioned, the edges or boundaries, or the irregular depressions of the "cover" or center being the portion produced by the revolving rollers before mentioned.

With this digression I will proceed with the construction and operation of the machine.

In the drawing accompanying this specification—

A denotes an upright cylindrical post or standard, erected upon, and supported in a perpendicular position by a bed-plate or base, B, the lower part of such standard being provided with a male screw, C, which is cut upon its periphery for some distance above the base B, but for purposes hereinafter alluded to.

Upon the upper part of the standard or post A, and revolving freely thereupon, is mounted a flat horizontal disk or face-plate, D, the revolutions of this disk being effected by means of an annular beveled gear or rack, E, formed upon its lower face, into which meshes a beveled pinion, F, mounted upon the inner extremity of a horizontal shaft, G, which is supported, and rotates in a standard, H, erected upon the base B of the machine, and to one side of the disk, as represented in the drawing, the outer end of the said shaft G being provided with fast and loose pulleys, I I', after the manner of machinery in general, the shaft G and pinion F being the driving-power of the machine.

Upon the upper face of the disk or face-plate D, and revolving with it, are the rollers before alluded to.

The first named, as being the one for effecting the depression of the sides of the sheet-metal blank to be operated upon, and which is shown at J, is mounted upon the inner extremity of a horizontal oscillating arm or lever, a, which lever is fulcrumed upon a post, b, supported upon the revolving disk or tablet D, and about midway between its center and circumference.

The post b, last mentioned, is inserted within a radial shelf-groove, c, formed in the upper face of the disk D, and is to be provided with a suitable means of feeding it toward or away from the central standard A, in order that the position of its roller J, with respect to the latter, or the matrix carried by it, may be varied to correspond with the varying height of the sides or walls of the different blanks which are introduced to the machine.

The outer end of the lever a is pivoted to the upper extremity of a pitman, d, the lower end of which is, in turn, pivoted to a lateral offset, e, of a tubular sleeve, f, which compresses, and both slides vertically and revolves freely upon the lower part of the central post A, and below the tablet D.

This sleeve *f* is formed with an annular spline or rib, *g*, which circumscribes it while clasping this rib; the reader will see a fork or clasp, *h*, which makes part of the hub *i* of a hand-wheel, *j*, such hand-wheel being mounted upon a post, *A*, and below the said sleeve, and having an interior female screw, *k*, to screw upon the male screw *C*, hereinbefore mentioned as being cut upon such post.

Revolution of the hand-wheel *j* in either direction will effect sympathetic vertical movements of the roller *f* toward or away from the upper end of the post *A*, or its matrix.

Hence, by manipulation of the hand-wheel at the hands of an attendant, the vertical adjustment of the roller *J* is controlled.

An adjustable stop or regulator, *l*, is situated below the inner end of the lever *a*, to determine the extent of the depression of said lever.

The upper end of the central post *A* is tubular or cavernous, and is for reception of the shank *m* of the molding-die or matrix hereinbefore frequently alluded to, and which is represented in the accompanying drawing at *n*.

This matrix, in its interior conformation, is of such construction as to correspond to the portion of a watch-case which is to be produced, whether the cover, "glass-bezel" or center, &c., and is to be held securely to the post or arbor *A* by a screw or other suitable device.

Both the upright and horizontal rollers act in conjunction with the upper surface of the matrix *n*, the latter roller being shown at *o* as mounted and revolving freely upon an upright post, *p*, erected upon a sliding block or carrier, *q*, which is contained within a radial shelf-groove, *r*, formed in the upper face of the disk *D*, hereinbefore mentioned, this last mentioned groove being of similar character to the groove *c*, and disposed with respect thereto in such manner that the roller *o* shall preferably act in advance of the roller *J*, as the two travel in company, in a circular path, about the upper circumference of the matrix.

The vertical adjustment of the roller or swage *o* toward or away from the matrix is effected by means of a male screw, *s*, cut upon the lower end of its post *p*, and which screws into the carrier *q*, before mentioned, while the horizontal adjustment of said roller, relatively to the matrix, is effected by means of a horizontal screw, *t*, which is screwed through an upright, *u*, erected upon the surface of the revolving-disk *D*, the inner end of said screw abutting against the outer side of the post *p*, as represented in the drawing.

The plunger to which allusion has before been made in this context, is exhibited in the annexed drawing at *x*, as a cylindrical block, inserted within the lower end of a perpendicular sliding arbor or spindle, *K*, such arbor being situated above the central post *A*, and in axial alignment therewith, and playing within a cross-head, *y*, surmounting the disk *D*, and its adjuncts, and supported upon columns, *z z*, erected upon the base of the machine, a spline and groove connection being created between the arbor and cross-head, to prevent rotation of the former within the latter.

The vertical feeding of the arbor and plunger, or the recession and approach of the same with respect to the post *A*, and its matrix, are effected by means of an upright screw, *a'*, which is screwed through a second cross or transverse bar, *b'*, spanning the upper ends of the columns *z z*, and situated over the cross-head *y*, such screw being in axial alignment with the arbor *k*, and being swiveled to it in a suitable manner.

The upper extremity of this latter screw *a'* is provided with a hand-wheel, *c'*, for rotating it in either direction.

The above constitutes the chief and characteristic mechanical features of a machine embodying my invention, although such constituent parts are susceptible of a large range in details.

The operation of a machine organized substantially as above set forth in brief, is as follows:

The circular piece of metal destined to form the desired object is first cut from a sheet, and struck up by a suitable press into the form shown in Figure 6 of the accompanying drawing, which is a section of a blank.

This blank, thus produced, is placed bottom down within the matrix *n*, and the plunger lowered, (by means of the screw *a'*) until it meets the blank, and clamps it tightly to and within the matrix, it being understood that the diameter of the plunger or die is somewhat less than that of the matrix, in order to allow of consolidation, and, when necessary, expansion of the metal.

The driving-pinion is next put in revolution, which imparts rotation to the tablet *D*, the roller *o* being previously advanced until it nearly or quite impinges against the outer face of the side or wall of the blank, thus serving to prevent lateral crushing or misplacement of such wall.

As the two rollers, by the revolution of the tablet, travel about the blank, the upright roller rests upon the upper edge of such blank; consequently, if the attendant, by means of the screw *c*, depresses the said roller, the side or wall of the blank will be compressed, and forced within the space between the circumference of the plunger or male die, and, as a natural result, such blank will receive the impress of the characters formed in such die, of whatever nature they may be, whether intended for producing the "hinge-bearer," the "thumb-piece," the "pendent-lip," &c.

In order to produce these details of the watch-case, I am compelled to employ a sectional plunger, with a detachable die for producing the individual detail, since, were this portion of the plunger made integral with its main body, the watch-cover could not be detached from it.

The amount of metal contained in the wall or sides of a blank is to be so calculated as to produce the exact effect required. For instance, in producing a cover, the length of the side or inclosing rim of the blank should be such that, upon compressing and depressing the metal it shall not only be crowded into the "beading" formed in the matrix, but shall expand its upper edge inward to such an extent as to produce an overhanging lip, as shown at *d'* in Figure 7 of the drawing, which is a section of a portion of the matrix and plunger, and of the cover of a watch case.

I have found in practice that the operation of the horizontal roller is attended with less strain, and performs its work in a much more perfect manner, by beveling its lower edge, as shown in the drawing.

I would here remark that in addition to the two swaging or compressing and forming rollers carried by the rotating tablet *D*, other instrumentalities may as well be applied thereto, a "milling"-wheel for milling the outer edge of the center of the case.

Claims.

I claim—

1. The combination with the matrix and plunger, of two rollers or revolving swages, mounted, the one upon a vertical, and the other upon a horizontal axis, and arranged to move in a circular path around the plunger, and to operate in connection with said plunger and matrix, substantially as described, so that the former roller shall prevent the lateral displacement or fracture of that portion of the blank which projects above the matrix, while the latter roller is

crowding or compressing the said portion of the blank down into the space between the matrix and the plunger, as set forth.

2. The combination with the matrix and plunger, of the two rollers or revolving swages J and O, the revolving tablet D, upon which said rollers are mounted, and the means, substantially as described, whereby said rollers may be both vertically and laterally adjusted with respect to said matrix and plunger, as shown and set forth.

3. The combination with the roller J, oscillating arm *a*, and post *b*, supported upon the tablet D of the

pitman *d*, sleeve *f*, and wheel *j*, arranged substantially as shown and described.

4. In combination with the elements named in the preceding clause, the adjustable stop *i*, arranged and operating as set forth.

5. The combination and arrangement of the revolving tablet D, post A, matrix *n*, rollers J and O, plunger *x*, arbor *k*, and screw *a'*, the whole operating together to produce results hereinbefore explained.

Witnesses: THOS. BRADFORD DILL.

FRED. CURTIS,

EDWARD GRIFFITH.