

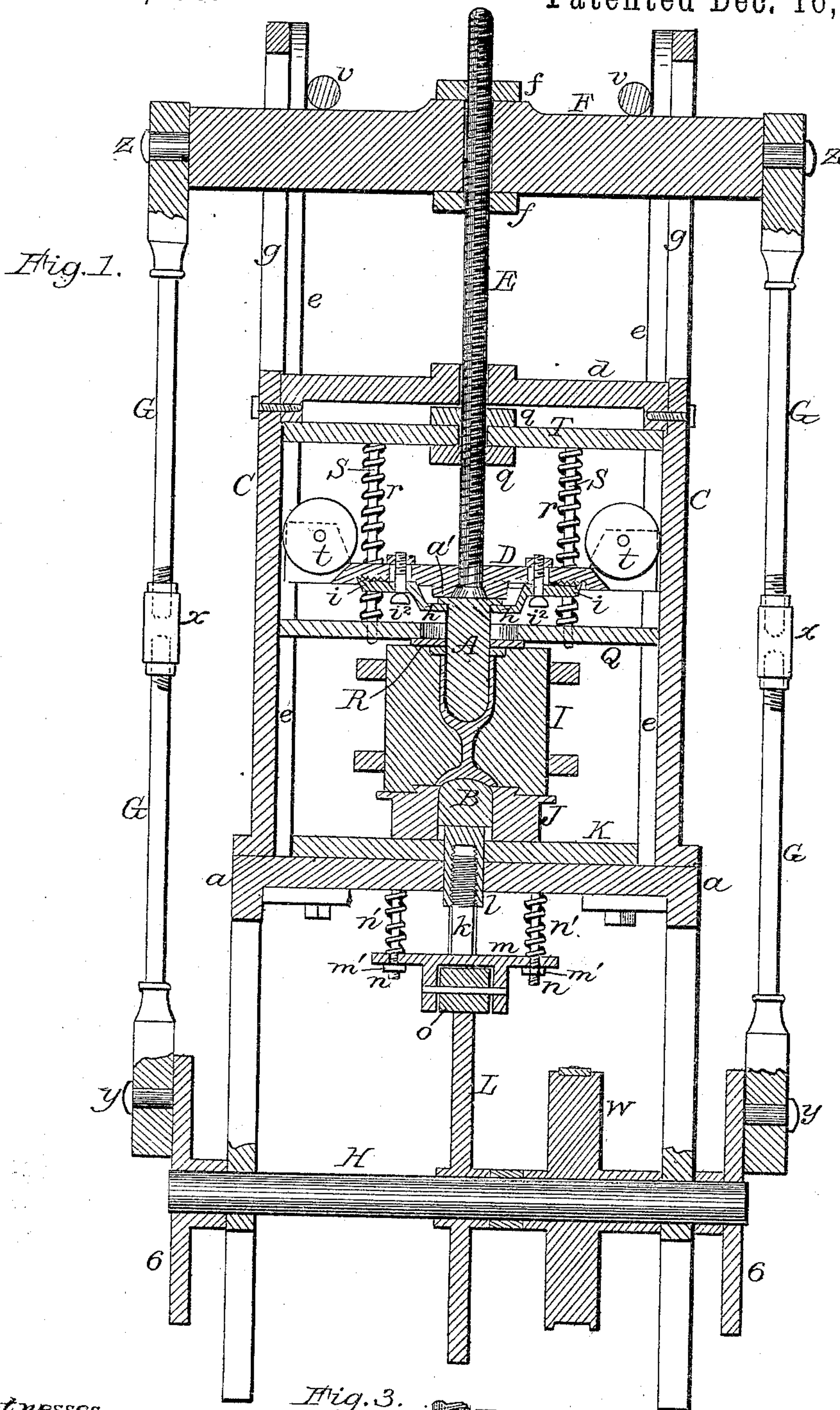
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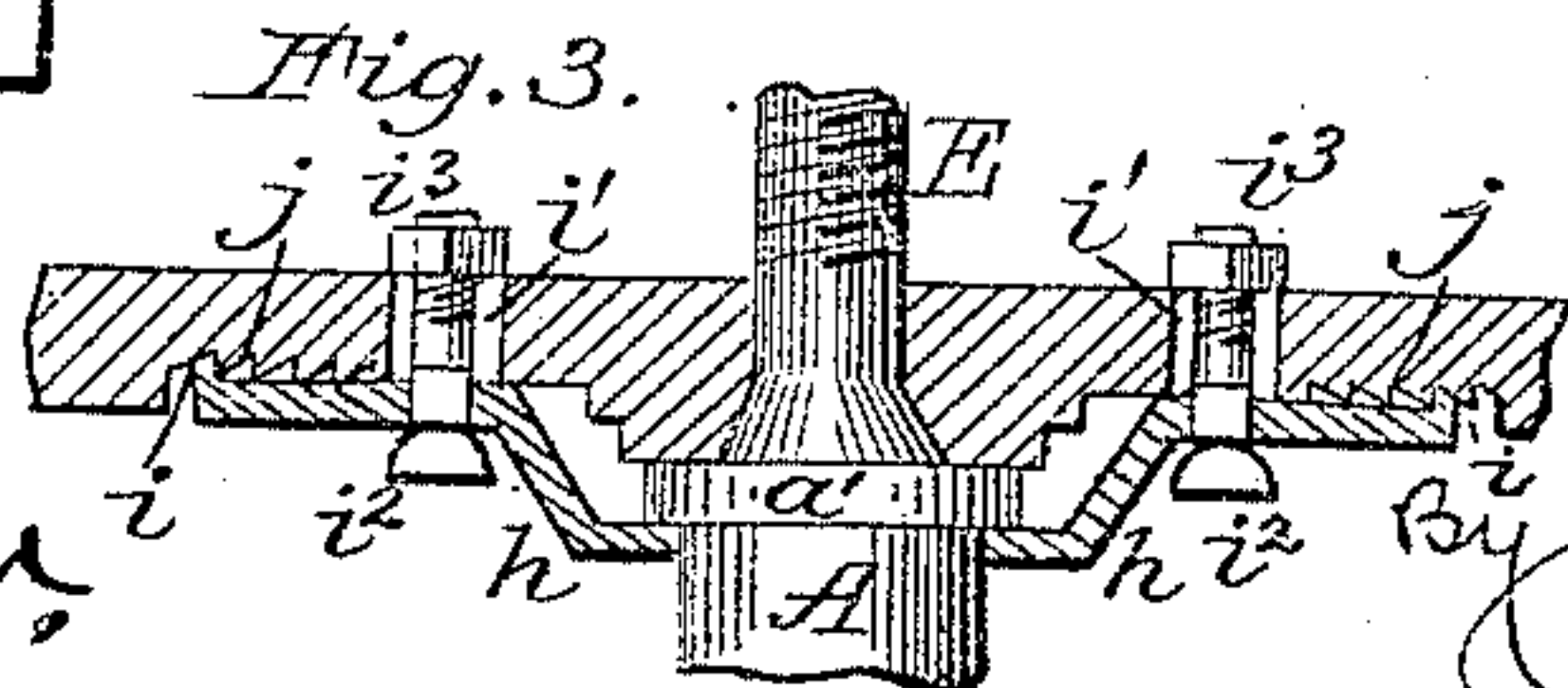
S. HIPKINS, JR.
GLASS PRESS.

No. 442,890.

Patented Dec. 16, 1890.



Witnesses
Howell Zartle
Philip T. Lerner,



Inventor
Stephen Hipkins Jr.
By John S. Johnson
his Attorneys

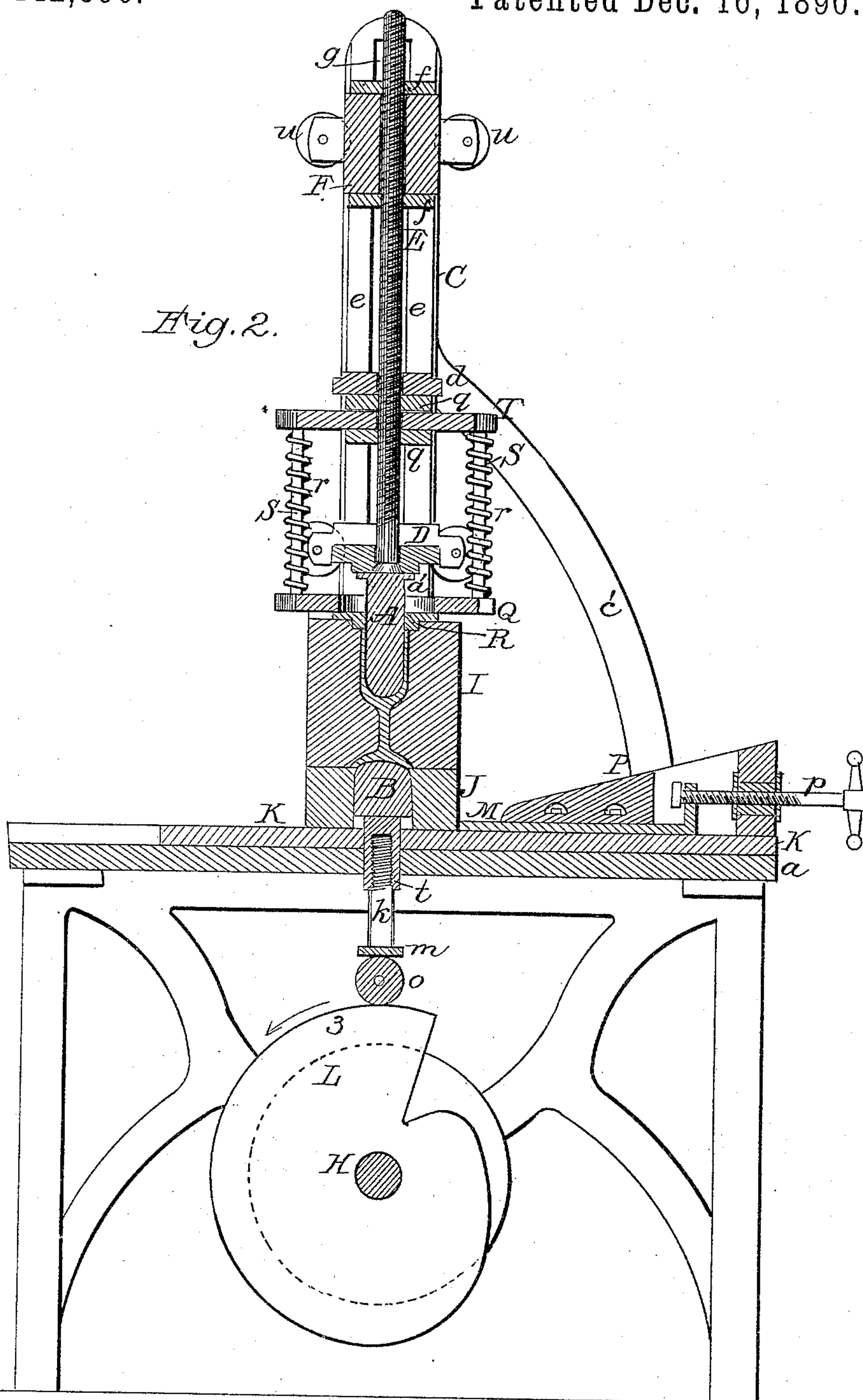
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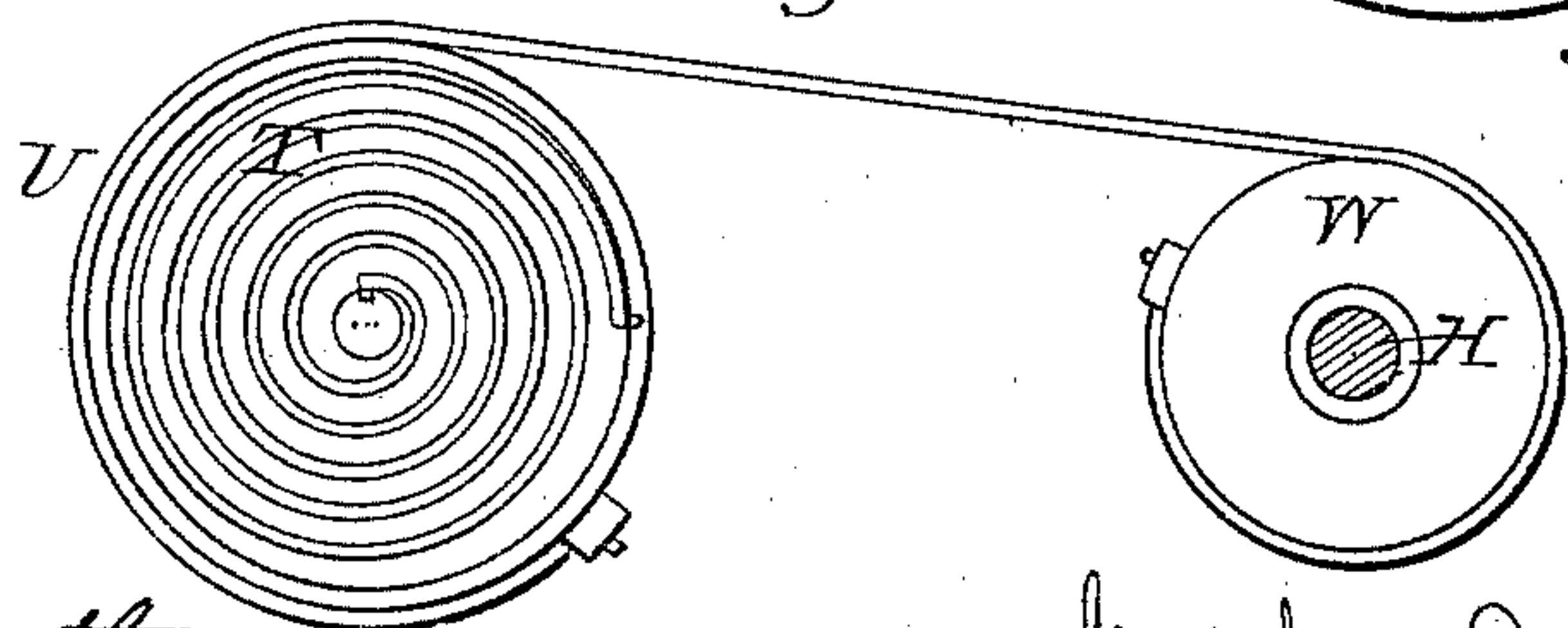
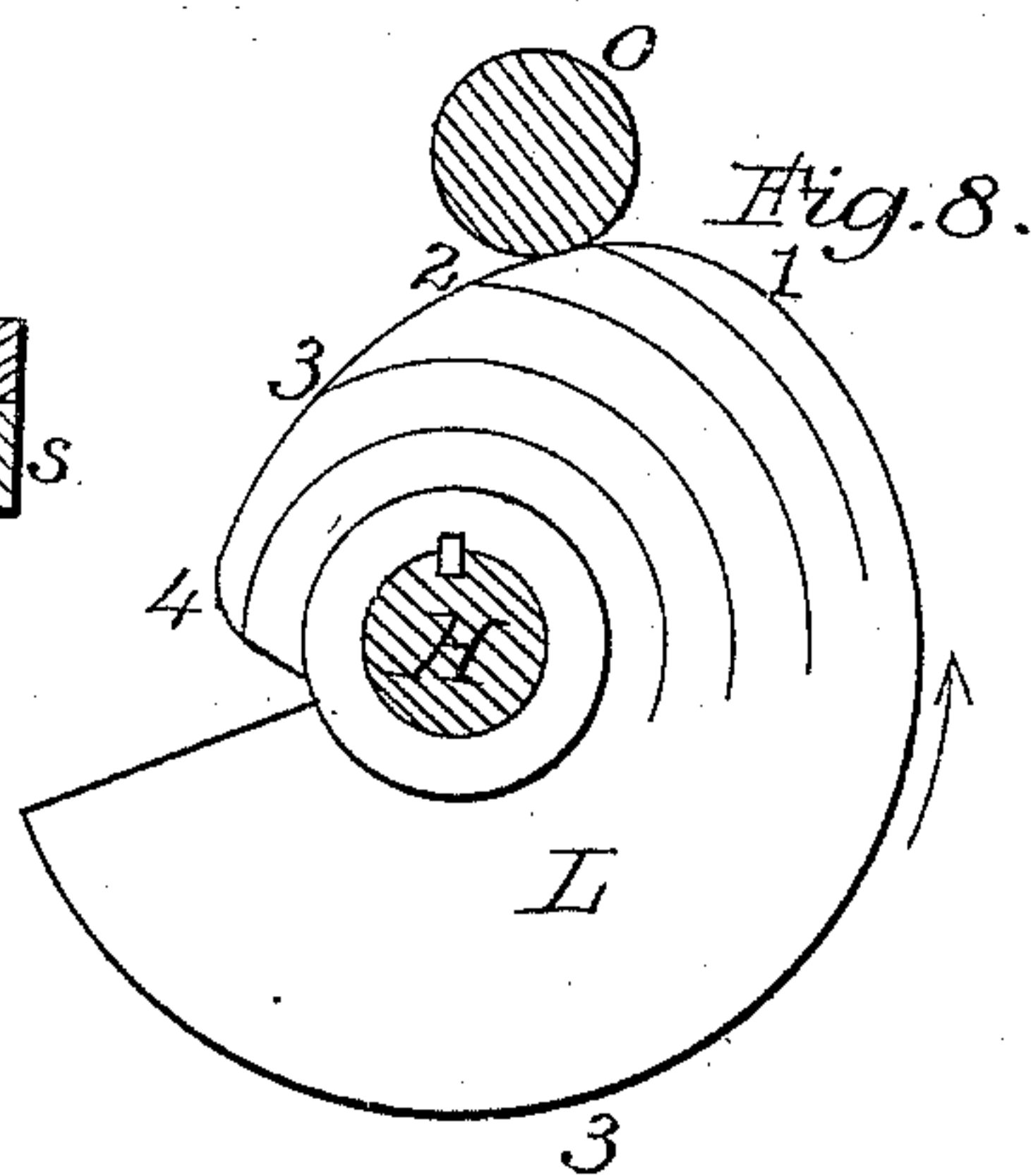
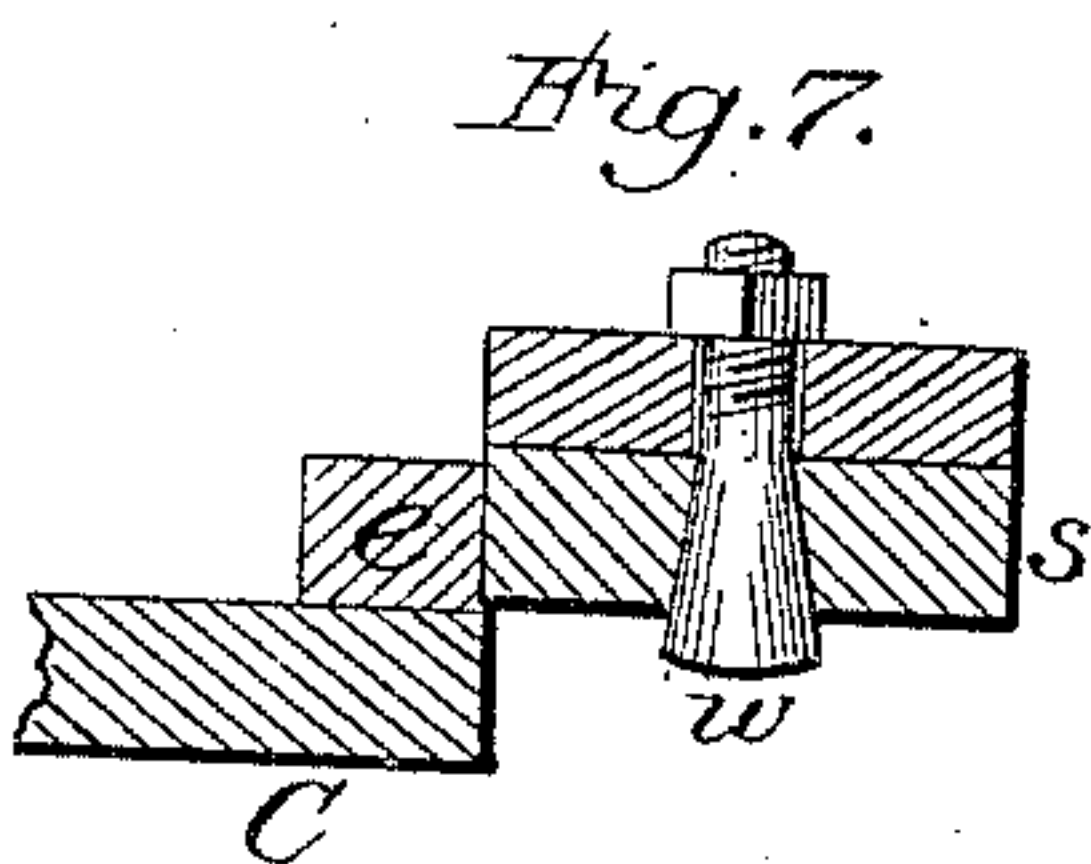
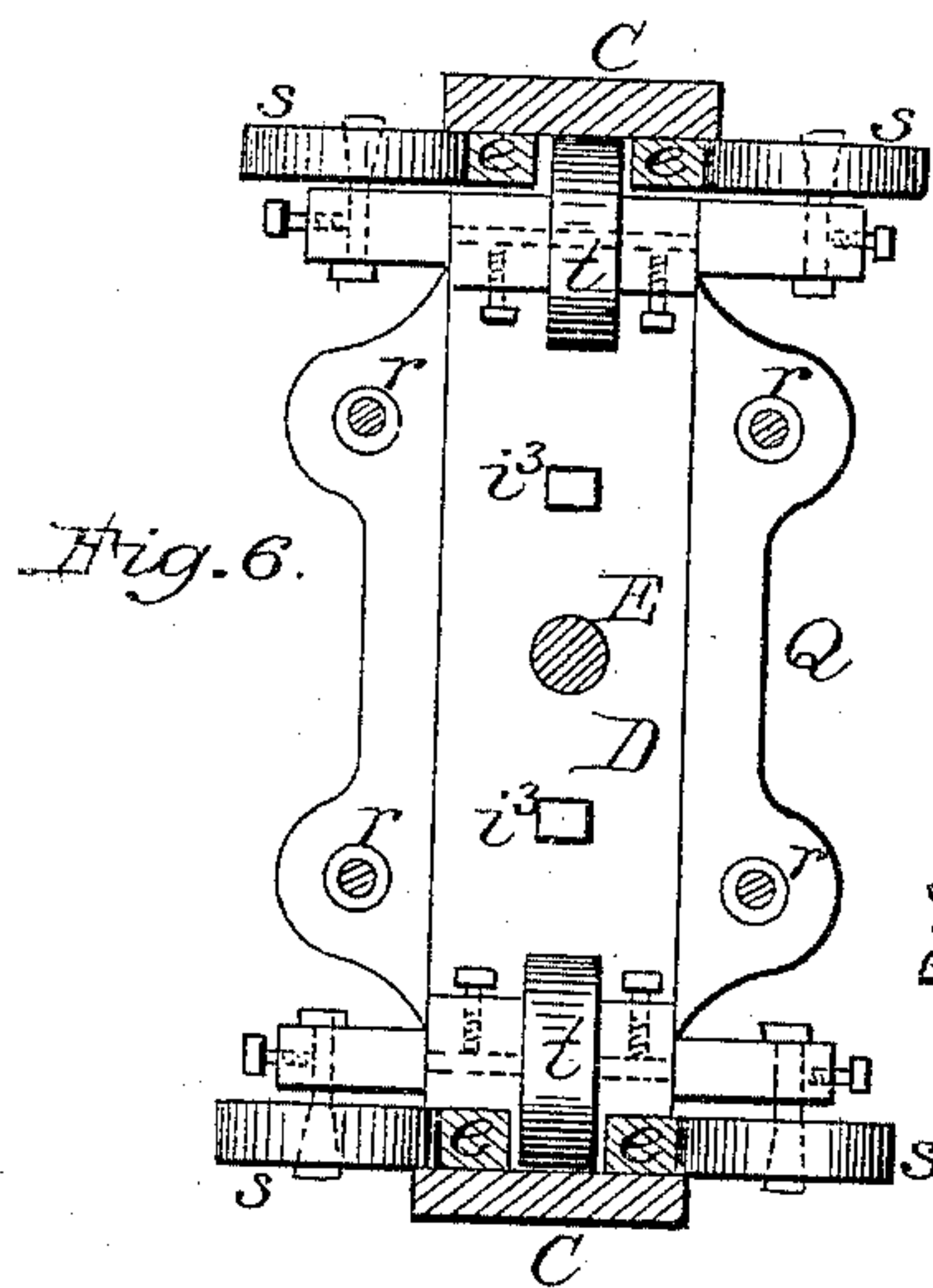
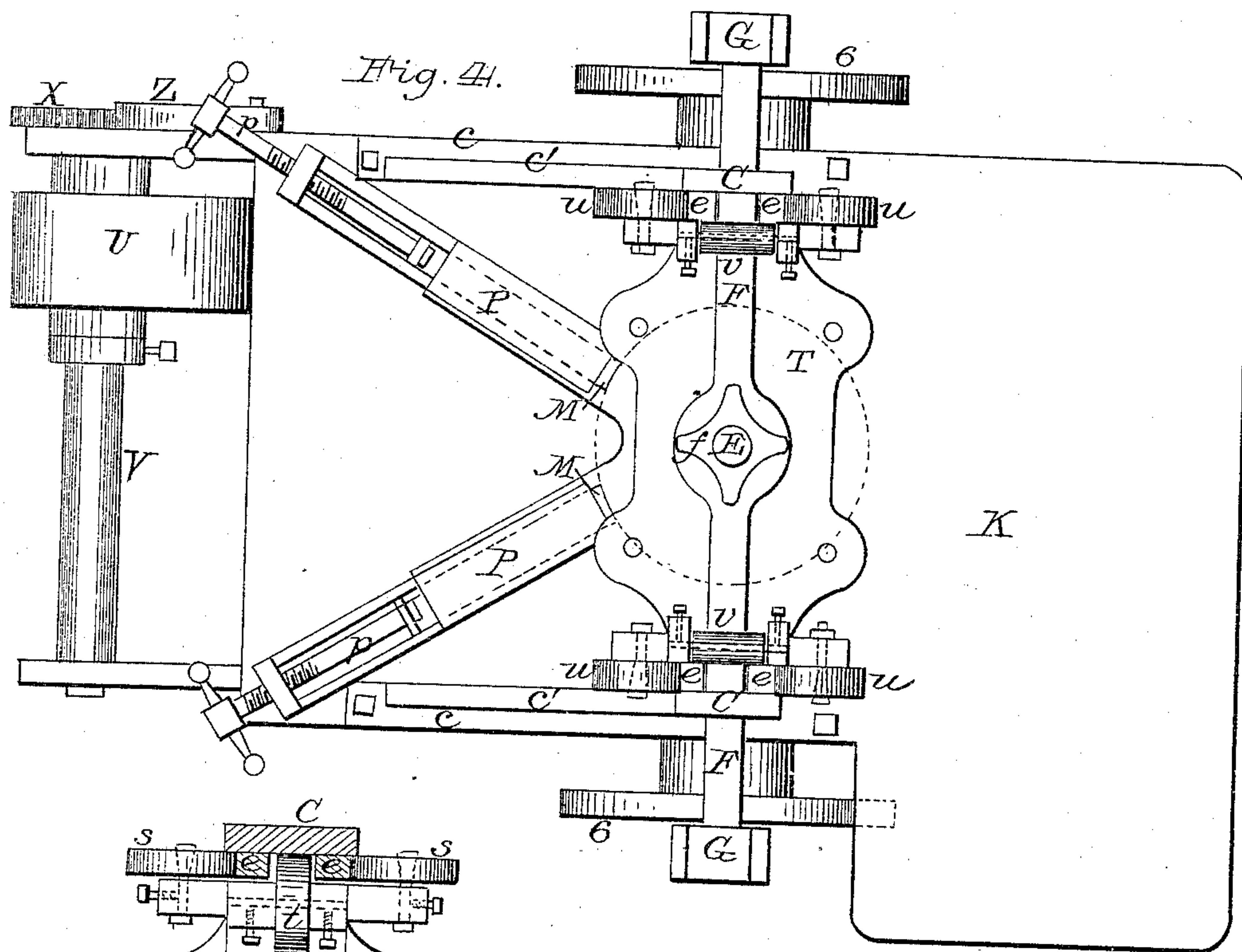


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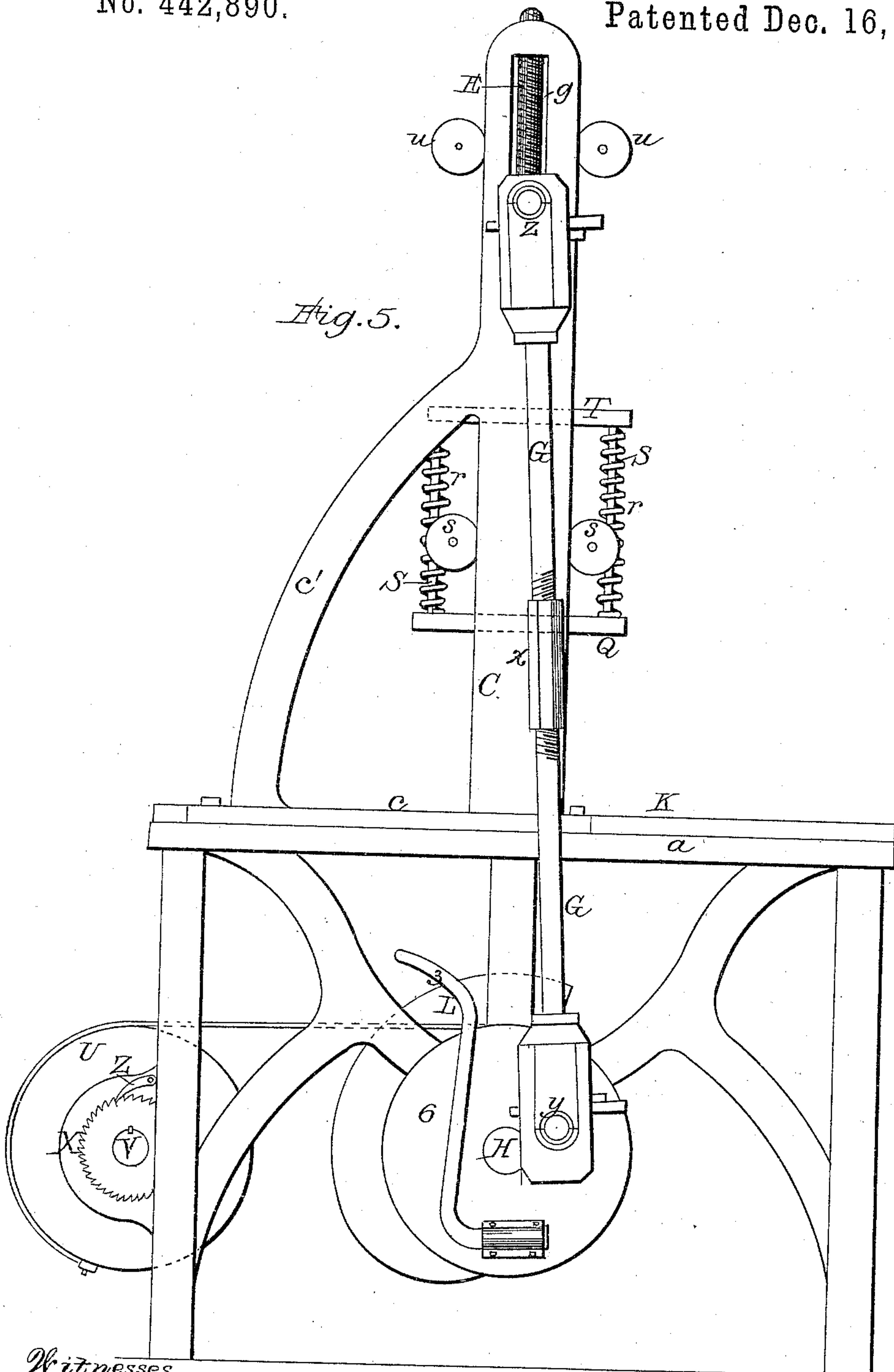
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UNITED STATES PATENT OFFICE.

STEPHEN HIPKINS, JR., OF MARTIN'S FERRY, OHIO.

GLASS-PRESS.

SPECIFICATION forming part of Letters Patent No. 442,890, dated December 16, 1890.

Application filed August 29, 1890. Serial No. 363,434. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN HIPKINS, JR., a citizen of the United States, residing at Martin's Ferry, Belmont county, in the State of Ohio, have invented new and useful Improvements in Glass-Presses, of which the following is a specification.

My invention relates to glass-presses; and it consists of certain novel parts and combinations of parts which will be separately pointed out in the claims concluding this specification.

In the accompanying drawings I have illustrated a press adapted for manufacturing goblets by press-molding, and which embodies in total combination all the features of improvement which constitute my present invention.

For the purpose of informing those skilled in the art to which my invention appertains of the nature of my present invention, and for the purpose of instructing them how the same may be particularly and advantageously employed, I will now describe the devices which constitute my improved press, as illustrated in the accompanying drawings, which show the forms I at present prefer to employ.

In said drawings, Figure 1 represents a vertical longitudinal section of my improved press, the press parts being in the positions they occupy when the article is completed. Fig. 2 is a vertical cross-section of the same. Fig. 3 shows in vertical section the mold-clamping parts enlarged. Fig. 4 is a top view of the press. Fig. 5 is a side view of the same. Fig. 6 is a horizontal section taken above the cross-head. Fig. 7 is a detail view of one of the roller-bearings. Fig. 8 is a detail view of the under plunger-operating cam, and Fig. 9 is a detail view of the balancing-spring.

The press-operating mechanism is mounted in a suitable frame, that shown being a table *a*, supported by legs. The press has two co-acting simultaneously-moving plungers, one *A* of which is mounted in a vertical guide-frame bolted to the table and forms the bowl of the article in the mold, and the other *B* is mounted in a guide-housing beneath the table and forms the foot or base of the article in the mold. The top guide-frame consists of two standards *C C*, each having a foot *c* and a brace *c'* firmly secured to the table at each side by bolts passing through said foot, and

these standards are connected near the middle of their length by a horizontal cross-bar *d*. On their inner face at their edges these standards have bars or ribs *e e*, preferably of steel their entire length, to form side bearings and guides, as I shall presently state. Below the fixed cross-bar *d* and between the standards I place a horizontal cross-head *D* and suspend it by a central screw-bolt *E*, which passes up freely through an opening in the said cross-bar *d* and through an opening in a top cross-beam *F*, by which it is suspended, and upon which it is made adjustable vertically by nuts *f* on the screw-bearing upon the upper and upon the under sides of said beam. The ends of this cross-beam pass through slots *g g* in the upper portions of the standards and are connected to pitman-rods *G G*, which are connected to and operated by a crank-shaft *H*, mounted in suitable bearings depending from the table, and by which said cross-beam and cross-head are reciprocated, as I shall presently more particularly explain.

The upper plunger *A* is clamped to and held in place against the under side of the cross-head by means of a clamp composed of two adjustable dogs *h h*, the inner arm ends of which are adapted to embrace the upper end of said plunger just beneath a head or collar *a'* thereon, so as to sustain it in position centrally with the mold, while the outer ends of these dogs have claw-heels *i i*, standing upward and adapted to bite or engage ratchet teeth or grooves *j* in the under side of the cross-head, as seen in Fig. 3. For this purpose these clamping-dogs have their inner arm ends bent to fit under the plunger-head *a'*, and the claw end of each dog has a hole through which passes a screw-bolt *i²*, up through a slot *i'* in the cross-head, and is clamped hard upon the dog by a nut *i³*. This construction permits the dogs to be set in or out from the plunger to suit the different sizes which may be used; and to cause the dogs to bear upon the head of the plunger with an accommodating hold and to relieve the bolt of undue strain I make the bolt-head *T* shape and form its bearing-side rounded, and it will be understood that the shank of the bolt is square, so that it cannot turn when being clamped, and that the clawed arm of the dog is seated in a recess in the under side

of the cross-head to hold it in line. This clamp device is a permanent fixture with the cross-head and permits the use of different kinds and sizes of molds which can be clamped to the cross-head and removed at pleasure for forming the bowl of the article. The mold I is seated upon the table, and may be of any suitable construction to be opened and closed in the usual manner, and adapted for use with a base J for containing the lower plunger B for forming the foot or base of the article. This lower plunger is fitted loosely within a central opening in the base of the mold and rests upon a separate table-plate K, and is raised to press the molten glass within the foot-cavity of the mold, as seen in Figs. 1 and 2. For operating this foot-forming plunger I provide a graduated cam L and intermediate pressure devices. This cam is mounted upon the crank-shaft II, and the intermediate pressure devices are connected to and depend from the under side of the table, so as to operate directly upon the bottom of the plunger by means of a sleeve *l*, fitted in an opening in the table in abutting relation to the plunger. A screw-threaded stem *k* engages an interior screw-thread of the sleeve *l*, and is carried by a short cross-arm *m*, fitted upon two screw-threaded pins *n*, fixed to and depending from the table. This cross-arm is constantly pressed down by springs *n'*, coiled upon said pins bearing against the table and the said cross-arm, which latter rests upon the said cam, so that the latter raises this plunger against the tension of the springs, and the latter, depressing the sleeve *l* by means of its screw-stem, allows the lower plunger to descend by gravity. The cross-arm is supported by nuts *m'* on the screw-pins, so as to adjust the tension of the springs, and the screw-stem *k* permits of the adjustment of the screw-sleeve, as may be required, to raise the plunger more or less to suit the thickness of the foot. A roll *o*, journaled on the under side of the cross-arm, forms the bearing upon the cam and serves to reduce the friction and wear thereof.

I have found in the use of press-molds that the sliding of the mold upon the table in setting it in the press and taking it out wears away the surface of the table and necessitates replanning the surface and destroys the table in time. This I avoid by the provision of an independent table-plate K, preferably of steel, suitably secured to the table and having an opening for the plunger-operating sleeve *l* to work in. This press-plate can be removed and renewed or planed off at any time when worn without disturbing the press parts. It also serves to hold the back guides M, which are used to center the mold in relation to the plungers. Referring to Figs. 2 and 4, these guides are seen as being formed of slides placed diagonally to each other with their ends in concentric relation to the circular wall of the base of the mold, and they are fitted within guides P, bolted to the table-plate

K, and provided with screws *p*, which engage with the outer ends of the said slides to set them in or out to suit different sizes of molds and to center the mold, as stated. This table-plate need not be fastened upon the table, but shouldered at its edges and fitted between and against the standards, which serve to hold it in place. The sleeve *l* for operating the lower plunger is fitted within an opening in said table, as in Fig. 1, and co-operates to hold this supplemental plate in place on the table to maintain the concentric relation of the back guides to the base of the mold when the said guides are arranged upon said plate.

For clamping and holding the mold in place when set, I provide a spring-sustained plate Q, having a central opening through which the upper plunger passes, and which is fitted at its ends between the guide ribs or bars *e* of the standards, so as to bear upon the top ring R of the mold. This spring clamp-plate Q is supported by four rods S, which are connected with and depend from a cap-plate T, which is adjustably secured to the central screw E by nuts *q q*, placed thereon above and below said cap-plate, and between the latter and the clamp-plate springs *r* are placed upon said rods to give the proper force to the clamp-plate.

The bearings for the cross-head are formed by rolls *s*, placed in pairs on each end thereof, so as to bear and roll upon the outer sides of each rib or bar *e* of each standard, and a third roll *t*, placed so as to bear and roll upon the inner side of each standard. The top cross-beam is provided with side bearing-rolls *u* at each end in the same way, and also with a cross-roll *v*, adapted to bear and roll upon the inner sides of the standard ribs or bars. These side bearing-rolls I prefer to mount upon tapering journals or pins *w*, fitted in suitable boss projections of the cross-head and cross-beam, so that they can be driven in to take up the wear upon the journal-pins or upon the eye of the roll. This construction also prevents the standards from wear and allows their guide-ribs to be made of steel. The side-roll journal-pins are provided with screw-nuts by which to secure them in place, and the journal-pins of all the rolls are held tight in their bosses by screws, so that the rolls only rotate as the upper plunger-operating parts are raised and lowered. This arrangement of the bearing-rolls gives the advantage of keeping the upper plunger in perfect alignment with the mold, for any wear on the ends or on the sides of the cross-head or of the guide-ribs or of the standards would, to a greater or less extent, impair the smooth working of the cross-head and cause more or less imperfection in the working relation of the plunger with the mold, and render it necessary not only to renew the press-standards but the plunger cross-head. The provision of the rolls not only avoids this very serious objection, but preserves the central

movement of the plunger in its relation to the mold. It is for this purpose that I arrange these rolls so as to act in pairs sidewise at each end of the cross-head, while a third intermediate roll coacts endwise at each end of the cross-head. These roll-bearings co-operate with the adjustable pitman-rods to cause the plunger to descend accurately into the center of the mold or article to be pressed therein, moving in a straight line and without any lateral or irregular or zigzag motion. These co-operating parts also prevent jolting or jarring of the plunger during its movement, so that it may at all times be kept perfectly true and straight.

I provide the pitman-rods G with a coupling formed by sleeved nut *x*, having a right and left screw-thread to receive the screw-threaded ends of the pitman-sections for taking up the wear upon the crank-pins *y*, the cross-beams, pins *z*, and the pitman-boxes. This provision for adjustment gives the important advantage of equalizing the action of the pitman-rod upon both its bearings at both sides of the press, and thereby avoid undue friction and wear and binding of the moving parts of the press, which would otherwise result from the coacting movements of the pitman-rods. This adjusting provision serves to render the press more durable, to keep its moving parts in perfect alignment, and easier to operate. It is also important in rendering the press more sensitive to the operator and enables him to know when the action of the top plunger is completed, so that he may relieve the glass from undue pressure, because to continue the pressure after the mold is filled tends to destroy the brilliancy of the glass. This provision for the adjustment of the pitman-rods gives the advantage of perfectly adjusting the press after it is put together and compensates for any want of harmony in the set of the crank-pins and of the top cross-beam, which is a very important matter, because of the difficulty in setting the bearings of the crank-shaft to be in exact working relation to the connections at both ends of the pitman-rods. This provision for adjusting the pitman-rods is important in giving the plunger a sharp and exact movement upon the glass at the completion of its work and prevents working the plunger with the least slack or overpressure.

In the provision of the bearing-rolls for the press cross-head and top beam the upper plunger is maintained in perfect alignment with the mold and with the guide-standards and with the parts working thereon.

As a means of balancing the upper plunger and its cross-head connected parts, I provide a counter balancing-spring T, coiled in a pulley-drum U, mounted to turn freely on a shaft V in the table-legs, with one end of the spring connected to said shaft and the other end to said pulley-drum, so that the tendency of the spring is constantly to turn its pulley-drum upon the shaft. A suitable belt is

connected to the circumference of said pulley-drum U and to a pulley W on the crank-shaft H, which, when the latter is rotated to bring down the upper plunger, causes the spring to be wound up within the drum, so that the tension thus produced serves to raise the said plunger and its connected parts, and thereby give a free and smooth movement to the upper plunger parts and avoid a sudden and jerking action.

The pulley-drum and its shaft is provided with a ratchet X and pawl Z connection for securing the drum to the shaft and setting the spring by turning the drum to the proper tension to suit the weight of the upper press, moving parts and weight of different plungers, which may be used interchangeably in the press.

In operating, the mold is open. The upper plunger is raised and the lower plunger is down. A lump of molten glass is put into the cavity in the base of the mold upon the lower plunger. The mold is then closed, and a lump of glass is dropped into the upper cavity of the mold and the two plungers are simultaneously operated to press the glass from below and from above into the mold. In this operation the lower plunger completes its movement first by means of the cam, and the said plunger is held at this point by the concentric portion 3 of the cam while the upper plunger is completing its movement. This gives the advantage of allowing the upper plunger to have a free movement in acting upon inequalities in the gathering of the glass, as it is well known that glass cannot be gathered in exact quantities. The action of the lower plunger is also made quicker by the action of the cam than that of the upper plunger, and this gives the advantage of forming heavy bases or feet before the lighter stem and bowl parts are completed. The importance of this is seen because in forming a heavy base or foot the work is divided between the two plungers and the thicker part of the article must be completed first to allow the upper plunger to adapt itself to the quantity of the glass in the mold. In this operation the extent of the upward movement or travel of the lower plunger can be varied to suit different bases or feet by the vertical adjustment of the screw-sleeve device *k l*, so as to set its cam-bearing roll *o* up or down to be acted upon by a certain portion of the cam, which is graduated so as to determine the extent of the travel of the lower plunger. In this adjustment the cam always has its full stroke; but the adjustment of its bearing-roll up or down causes the cam to act more or less with its cam-surface—that is, when the roll is set to receive the action of the cam-surface from 1 to 3, as in Fig. 2, the minimum movement of the plunger is effected, and when the roll is set to receive the action of the cam-surface from 1 to 4 the maximum movement of the plunger is effected. In this way the adjusting device can be set to cause the lower

plunger to form any style or size of base or article in the mold.

The construction of the press gives the advantage of allowing it to be adapted for using the upper plunger only or for using the lower plunger only, and in such uses the mold must be suited thereto.

The crank-pins are fixed in disks 6, and one of these disks has a suitable socket 7 to receive a curved lever 8, which serves as a handle by which to operate the crank-shaft, so as to give the latter a partial revolution only, and it is through this handle-lever that the operator is enabled to have sensitive control of the pressing. This partial revolution of the shaft is effected by the vibrating of the lever, as is usual in glass-presses, through an arc sufficient to oscillate the shaft II, so that the pitman-connections will bring the upper plunger down and the lower plunger up in the relative movements which I have stated. As the coil-spring is connected to the cam-shaft by the pulley-drum belt and as the descent of the upper plunger is balanced by the winding up of the springs during such descent, so the ascent of the plunger is assisted by the unwinding of the spring, and it is in this way that the upper plunger-moving parts are balanced.

I claim as my invention—

1. In a glass-press, the combination of the press-standards having guide-ribs, the upper plunger, and the cross-head carrying the latter, with the rolls *ss* at each side of each end of the cross-head bearing upon the outer sides of said standard-ribs, and the rolls *tt* at each end of said cross-head between the said side-roll bearing upon the inner sides of said standards, whereby to effect and maintain the perfect alignment of the upper plunger with the mold, as stated.

2. In a glass-press, the combination of the press-standards having guide-ribs, the upper plunger and a cross-head carrying the latter, the operating-shaft, the top cross-beam, and the screw connecting said beam and plunger, with the rolls *u* at each side of each end of said beam bearing upon the outer sides of said standard-ribs, and the rolls *v* at each end of said beam between the said side rolls bearing upon the inner sides of said ribs, and the adjustable pitman-rods, whereby to effect and maintain the alignment and the adjustment of the upper plunger and its operating parts to equalize the operating parts at both sides of the press and to prevent working the plunger with the least slack, as stated.

3. In a glass-press, the combination of the press-standards, a cross-head and a top cross-beam, a screw adjustably connecting said cross head and beam, a plunger secured to said cross-head, and a clamp for holding the mold in place, consisting of a spring-plate, a cap-plate adjustably secured to said screw, the pins connecting said spring and cap plates, and the springs upon said pins, substantially as described.

4. The combination of the cross-head of a glass-press, the dogs having claw ends and the clamping-bolts having T-heads formed with rounded bearings, said bolts passing through said dogs and through slots in said cross-head, and the latter having teeth for the dog-claws, and the plunger having a shouldered head.

5. In a glass-press, the combination, with the press-table, of an independent plate supplementing the table and retained in position between the press-standards for forming a wear-plate for the mold, as described.

6. In a glass-press, the combination, with the press-table, of an independent wear-plate supplementing the table, retained in position between the press-standards, and provided on its upper surface with abutting back guides for the mold, as set forth.

7. The combination, in a glass-press, of the mold, a plunger working upward in the base thereof, a cam having a concentric and an eccentrically-acting part, and intermediate yielding pressure devices operated by said cam for operating said plunger in the way described.

8. The combination, in a glass-press, of the mold, a plunger working upward in the base thereof, a cam having a concentric and an eccentrically-acting part, and intermediate yielding pressure devices having an adjustable screw-sleeve, and stem operated by said cam for operating said plunger, substantially as described, for the purpose stated.

9. The combination of a mold for pressing glass from above and from below, an upper plunger and a lower plunger, and means for completing the upward movement of the lower plunger in advance of the finishing downward movement of the upper plunger, for the purpose stated.

10. In a glass-press, the combination of the mold, a lower plunger working in the base thereof, a screw-threaded sleeve, a cross-arm having a screw-stem engaging said sleeve, guide-pins for supporting said cross-arm, and a cam having a concentric and an eccentric graduated acting-surface for operating said lower plunger, a crank-shaft for operating said cam, and means for connecting said shaft with the upper plunger.

11. In a glass-press, the combination of the upper plunger, its connected cross-beam, the crank-shaft, the pitman-rods connecting it with said cross-beam, the supplemented shaft having a balancing spring-drum, and a belt connecting said spring-drum with a pulley on said crank-shaft, whereby to balance the supporting and moving parts of the upper plunger in the way described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

STEPHEN HIPKINS, JR.

Witnesses:

G. E. H. JOHNSON,
PHILIP F. LARNER.