

(No Model.)

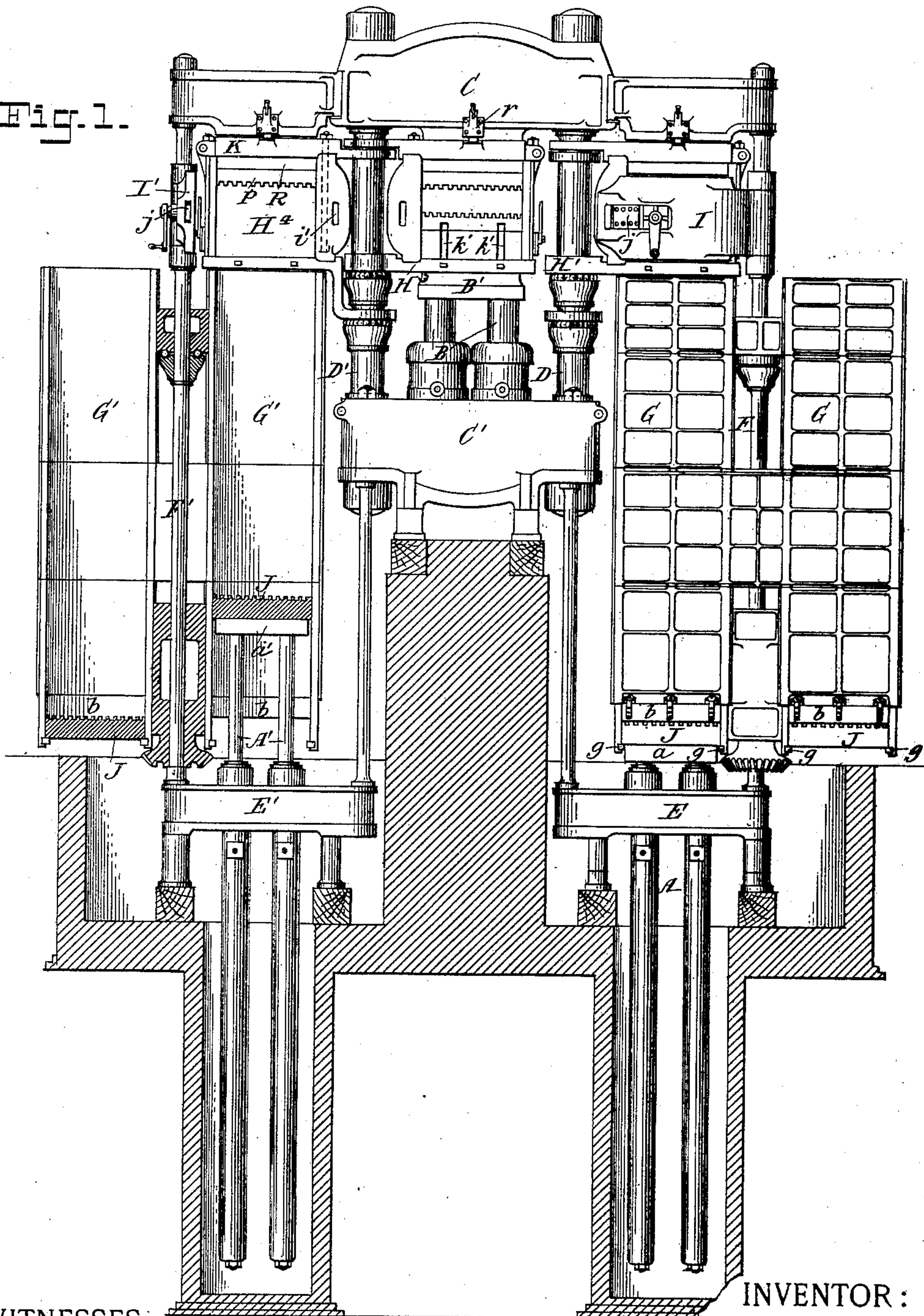
4 Sheets—Sheet 1.

J. WATSON.
BALING PRESS.

No. 367,483.

Patented Aug. 2, 1887.

Fig. 1.



WITNESSES:

John A. Rennie
A. L. Schultz

INVENTOR:

James Watson
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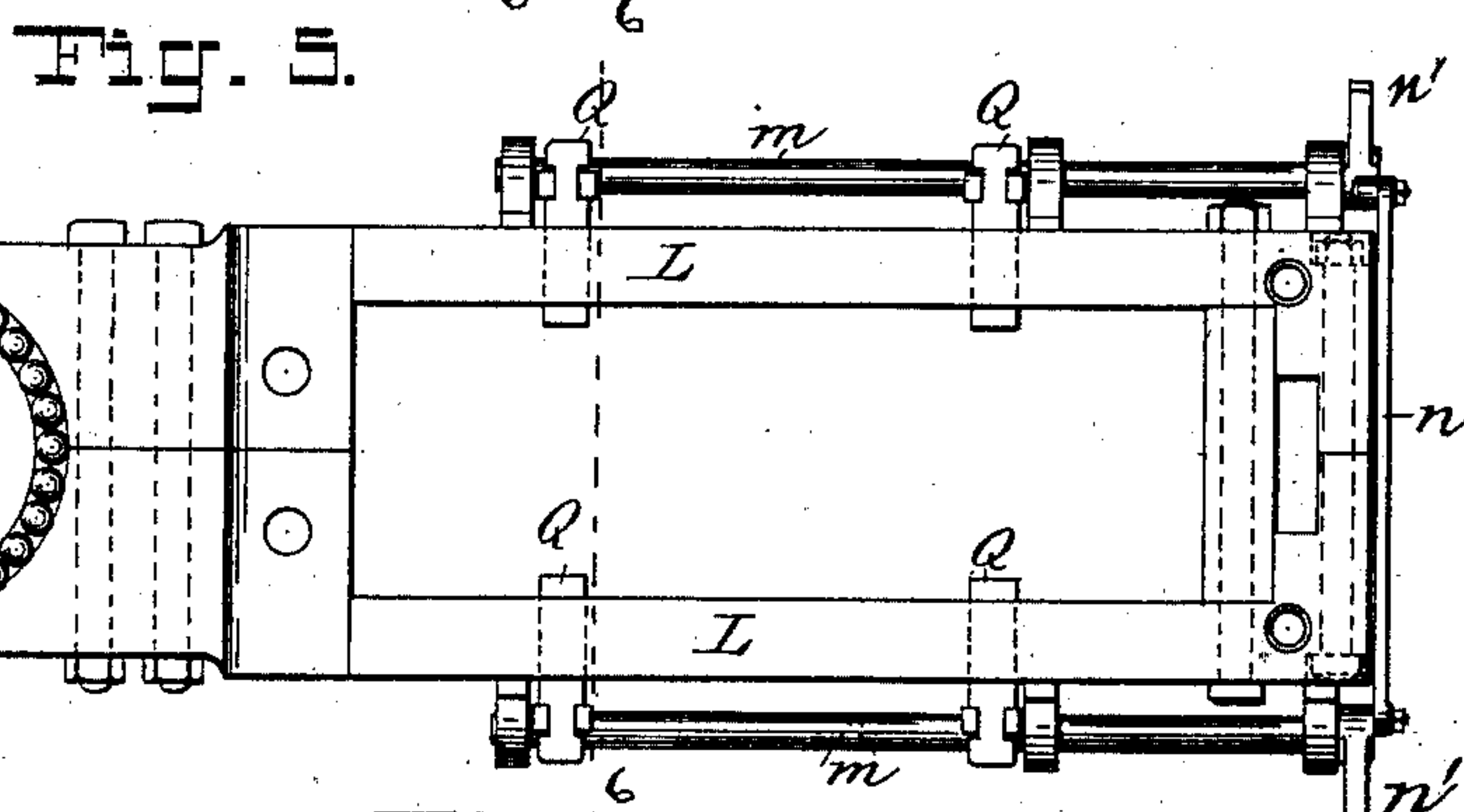
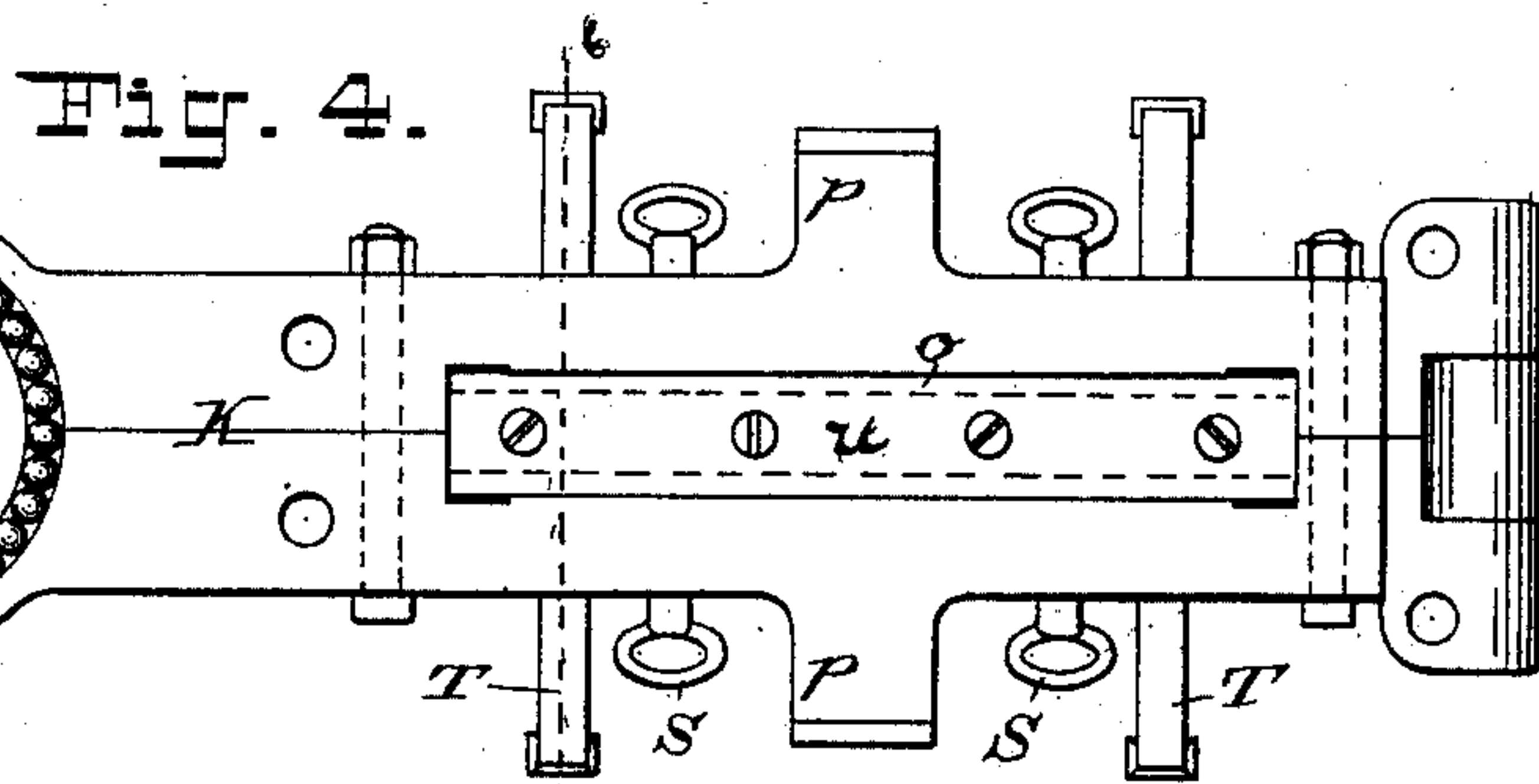


Fig. 6.

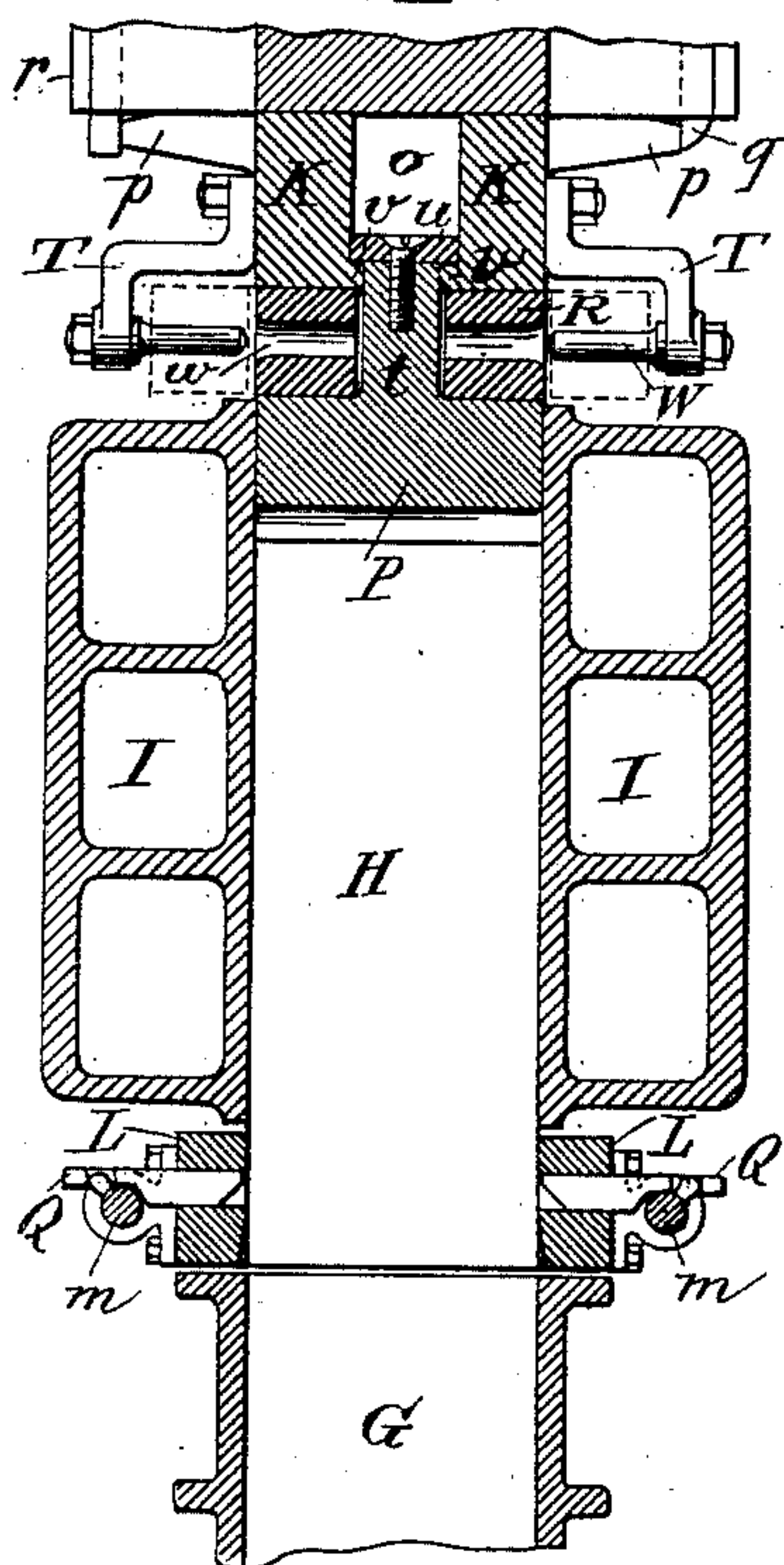


Fig. 7.

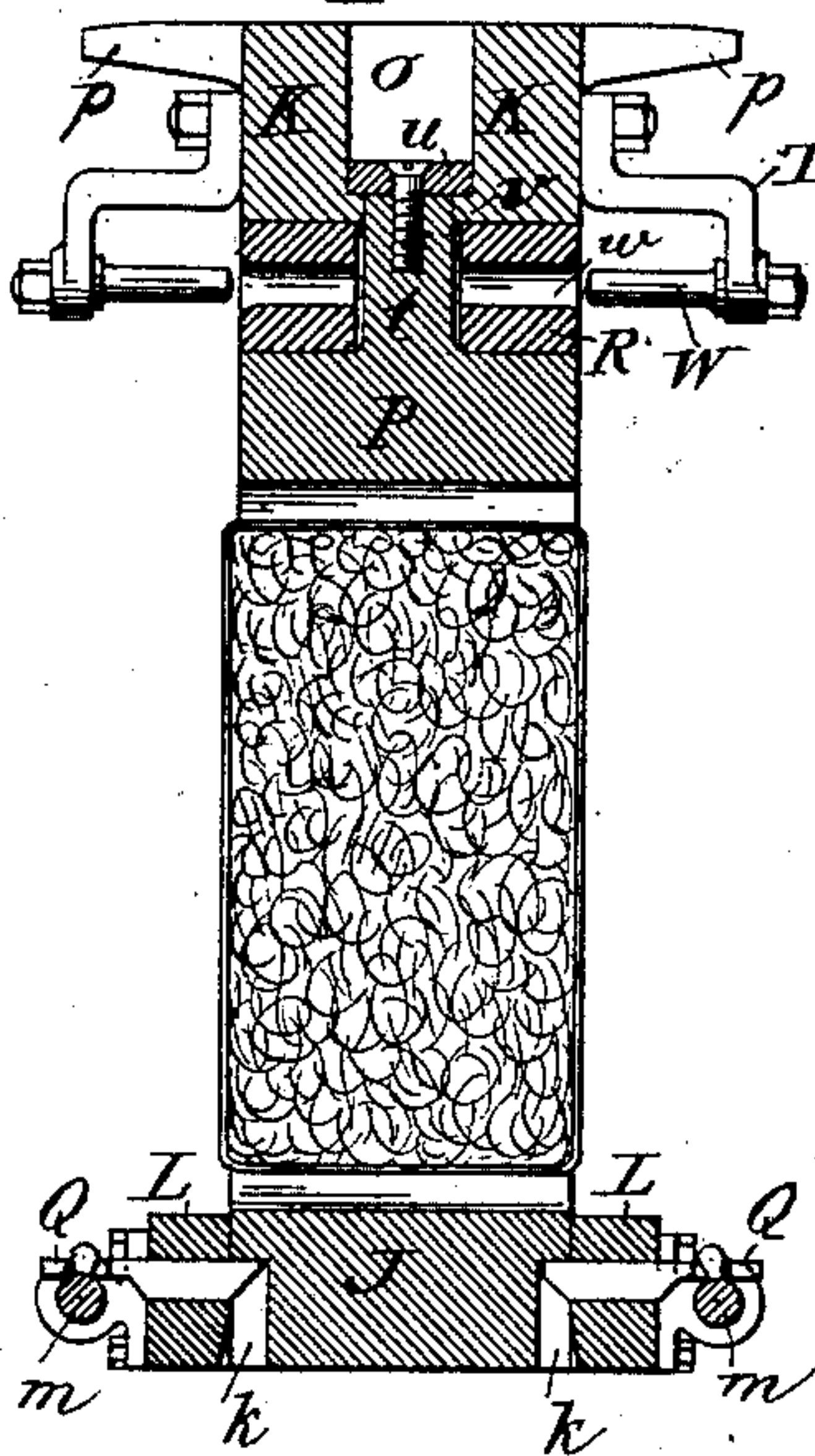
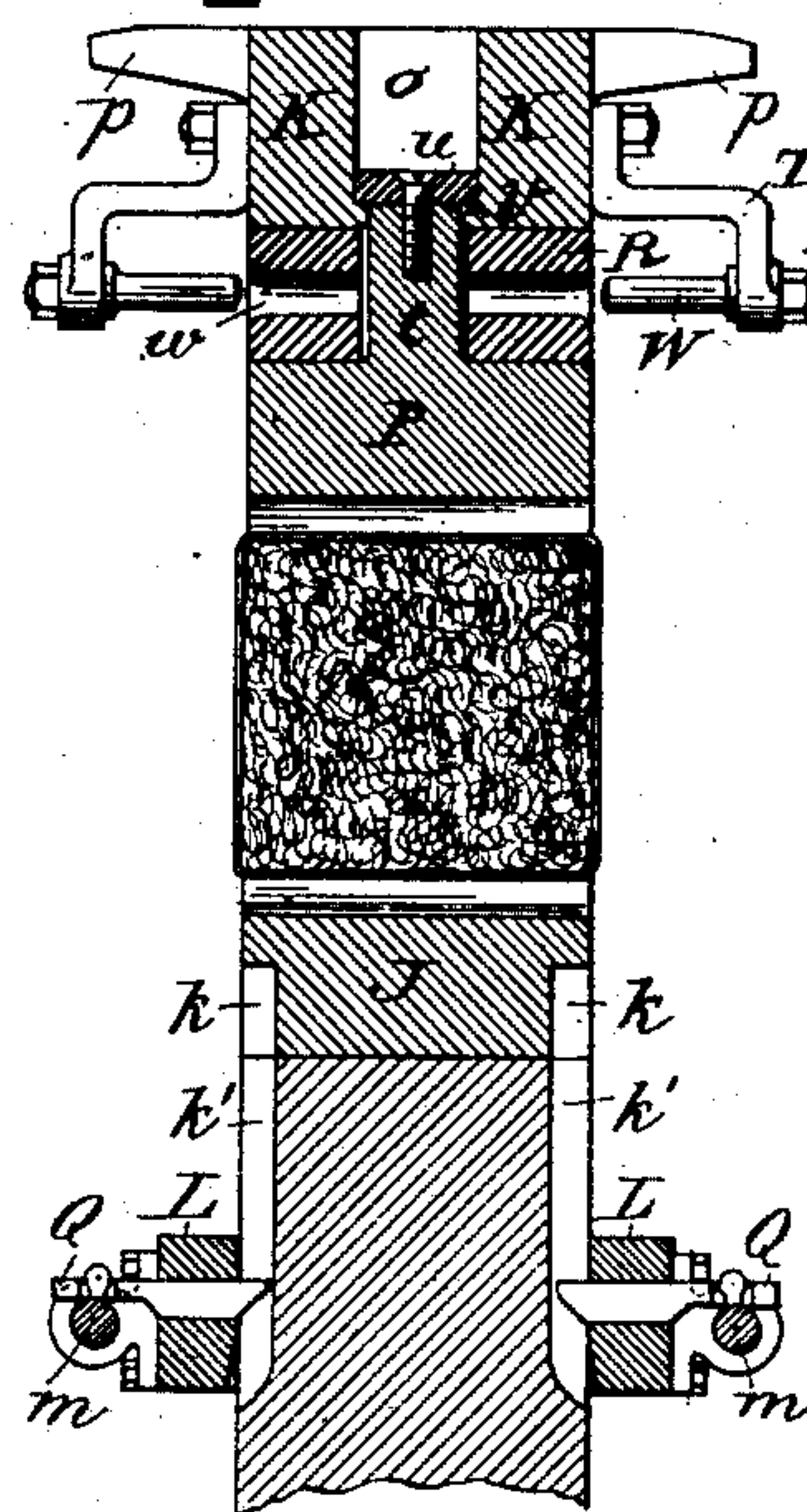


Fig. 8.



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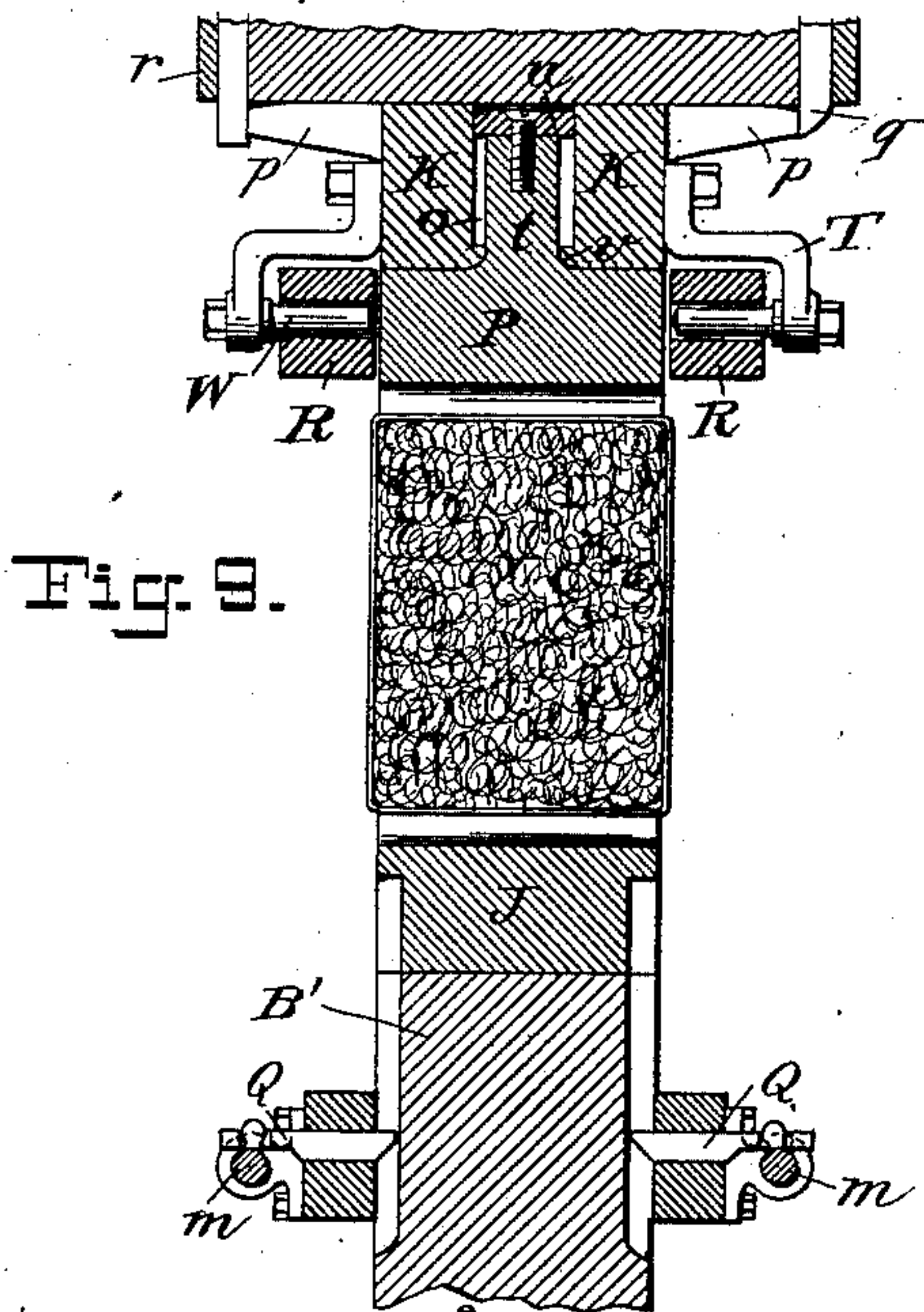


Fig. 9.

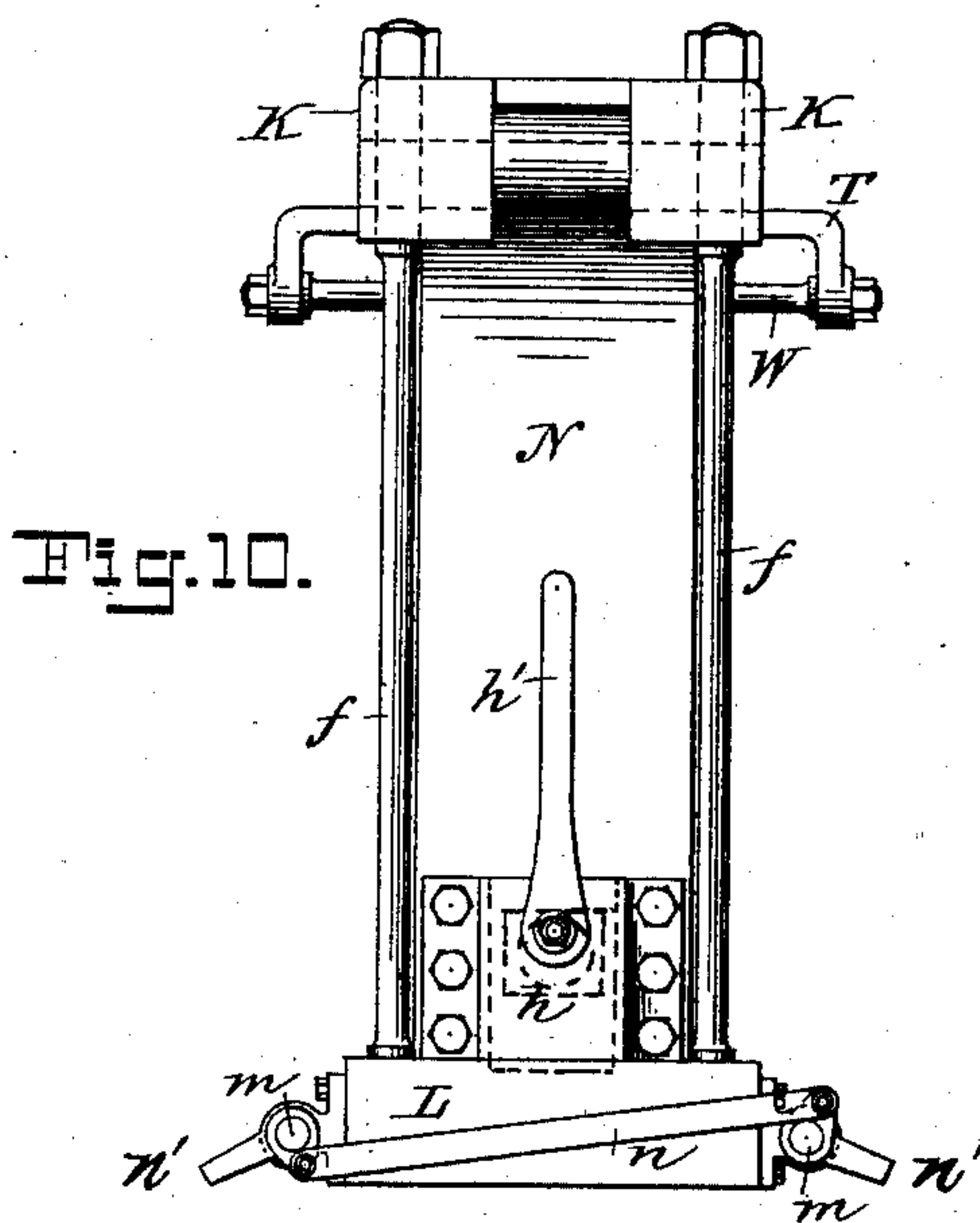


Fig. 10.

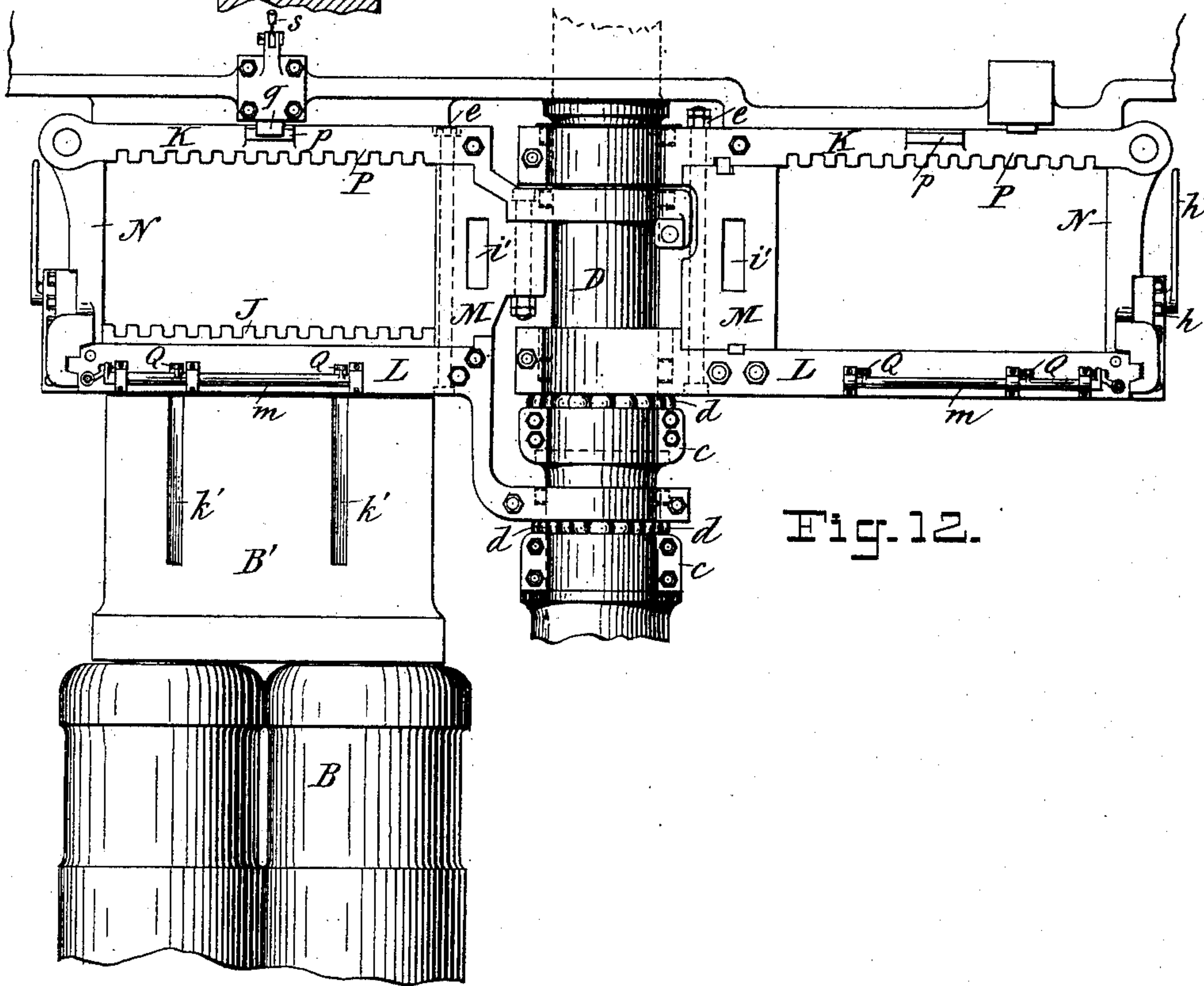


Fig. 12.

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UNITED STATES PATENT OFFICE.

JAMES WATSON, OF LONDON, ENGLAND.

BALING-PRESS.

SPECIFICATION forming part of Letters Patent No. 367,483, dated August 2, 1887.

Application filed May 16, 1887. Serial No. 238,303. (No model.)

To all whom it may concern:

Be it known that I, JAMES WATSON, a British subject, residing at London, England, have invented certain new and useful Improvements in Baling-Presses, of which the following is a specification.

This invention relates to hydraulic baling-presses of that class wherein the material to be baled is first given a preliminary pressure by one or more long-stroke rams and then a final squeezing by one or more short-stroke rams. In presses of this character the cotton or other material is filled into a deep box, which is then rotated until it comes over the long-stroke ram or rams. The latter then rise, thereby forcing the cotton up through the deep box and out at the top thereof into a shallow box or frame which stands directly thereover, thereby forming a partly-pressed bale contained entirely in said shallow box. The shallow box is then rotated until it is brought over the follower of the short-stroke ram or rams, which then rise, giving the final pressure to the bale, which is then lashed or hooped, and, being relieved from pressure by the descent of the short-stroke rams, is tumbled out of the box. In my United States Patent No. 283,838, dated August 28, 1883, is shown a baling-press of this character, wherein two shallow boxes are employed rigidly connected together end to end and pivoted on an axis intersecting their adjoining ends, so that when one box is in position over the preparatory or long-stroke rams the other is in position over the finishing or short-stroke rams. The sides of the shallow boxes are formed of hinged doors, which are kept closed during the operation of forcing the material from the deep box up into the shallow box, are carried around with the boxes when they are rotated, and are opened after the finishing-rams have begun to compress the bale. The bottoms of the shallow boxes are formed of sliding toothed stops or grids carried by the doors. These are thrust under the partly-pressed bale, and serve to hold it in the shallow box while the latter is being swung around from the preparatory to the finishing rams. With boxes of this construction it was impossible to lash the bale until after it had been carried over the finishing-ram and received its final pressure.

In my United States Patent No. 294,551,

dated March 4, 1884, is shown another press of the same general character, wherein the deep boxes and preparatory rams are duplicated, the finishing-ram receiving partly-pressed bales alternately from opposite sides. In this press there are two shallow boxes, each being independent of the other and the two being pivoted on different axes. The side doors, instead of being hinged to the shallow boxes and carried around with them, are hinged on stationary axes. The shallow boxes are constructed with a bottom plate or open frame, the opening in which is of the same size as the interior of the deep boxes in plan. In this press the lashings are put around the bale before the latter is swung over the finishing-ram, thus avoiding the waste of time involved in lashing the bale entirely while it is held by the finishing-ram, as was necessary in my first press herein referred to, and consequently enabling the finishing-ram to press more bales in a given time. It is necessary, however, that the bale should be held compressed by the preparatory ram while the lashings are thus being put around it, so that during this time this ram is necessarily inactive. Thus in my said 1884 patent the lashing of the bale was performed mainly over the preparatory rams, while in my said 1883 patent it was performed entirely over the finishing-rams. The mere transference of this operation from one set of rams to the other would have involved no material saving of time, and hence no increase of any consequence in the capacity of the press, except for the fact that the construction of independently-revolving boxes in that patent enabled the preparatory boxes and rams to be duplicated, so that in two sets of boxes the bales were being prepared for the action of the finishing-rams.

My present invention aims to increase the efficiency and economy of working of a press wherein only one set of preparatory boxes and one preparatory ram or pair of rams are employed. To this end I provide means whereby the partly-compressed bale may be lashed after being removed from over the preparatory rams and before being swung over the finishing-rams. Thus as soon as the preparatory rams have pressed the material into the shallow box the side doors may be at once opened and the shallow box containing the partly-formed bale

swung out, thereby leaving the preparatory ram free, so that it may be utilized in preparing the next successive bale during the time that the lashings are being passed around the bale which has thus been prepared.

In carrying my present invention into practice I connect three (or more) shallow boxes rigidly together and pivot them upon a common axis, from which they project radially at equal angular distances apart. I arrange the preparatory and finishing rams in planes at an angular distance the one from the other equal to the angular distances apart of the shallow boxes—that is, in the case of three shallow boxes, at one hundred and twenty degrees apart. Thus when one of the shallow boxes is over one of the rams another of them will be over the other rams, and the third will be standing out clear of both rams and in position admitting of convenient lashing of the bale. In order to admit of the lashing of the bale while the box containing it stands clear from the rams, I construct the shallow boxes to receive removable false bottoms or lashing-plates, which are locked into them in the manner that I will presently describe.

Figure 1 of the accompanying drawings is an elevation of a baling-press constructed according to my invention, its foundations being shown in vertical section. The view is looking in the direction of the arrow 1 in Fig. 2. Fig. 2 is a plan of the press. Fig. 3 is a horizontal section thereof in the plane of the line 3 3 in Fig. 1, showing the side doors closed against the shallow box which is over the preparatory ram. Fig. 4 is a section cut in the plane indicated by line 4 4 in Fig. 1, with the deep and shallow boxes omitted, the view being, in fact, a plan of the respective rams or hydraulic presses. Fig. 5 is an elevation of the shallow boxes and the finishing-ram on a larger scale. This view is looking in the direction of the arrow 5 in Fig. 2, or in the contrary direction from Fig. 1. Fig. 6 is a plan view of the three shallow revolving boxes on the same scale as Fig. 5, the left-hand box being in horizontal section cut in the plane of the dotted line 6 6 therein. Fig. 7 is a side elevation of one of the removable false bottoms or lashing-plates; and Fig. 8 is a transverse section on the same scale as Figs. 5, 6, and 7 through one of the shallow boxes, taken in the plane of the line 8 8 in Fig. 6, and showing the parts at the time when a partly-formed bale is being lashed.

Referring first to Fig. 1, let A designate the long-stroke or preparatory hydraulic press or ram or pair of rams; B, the short-stroke or finishing press or rams; C, the upper cross-head of the press; C', the lower cross-head, on which the short-stroke rams are mounted; D and D', the columns uniting these two cross-heads, and which serve to take the thrust of the short-stroke rams; E, the upper cross-head, and E' the lower cross-head for the long-stroke rams, and F a column connecting these cross-heads.

G G are the deep or preparatory boxes,

which are connected rigidly together and pivoted on the column F. I have shown two of these boxes; but there may be two, three, or four, or more, if preferred. They revolve in a radius denoted by the dotted circle x in Fig. 2. Each box G has a capacity for holding sufficient of the bulky or loose material to form a bale. For a more exact description of these boxes and the method of operating them I would make reference to my said 1883 patent.

H H H are the three shallow boxes, which are connected rigidly together and pivoted on the column D. These boxes are arranged radially at equal angular distances apart—namely, one hundred and twenty degrees apart from center to center. The respective presses or rams A and B are likewise arranged in planes one hundred and twenty degrees apart, as shown in Fig. 4, so that when one of the boxes H stands directly over one pair of rams another of them stands directly over the other pair of rams and the third projects clear of both pairs of rams, as is apparent from Figs. 2 and 3.

I will now describe the construction of the shallow boxes with reference particularly to Figs. 5, 6, and 8.

Each box H consists of a top plate, K, an inner end plate or block, M, a bottom frame, L, and an easing-door, N, at its outer end. The three inner end blocks, M M M, are provided with flanges, through which bolts are passed to connect the three boxes together and form a hub for the set of boxes, as clearly shown in Fig. 6. This hub fits over the column B, anti-friction balls or rollers being interposed at top and bottom to enable the boxes to be easily rotated. The three top plates, K K K, are connected together in like manner and fastened to the blocks M M M. These plates are formed with notches on their under sides, through which to pass the ties or bands with which the bale is lashed. The bottom frame, L, is of U shape in plan, as shown at the left hand in Fig. 6, and is bolted to the block M by bolts $e e$. The opening in this frame should be of precisely the same size and shape as the opening in the deep boxes G G. The outer ends of the upper plate, K, and lower frame, L, are tied together by means of two bolts or pillars, $f f$. The end easing-door, N, is hinged to the outer end of the upper plate, K, extends thence downward between the tie-bolts $f f$, and terminates on top of the lower plate or frame, L, to which it is fastened by a vertically-sliding bolt, h , which is operated by a hand-lever, h' . When this bolt is thrust downward, it enters a hole or recess in the frame L.

The sides of the boxes H H are open, being closed by side doors, I I, during the preparatory pressing, but being open at all other times. These doors are constructed and mounted in the same manner as in my said 1884 patent. They are pivoted or hinged to a fixed frame, I', which is fastened on the column F. One of the doors has a hasp, i , hinged to its outer end, which, when the door is closed, projects

through a hole, i' , in the block M of the shallow box which at the time is standing over the preparatory rams, and when the other door is closed passes through a hole, j' , in the end of the latter, and is engaged by a locking-bolt, j , borne thereby, which is operated by a lever, l , whereby the two doors are fastened securely in their closed position. Other suitable fastenings may be applied.

J J are the false bottoms for the shallow boxes, of which there are four. One of them is shown separately in Fig. 7. These false bottoms or lashing-plates constitute followers for the rams, and in operation circulate from the deep boxes into the shallow boxes and back into the deep boxes. They form a free fit with the deep boxes, so that they may freely ascend or descend therein. The deep boxes have ledges g at their bottom ends, Fig. 1, which arrest these plates or followers and retain them therein as false bottoms therefor. When the rams of the long-stroke press A rise, their follower a lifts the plate J and carries it up through the deep box and through the opening in the frame L of the shallow box which is standing in position over the deep box. The plates J are made a free fit with this opening. The frame L is provided with some sort of locking device for holding the plate J in place, so that it may constitute a false bottom for the shallow box.

The construction of locking device which I prefer consists of bolts Q Q, sliding in the frame L, and so that when thrust in engaging notches k k , formed in the opposite sides of the plate J, Fig. 7, the plate is locked in place in the manner best shown in Fig. 8. The bolts Q Q are all operated simultaneously through the medium of two rock-shafts, m m , on opposite sides of the frame L, which shafts have radial arms entering notches in the bolts. The two shafts are caused to be operated together in opposite directions by means of a link or bar, n , which extends across the outer end of the box, as shown in Fig. 5, and has its opposite ends coupled to an upwardly-projecting crank on one shaft m and to a downwardly-projecting crank on the other. Levers o o project from the respective shafts, by means of which the workman may thrust in or withdraw the bolts.

The follower a of the long-stroke press or rams and the follower B' of the short-stroke press or rams are both of the same shape in plan as the interior of the deep boxes and as the openings in the bottom frames of the shallow boxes, and enough smaller to move freely therein. The follower B' is formed with two vertical grooves, k' k' , on each side, corresponding in position with the recesses k k and bolts Q Q. This is in order that when the follower B' rises to give the final pressure it shall not interfere with the bolt, but shall simply lift the plate J off from the bolt. Upon the descent of the follower the plate J will be arrested by the bolts.

The set of revolving shallow boxes (which I will term the "revolver") is locked fast in

each of its three positions—that is, in the position wherein the three boxes come successively inline with either pair of rams—by means of suitable bolts or catches. The top plate, K, of each box is formed with laterally-projecting arms p p on opposite sides. On the upper cross-head, C, over the finishing-rams, are mounted a beveled latch, q , on one side and a bolt, r , on the opposite side. As the revolver is turned the box H which is approaching the finishing-rams first encounters the beveled latch q , under which its advancing arm p wipes and lifts it, and upon the box reaching the correct position this arm abuts against the bolt r , and at the same instant the end of the other arm p passes from under the latch q and the latter springs back and engages it, preventing a rebound. The revolver is then held firmly in place by the opposite ends of the arms p p of one box being confined between the two latches q and r . When it is desired to swing the revolver farther, the bolt r is raised by means of a lever, s . (Shown in Fig. 1.)

I will now explain the operation of the press. The cotton or other loose material is first filled into one of the deep boxes while it is turned outwardly—that is, while it occupies the position shown at the left hand in Fig. 1. The boxes G G are then turned on their axis until the full box is brought over the long-stroke rams A. At the same time an empty shallow box is locked in position directly over this ram, and the side doors, I I, are closed against this shallow box and locked in place. Water is then turned on to the rams A, which ascend, forcing the loose lashing plate or follower J up through the deep box G and compressing the cotton into the shallow box. When the follower or plate J is thus raised to the proper height, the attendant throws in the bolts Q Q, and thereby locks it into the shallow box. The doors I I are unlocked as soon as the rams A reach their highest position—an operation which may, if desired, be performed automatically. The doors are then thrown open, the stop-bolt r is raised, and the revolver is turned one-third of a revolution, thus carrying the shallow box into which the cotton has been compressed into the position indicated at X² in Figs. 2, 3, and 5. We thus have a partly-compressed bale held in a frame or box with open sides and standing free from the frame of the press, so that the men can conveniently get access to it for passing the lashings around the bale. Thus the bale is lashed while the box containing it is, as it were, out of the press. After the bale has been lashed the revolver is turned another third of a revolution until the box containing the bale comes directly over the finishing-rams, whereupon the latter ascend, the follower B' rising under the loose plate J and forcing the latter up, thereby giving the bale its final pressure. The finishing-rams remain in this position for a moment, while the men draw the lashings tight around the bale and make their ends fast in the usual way. The rams then descend, the end easing-

door, N, is unfastened, thereby relieving the bale of end pressure, and the bale is tumbled out of the press. As the finishing-ram descends the loose plate J descends with it until again caught by the bolts Q Q. After the follower B' has descended low enough to clear the box, the revolver may be again turned, the empty box being thus swung out and brought over the preparatory rams again. At this time the deep box G in line with it is empty and the rams A are elevated with their follower *a* at the top thereof. The attendant then withdraws the bolt Q Q and the loose plate or follower J drops an inch or so onto the follower *a*, whereupon the rams A are lowered away to the bottom of their stroke, the plate J being arrested by the ledges *g g* at the bottom of the box. The pair of boxes G G is then turned a half-revolution, thereby bringing the empty box again into the filling position. The workman on the lower level then opens a small door, *b*, at the bottom of the box G, spreads a baling-cloth on the top of the follower J, and the box is then refilled with loose cotton.

We have thus followed the course of one charge of cotton during its formation into a bale, and have traced the loose plate or follower J during its circulation from the bottom of one deep box into one of the shallow boxes during its revolution therewith, its return into the other one of the deep boxes, and the rotation thereof to the point of starting. If two deep boxes G G are used, the plate J will enter them alternately.

During the time that the revolver is standing in either of its three positions three distinct operations are being performed simultaneously. The box H in the position X' over the preparatory rams drops its plate J, the preparatory rams descend, the boxes G revolve, bringing a full box beneath the box H, the preparatory rams ascend, thereby forcing a new bale up into the shallow box, the plate J under this bale is locked into the box, the follower *a* drops back enough to clear the bottom of the box, and the doors I I are thrown open. While this set of operations is being performed in the position X' the partly-pressed bale held in the box H which is standing in the position X² receives the preliminary lashing. This bale is three-fourths hooped in this position; and simultaneously with these two sets of operations the bale held in the box H which is in the position X³ over the finishing-rams receives its final pressure, has its lashings drawn tight and fastened, is released by the running down of the ram and the opening of the easing-door, and is tumbled out. These three sets of operations consume very nearly the same amount of time, so that the waste or loss of time is very slight, and the capacity of the press is consequently very high.

The rams A and B work alternately, so that the same pumps can supply them both. As soon as the revolver has been turned to a new position the finishing-rams B ascend, during

which time the rams A are lowered away and the boxes G G are revolved. After the ascent of the rams B is completed the rams A are run up.

In another application for patent executed by me simultaneously herewith (filed May 13, 1887, Serial No. 238,083) I have described and claimed the construction of the individual shallow boxes H H which is illustrated and described in my present application. I make no claim in this application to this construction of boxes, except in the case of boxes that are rigidly connected together, so that they necessarily revolve simultaneously. In my said other application I have described a construction for the shallow boxes which admits of pressing two sizes or weights of bales in the same press. That construction may be applied as well to a rigid-revolver press such as is claimed in my present application as to an independent-revolver press such as is claimed in my said other application.

It is not essential to my present invention in its broadest features that three shallow boxes be connected together, although this number is highly preferable. It is possible to employ a less number or a greater number.

What I claim, and desire to secure by Letters Patent is, in a baling-press, the following defined novel features or combinations, substantially as hereinbefore specified, namely:

1. The combination of the preparatory and the finishing rams, deep boxes for holding the loose material for the action of the preparatory ram, two or more rotative shallow boxes rigidly connected together in such manner that when one stands over the preparatory ram another shall stand over the finishing-ram, constructed with open sides and with a bottom opening, doors for closing the sides of said boxes, loose lashing plates or followers fitting freely within said deep boxes and adapted to enter the bottom openings in the shallow boxes, and suitable means for fastening said followers in the shallow boxes as false bottoms therefor, whereby when a partly-formed bale has been pressed into a shallow box the set of shallow boxes may be partially revolved and the bale may be lashed after being swung out from the preparatory ram and before being swung over the finishing-ram.

2. The combination of the preparatory and the finishing rams, a set of revolving deep boxes arranged to be brought successively in coincidence with the preparatory ram, a set of rotative shallow boxes rigidly connected together and adapted to be brought into coincidence successively with the preparatory and finishing rams, and constructed with open sides and with a bottom opening, two doors mounted on a stationary part and adapted to close the sides of said boxes successively and while either one thereof is in position over the preparatory ram, loose lashing plates or followers adapted to pass from the deep boxes and enter the bottom openings in the shallow boxes, and lock-

ing mechanism for fastening said followers in the shallow boxes as false bottoms therefor.

3. The combination of preparatory and finishing rams set in planes approximately one hundred and twenty degrees apart, a deep box for holding the loose material for the action of the preparatory ram, and a set of three rotative shallow boxes rigidly connected together and arranged radially around their rotative axis at equal angular distances apart, whereby while one of said shallow boxes is

standing over the preparatory ram the second is over the finishing-ram and the third is standing clear of both rams.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES WATSON.

Witnesses:

ARTHUR C. FRASER,

GEORGE H. FRASER.