

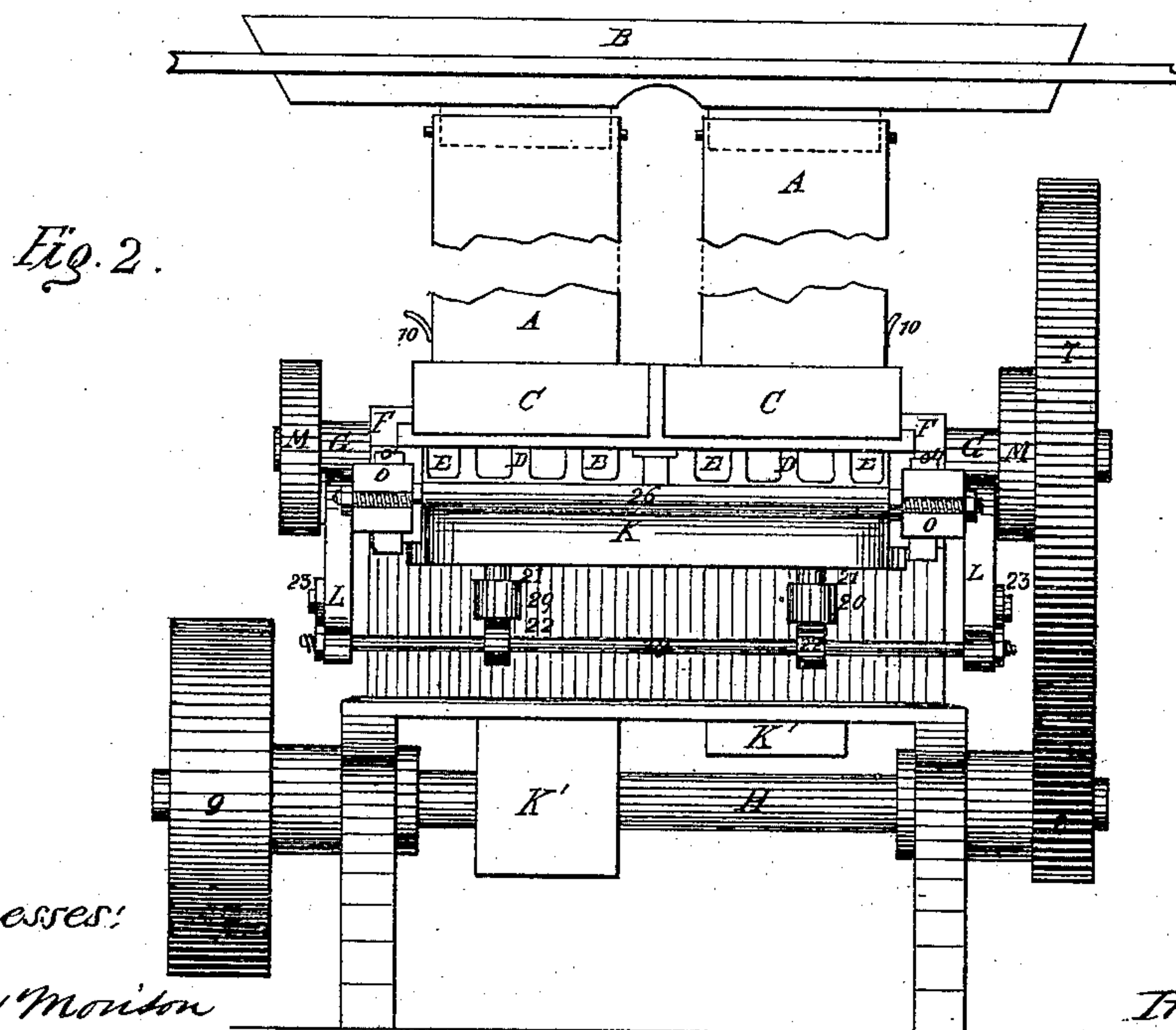
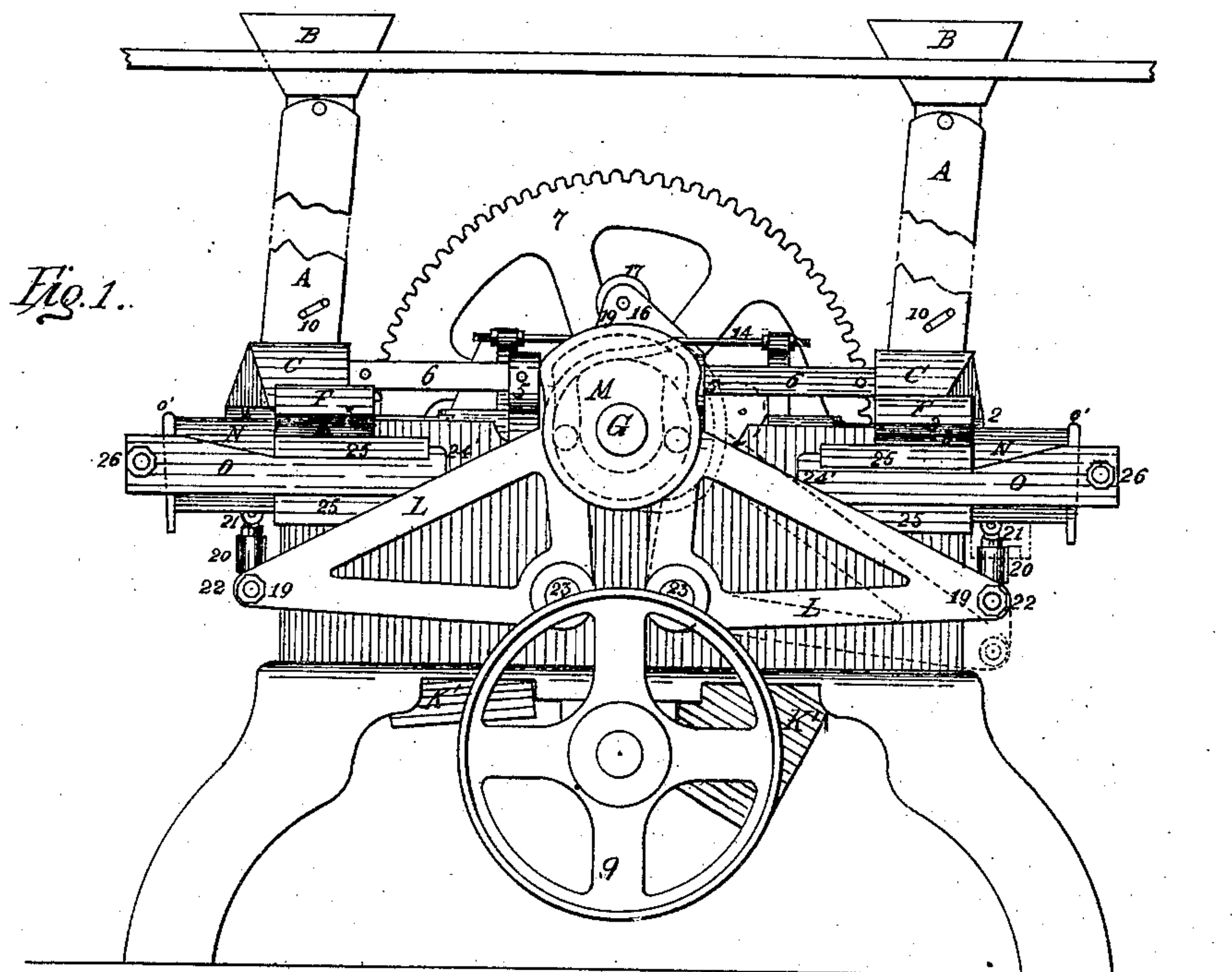
T. M. Mitchell.

Pent Machine.

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N^o 103,913.

Patented Jun 7, 1870.



Witnesses:

Benjamin Morison _____
 Charles Morison _____

Wm. H. Morrison

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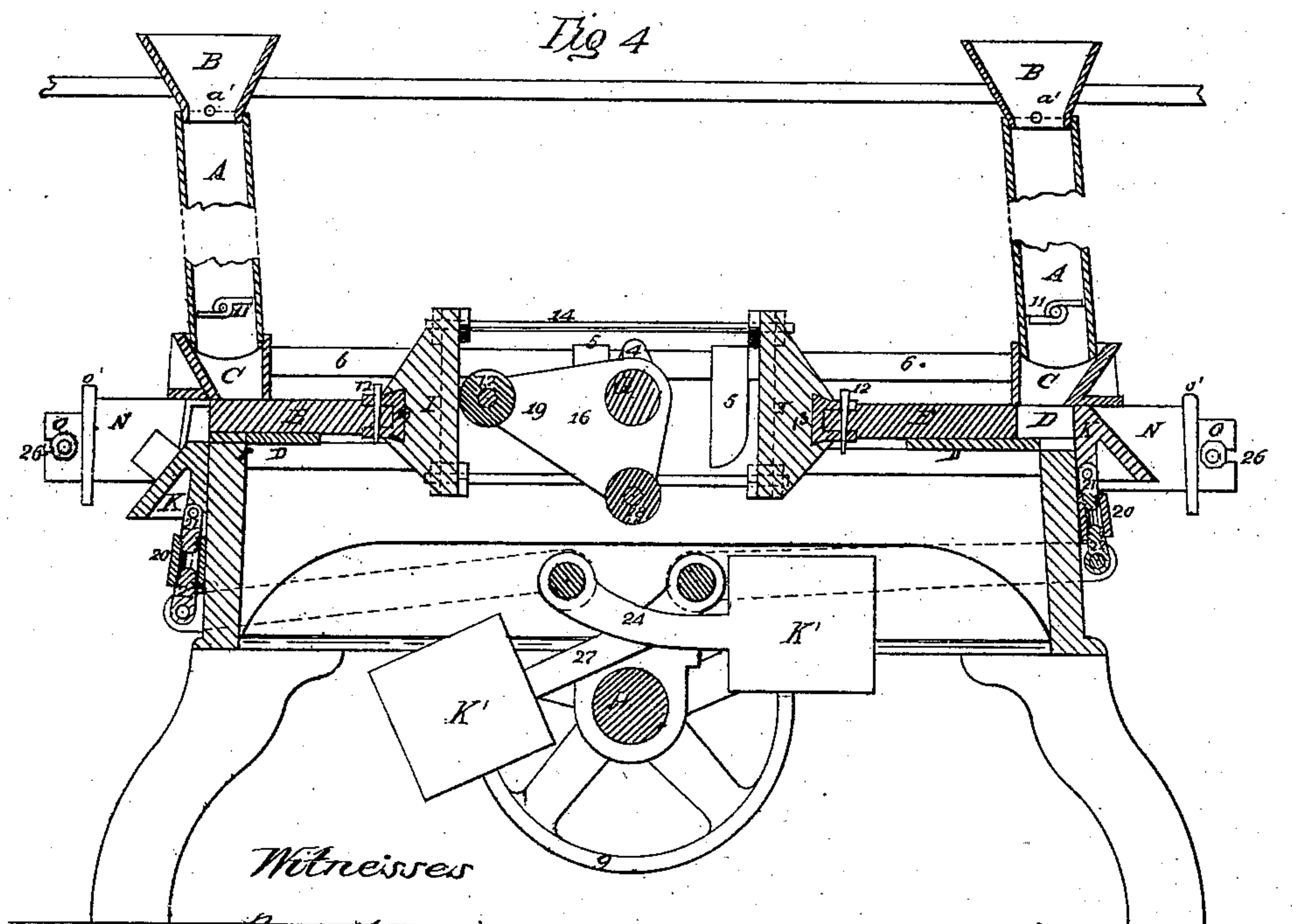
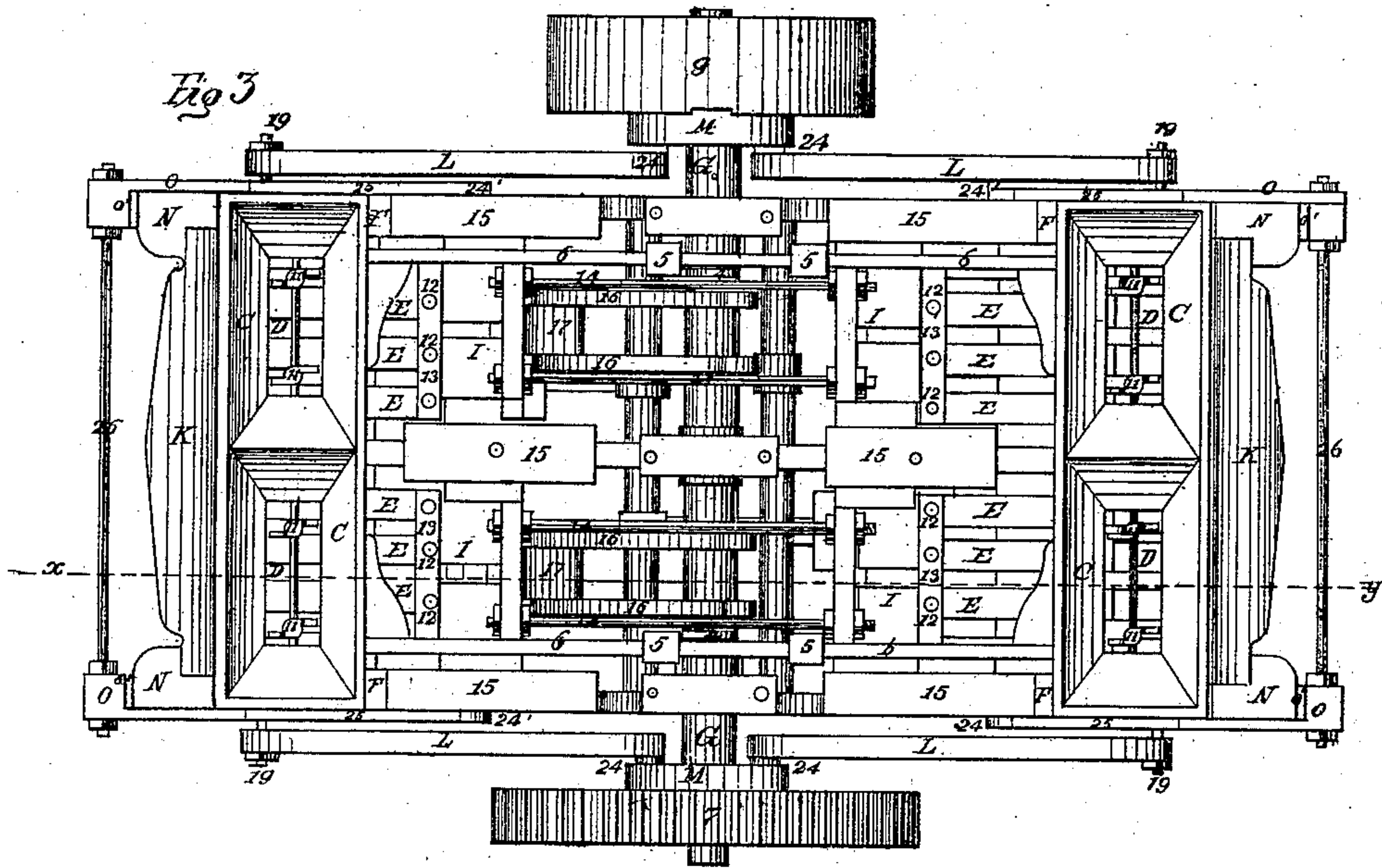
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Fig. 5.

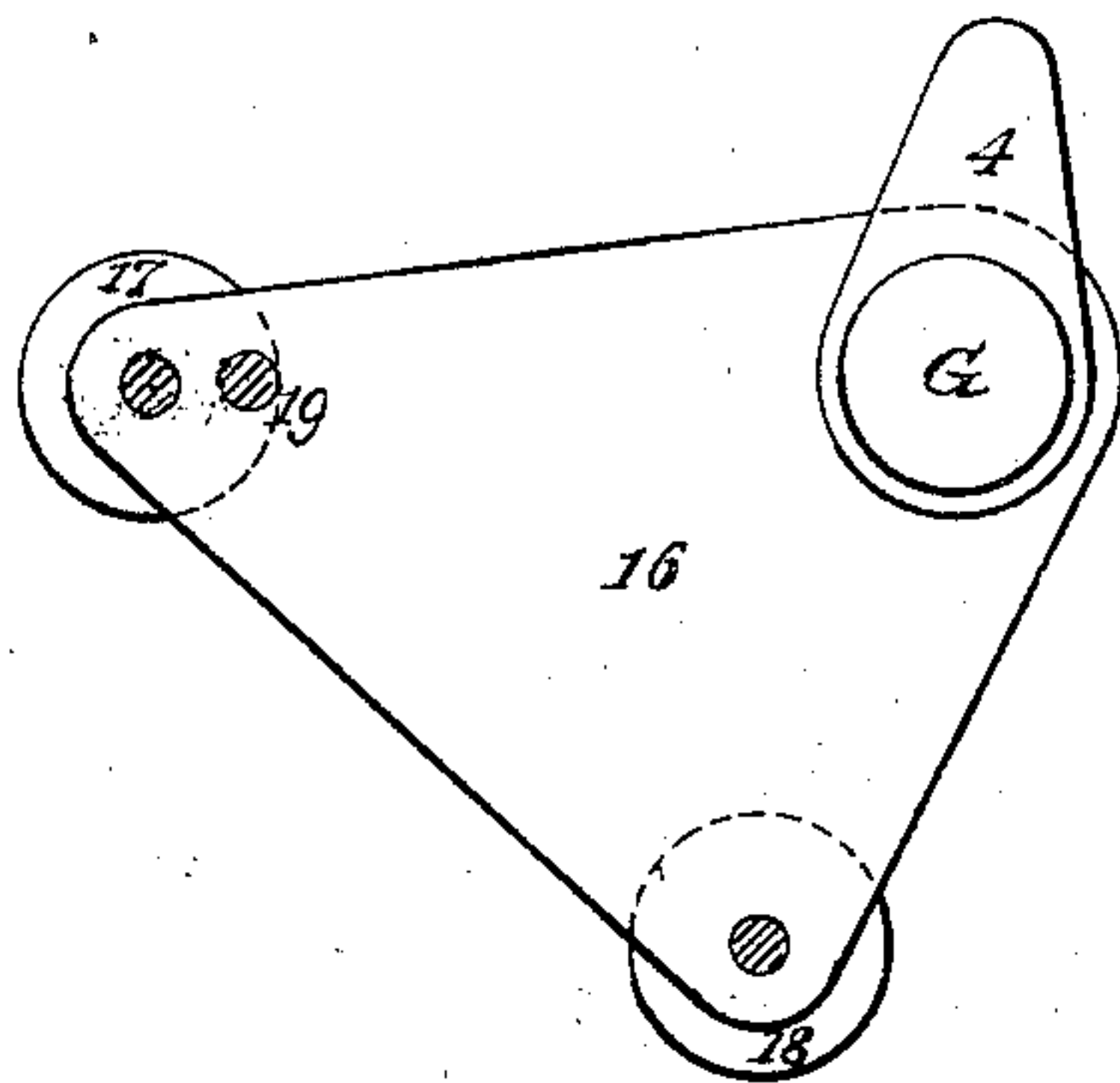


Fig. 6.

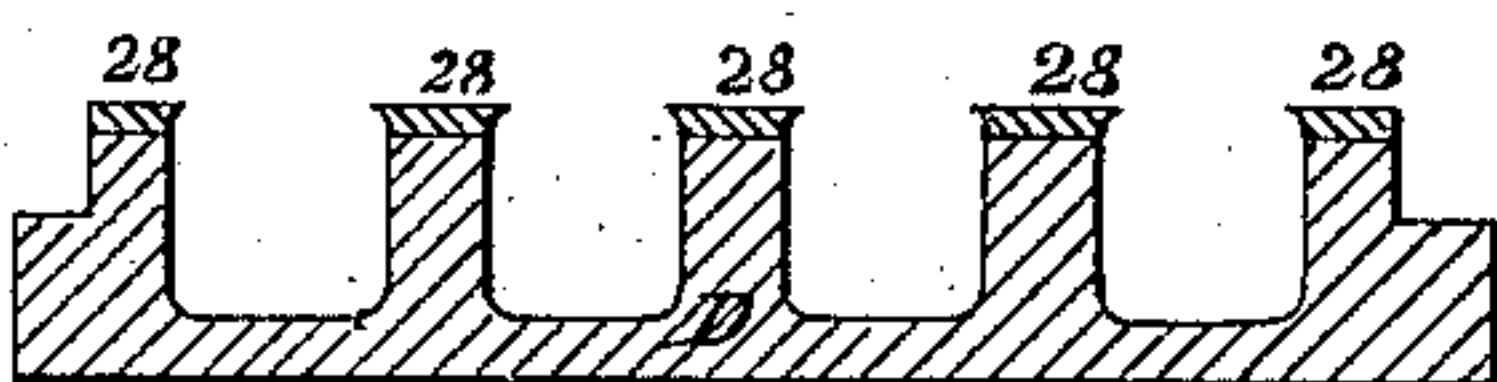


Fig. 9.

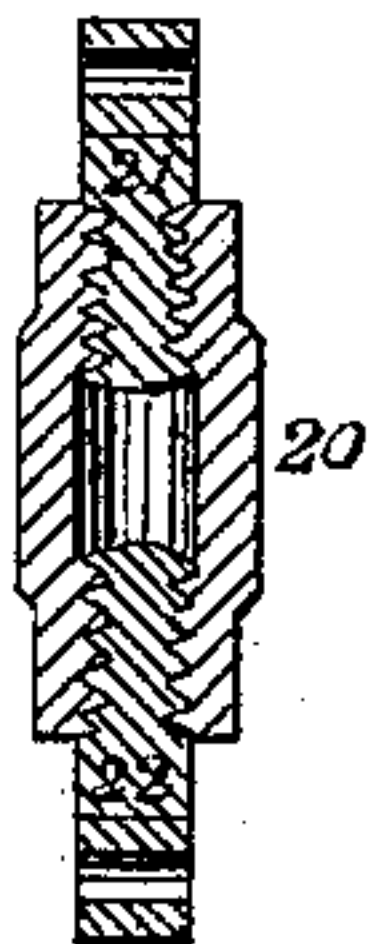


Fig. 7.

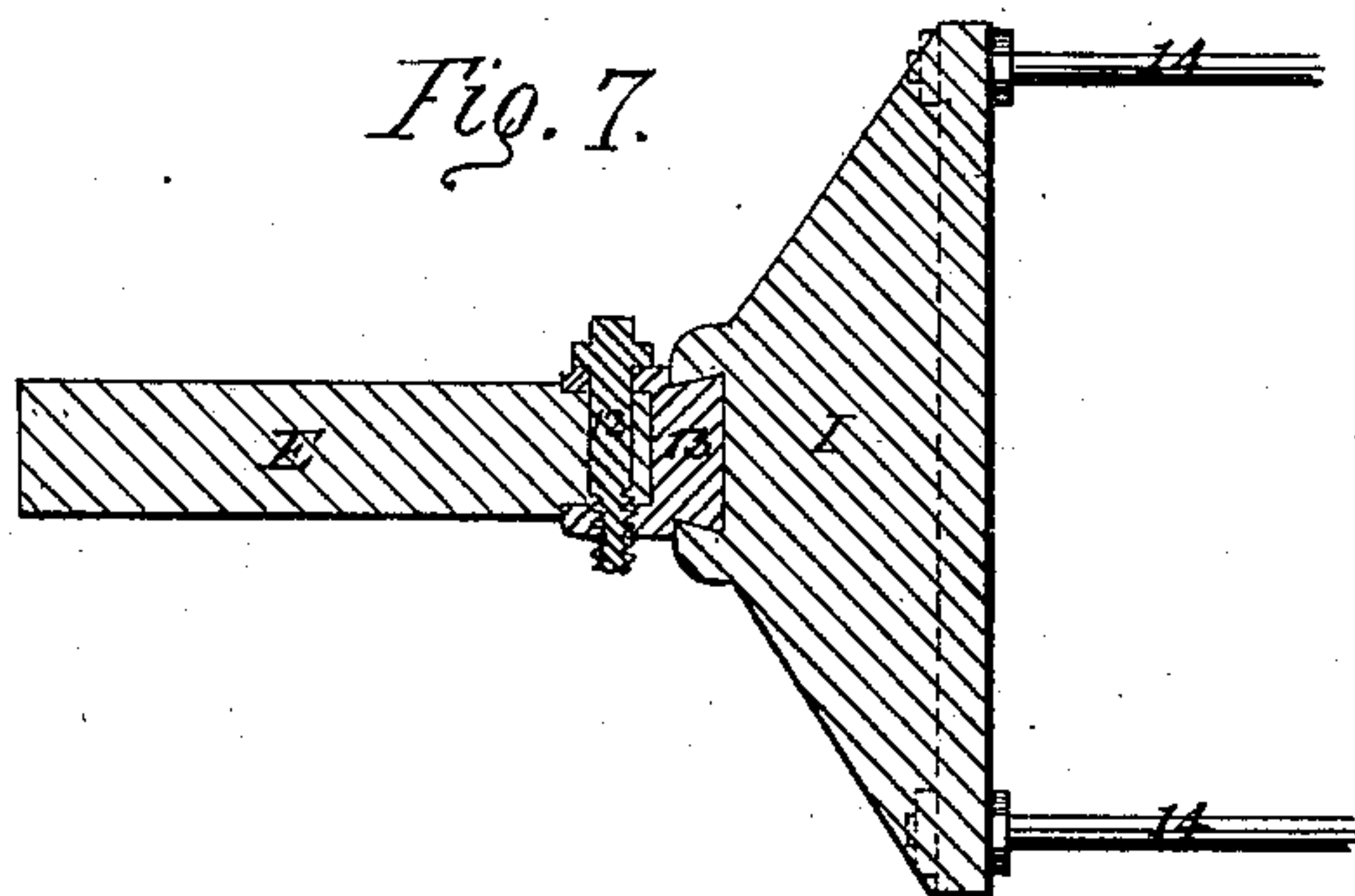
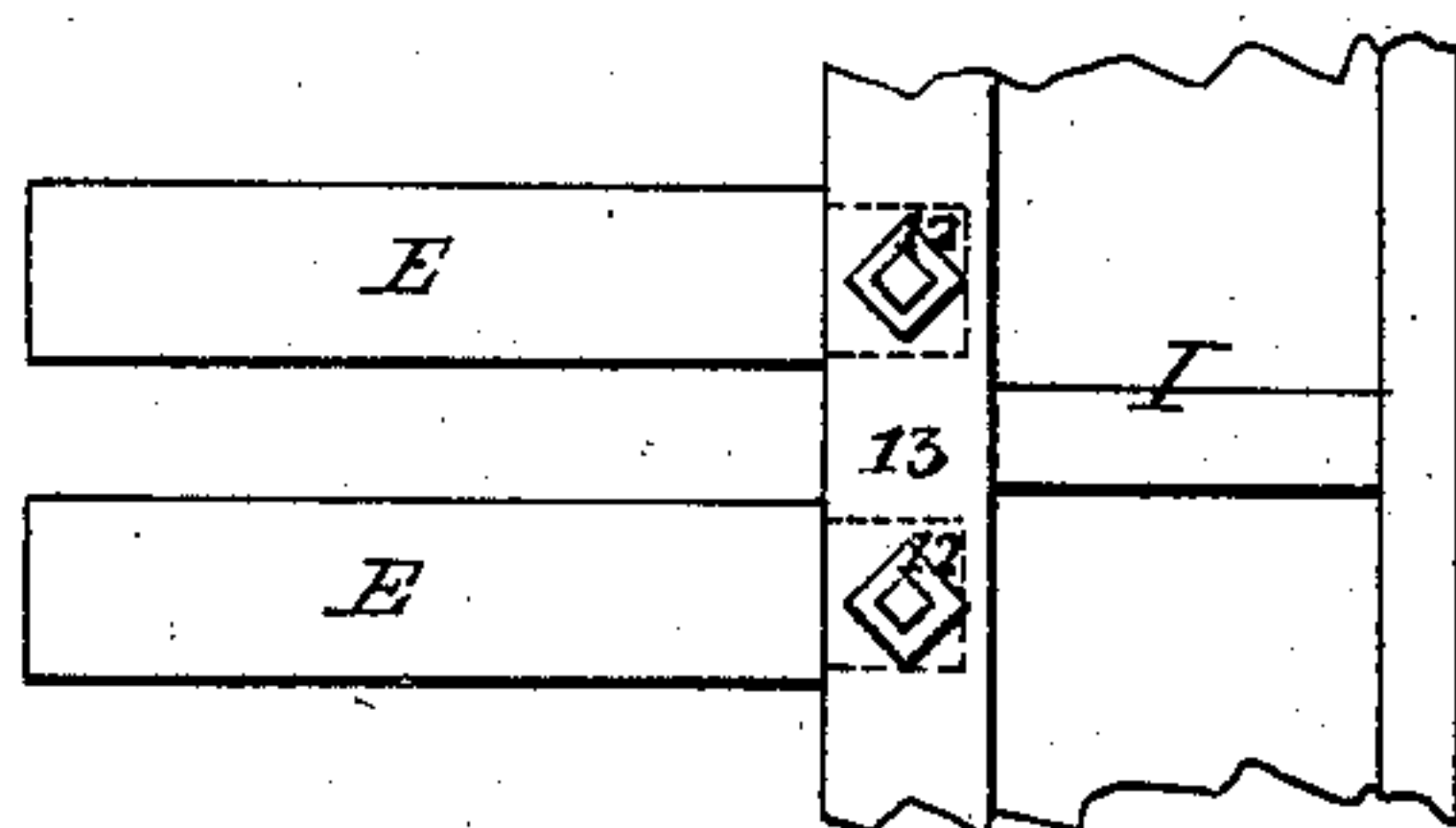


Fig. 8.



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THOMAS M. MITCHELL, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 103,913, dated June 7, 1870.

IMPROVED FUEL-PRESS.

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

I, THOMAS M. MITCHELL, of the city of Philadelphia, in the State of Pennsylvania, have invented certain Improvements in Presses, of which the following is a specification.

Nature and Objects of the Invention.

My improvements relate to that class of presses which are used for condensing or compressing substances in molds, and more particularly to such of the class as are intended for the production of solid artificial lumps or blocks of fuel from the granulated waste or refuse anthracite coal-dust of the mines and coal depositaries.

The first part of my invention relates to the manner of constructing and of applying to the press the mold-boxes, so that they may be readily removed or changed, as occasion may require; the object of this part of my invention being to allow several sizes of the lumps or blocks of fuel to be produced by the same press at different times, as the demand may require.

The second part of my invention relates to the combination, with the bed-plate of the press and the open ends of the molds, of a strong and heavy abutment-piece and adjustable guides and grips, for covering the outer ends of the molds while they are being filled, and also for resisting the pressure of the pistons or plungers during the condensation of the contents of the said molds, in such a manner that the said abutment-piece will be raised by the combined operation of cams, levers, and a counterpoise, to cover the open ends of the molds, and lowered, by gravitation, to uncover the said ends of the molds, and permit the condensed lumps or blocks of fuel to slide down over the inclined outside surface of the said abutment-piece, into any suitable car, as they are pushed out of the said molds by the pistons or plungers; the object of this part of my invention being to afford a sufficiently substantial and reliable resistance to the very powerful pressure which is required to be given to the pistons or plungers in the molds, in order to condense the contents of the latter, to sustain the molds in place, and also to lessen the strain upon the cams and friction-rollers, which raise the abutment-piece during the operation of the press.

The third part of my invention relates to the combination of adjustable yokes with the throw-out knuckle of the cam-cranks, and its friction-roll, set in an adjustable bearing, in such a manner that each of the cam-cranks and their friction-rolls may be readily varied to suit the different distances apart of the cross-heads of the plungers or pistons of the press; the object of this part of my invention being to provide for the discharge of the different-sized blocks of fuel, by the said plungers, without varying the extent of the motions of the same, effected by the throw-out cam-

crank and its friction-roll, whereby the said blocks of fuel are pushed entirely out of the molds, and the said plungers, at the same time, prevented from being pushed farther than to the outer ends of the said molds.

The fourth part of my invention relates to the arrangement of sliding feed-boxes with the bed-plate of the press, and certain adjustable cap-blocks, in such a manner that the said feed-boxes can be readily secured in either a sufficiently raised or lowered position to correspond with the larger or smaller mold-boxes that may from time to time be required to be introduced.

The fifth part of my invention relates to the combination, with the ends of the abutment-piece and the bed-plate, of the wrought-iron T-headed grips and adjustable blocks, having tapering recesses, in such a manner that when the said abutment-piece is covering the outer ends of the molds, it will be firmly supported against the powerful condensing pressure of the plungers or pistons by the said grips, and be permitted, by the tapering recesses in the adjustable blocks, to slip downward by gravitation when the condensed blocks of fuel require to be pushed out of the mold.

The sixth part of my invention relates to the combination, with the abutment-piece and the connecting-bar of its two operating levers, of a pair of running sockets, each connected with two eye-bolts, by right and left screw-threads, in such a manner that the abutment-piece and the connecting-bar of the operating levers can be readily adjusted in relation to their distance apart, to suit any change in the height of the mold-boxes.

Description of the Accompanying Drawings.

Figure 1 is a side elevation of the press embodying my invention;

Figure 2 is an end elevation;

Figure 3, a plan or top view; and

Figure 4, a vertical longitudinal section of the same on the dotted line *xy* of fig. 3.

Figure 5 is an enlarged side elevation of one of the cam-cranks, which operate the plungers or pistons, and of the toe, which operate the feed-boxes, together with a transverse section of the carrying-shaft.

Figure 6 is an enlarged transverse section of one of the series of mold-boxes.

Figure 7 is an enlarged vertical transverse section of one of the cross-heads, with its attached plunger-holder, and a longitudinal section of one of the plungers or pistons attached thereto.

Figure 8 is a sectional plan view of fig. 7.

Figure 9 is a vertical central section of one of the two running sockets and corresponding eye-bolts, for adjusting the position of the abutment-piece in relation to the height of the mold-boxes.

General Description.

The chutes A A are suspended, by pivots *a' a'*, from the bottom B of a "mixer," not shown, which is intended to be located in the next story above of the building, or at such a height above the press as will insure the rapid filling of the mold-boxes by the gravitation of the mixture of the coal-dust and its agglutinating materials. The lower ends of said chutes open directly into the feed-boxes C C, but are not fastened thereto. The feed-boxes C C are open both at top and bottom, and their bottom edges rest in close sliding contact upon the open mold-boxes D D below, and are held down or prevented from raising out of such contact during the pressure of the pistons or plungers E E upon the contents of the said mold-boxes, when the latter are covered by the said feed-boxes, as will be described, by means of cap-blocks F F, which fit over projections, 1 1, at each end of the connected feed-boxes, in such a manner as will allow the said feed-boxes to slide forward and backward over the molds.

The forward or outer edge of the bottom of the said connected feed-boxes has a flat projecting plate, 2, (see fig. 4,) the under surface of which is in the same plane with the bottom edges of the said feed-boxes, and, when applied in the same plane, also with the upper surfaces of the mold-boxes, so that when the feed-boxes are slid forward and the molds are being filled, the said projecting plate 2 will be forward, and, consequently, leaving an open communication between the chutes A and the mold-boxes D D, but, when the feed-boxes are drawn inward, the said projecting plate 2 will form a substantial covering for the open upper sides of the mold-boxes, which will resist the pressure of the pistons or plungers E, while the contents of the said molds are being condensed and pushed out.

The cap-blocks F are adjusted in height to suit the different-sized molds that are intended to be used from time to time in the same press, by means of removable or changeable plates 3 3, which can be readily inserted or withdrawn from between the said cap-blocks and the bed-plate of the press, as the said changes in the molds may require.

It will be observed that this press is double-acting, or that both ends are fitted with the changeable mold-boxes and pistons or plungers, and with the feed-boxes connected with chutes respectively, so that, when the contents of the mold-boxes in one end of the press are being condensed and pushed out, the mold-boxes in the opposite end will be filling with the mixture gravitating through their respective chutes and feed-boxes. The requisite sliding motions of the two opposite feed-boxes C C are effected by means of two cam-cranks, 4 4, which come in contact, periodically and respectively, with two toes, 5 5, adjustably secured to two rigid bars, 6 6, which firmly connect together the feed-boxes C C of the two opposite ends of the press.

The cam-cranks 4 4 are secured to the main shaft G, which has a large spur-wheel, 7, on one end, which gears into a pinion, 8, on one end of the driving-shaft H, a band-wheel, 9, being fixed on the opposite end of the latter in the usual manner, whereby the required motions are given to the different parts of the press. In each of the chambers A A there is a shaft, provided with an outside hand-crank, 10, and inside arms 11, whereby severe agitation can be given to the contents of the chutes should it be at any time desirable.

The pistons or plungers E E of the mold-boxes D D of each end of the press are secured by set-screws or draw-pins 12, in an iron head, 13, which is removably secured in an iron cross-head, I. The cross-heads I I are adjustably secured together by means of tie-rods, with screw-nuts and jam-nuts, for the purpose, and move in guides 15. The necessary sliding motions are given to the said plungers or pistons by means of

double cam-cranks 16 16, provided with friction-rolls 17 17 and 18 18, and fixed on the main shaft G.

The rolls 17 17 are changeable, by means of extra bearing-holes 19, or slots and blocks, as indicated by the dotted lines in fig. 5, to correspond with such changes in the adjustments of the cross-heads I I, which the different sizes of the molds may from time to time require, because the throw-out motions of the pistons or plungers must always be of sufficient extent to cause the ends of the said plungers to come flush with the outside ends of their respective mold-boxes, in discharging their contents. The friction-rolls 18 18 produce the condensation only, and the variations in the mold-boxes are provided by adjusting the distance apart of the two cross-heads I I. As the shaft G is rotated, the successive condensing and throw-out motions of the pistons or plungers are effected by the force of the cam-cranks 16 operating against the cross-head I of that end of the press, which operation, at the same time, opens the mold-boxes in the opposite end of the same, (see figs. 1 and 2,) by sliding the feed-boxes.

The abutment-pieces K K are provided for the purpose of closing the outer ends of the mold-boxes D D previous to the filling of the same, of retaining their contents against the condensing pressure of the pistons or plungers E E, and of opening the same for the discharge of the condensed blocks of fuel.

Each abutment-piece E consists of a very strong and heavy piece of cast-iron, which is supported upon a horizontal bar, 19, by means of a pair of running sockets, 20, each connected with two eye-bolts, 21 22, by right and left screw-threads, so that by rotating the sockets 20, the abutment K may be readily adjusted to the height required.

The bar 19 connects the two opposite side levers, L L, at the same end of the press, and each of said levers has their respective fulcrums at 23, their power-ends being respectively fitted with steel friction-rolls 24 24, which traverse a groove in the inner side of respective hollow cams M M, fixed on the shaft G, and constructed and applied so as to cause alternate rising and falling motions in the abutment-piece K as the said cam is rotated.

The abutment-piece K slides vertically in tapering guide-grooves in respective adjustable blocks N N, so that when raised up to cover the open ends of the molds D D, it will be held firmly in close contact with the said molds, and, as soon as it is started downward, it will be free from any binding or frictional restraint from the said guides or grooves. As a very powerful pressure has to be resisted by this abutment-piece K, its guide-blocks N N are supported by means of strong wrought-iron grips O O, secured to the bed-plate of the press by means of a T-head, 24', in each, and bolts with lugs 25 25 on the bed-plate.

The grips O O are tightened against the blocks N N by wedges O' O', and also connected by a tie-bolt, 26, which slips into slots in their ends, and is secured by screw-nuts, so as to prevent the said grips O O from spreading apart.

The upper side of the abutment-piece K is sloped downward, so as to form an inclined plane for the condensed blocks of fuel to slide freely down across it into the receiving-car, not shown, when the said piece K is at its lowest position, (see the left-hand end of press in fig. 4.)

As the abutment-pieces K K are each very heavy, a counterpoise, K', is supported by an arm, 27, fixed to the fulcrum-shaft of the side-levers L L, and to the said counterpoise, of sufficient weight to relieve the hollow cams M M and their friction-rollers 24 24 from the excessive strain to which they would otherwise be subjected.

The mold-boxes D D are in series of four or more in one piece, and are merely slipped out and in a

changes in them may require, and are so constructed that their centers are always parallel with the center of pressure. In the present case, the corners of the mold-boxes are rounded, and their upper edges faced with steel plates 28, (see fig. 6.) The guides of the abutment-pieces are also faced with steel, and all the different parts of the press are made of the appropriate weight and strength of metal required to stand firmly the very powerful pressure required to condense the contents of the molds into blocks or lumps, nearly or quite as solid and hard as the natural lumps of anthracite coal.

The operation of this press will now be understood without further description or explanation, except to say that as the contents of the mold-boxes in one end of the press are being condensed and pushed out, the molds in the opposite end are being filled by the gravitation of the mass from the "mixer" above (not shown) through the chutes, aided by the vibratory motions of the latter, and that as the shorter knuckles of the cam-cranks 16 16 contain the friction-rollers 18 18, and give the condensing pressure, and the longer knuckles of the said cam-cranks contain the adjustable friction-rollers 17 17 are required to give only the throw-out motion to the pistons or plungers, but two motions are required to condense and discharge the fuel from either end of the press.

Claims.

I claim as my invention—

1. The changeable series of mold-boxes D D, each series being in one piece with open upper sides and ends, as shown and described, in combination with the

bed-plate of the press and the adjustable feed-boxes C C, substantially as and for the purpose hereinbefore set forth.

2. The combination, with the bed-plate and the open outer ends of the mold-boxes D D, of the adjustable abutment-piece K, the connected side-levers L L with their friction-rollers 24 24 and hollow cams M M, and the counterpoise K', substantially as and for the purpose hereinbefore set forth.

3. The combination of the adjustable yokes I 14 with the throw-out knuckle of cam-cranks 16, and its friction-roll 17, when said roll is set in an adjustable bearing, as and for the purpose hereinbefore shown and described.

4. The arrangement of the sliding feed-boxes O with the bed-plate of the machine and the adjustable cap-blocks F F, as shown and described, and for the purpose set forth.

5. The combination, with the ends of the abutment-piece K and the bed-plate of the press, of the adjustable recessed blocks N N and the wrought-iron T-head grips O O, substantially as and for the purposes hereinbefore set forth.

6. The combination, with the abutment-piece K and the connecting-bar 19 of its two operating side-levers, L L, of the pair of running sockets 20 and their respective eye-bolts 21 and 22, substantially as and for the purpose hereinbefore set forth.

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Witnesses:

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