

No. 744,430.

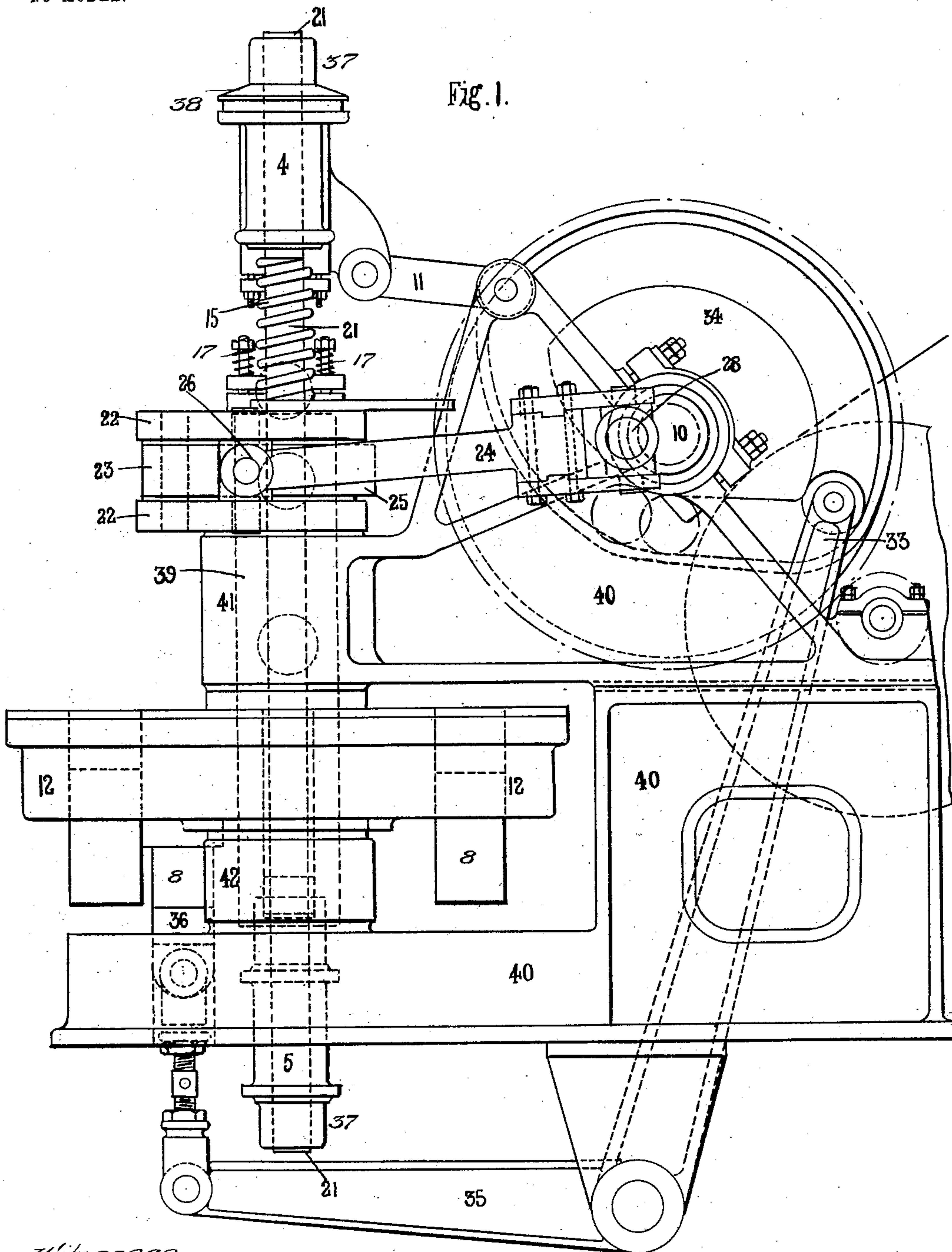
PATENTED NOV. 17, 1903.

E. R. SUTCLIFFE.
BRICK MAKING MACHINE.

APPLICATION FILED JAN. 6, 1903.

NO MODEL.

5 SHEETS—SHEET 1.



Witnesses -

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Att'y.

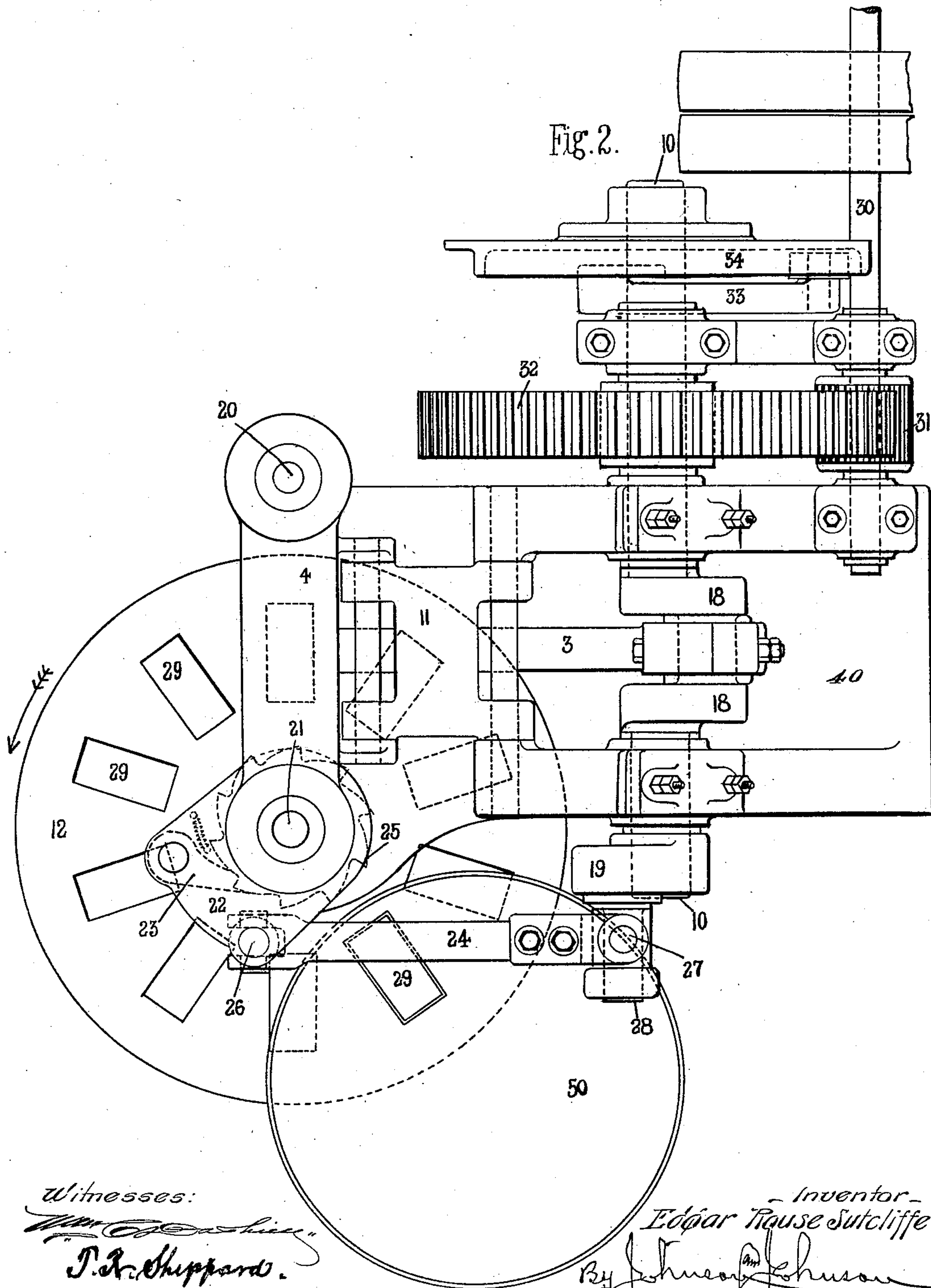
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6 SHEETS—SHEET 2.



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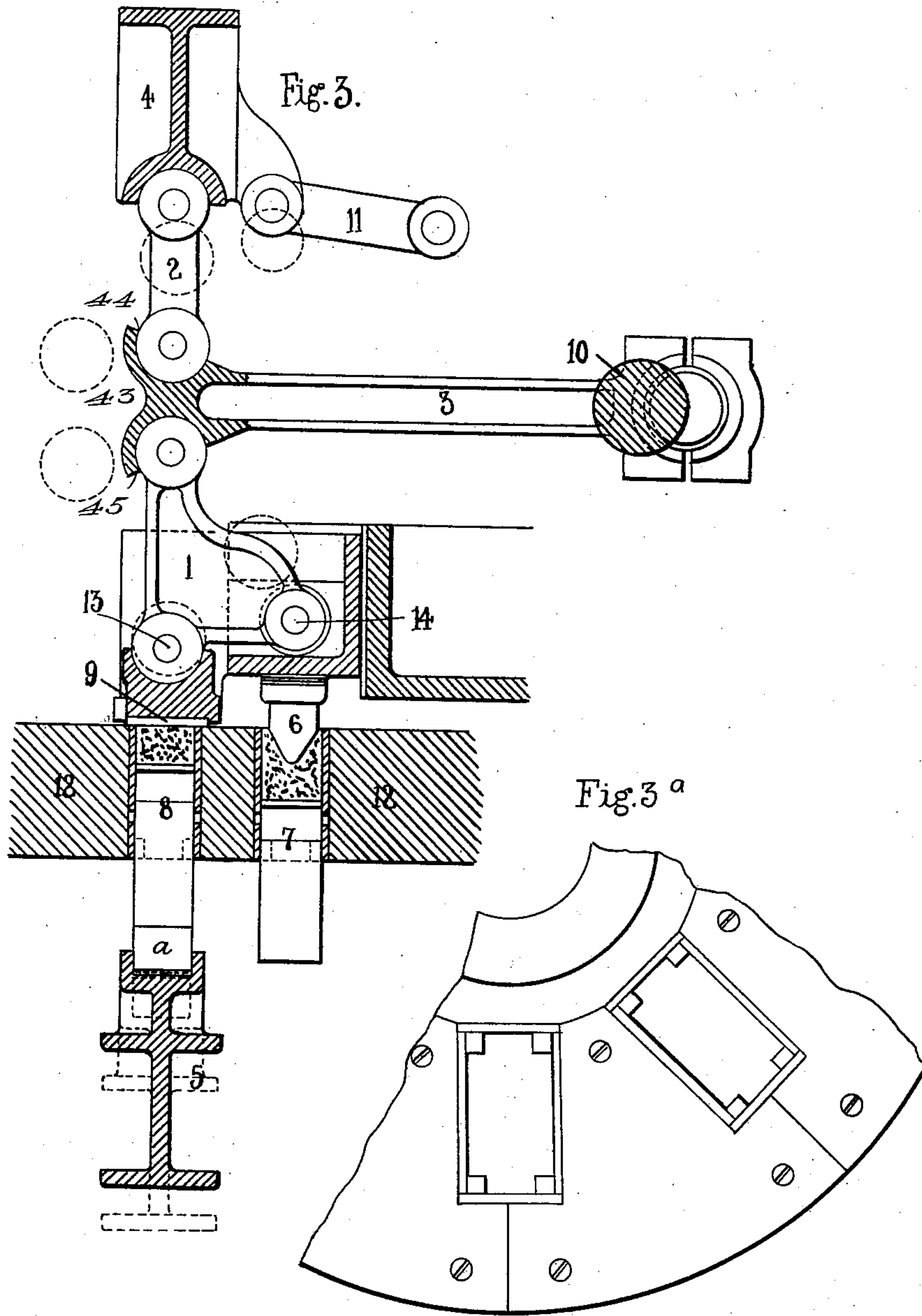
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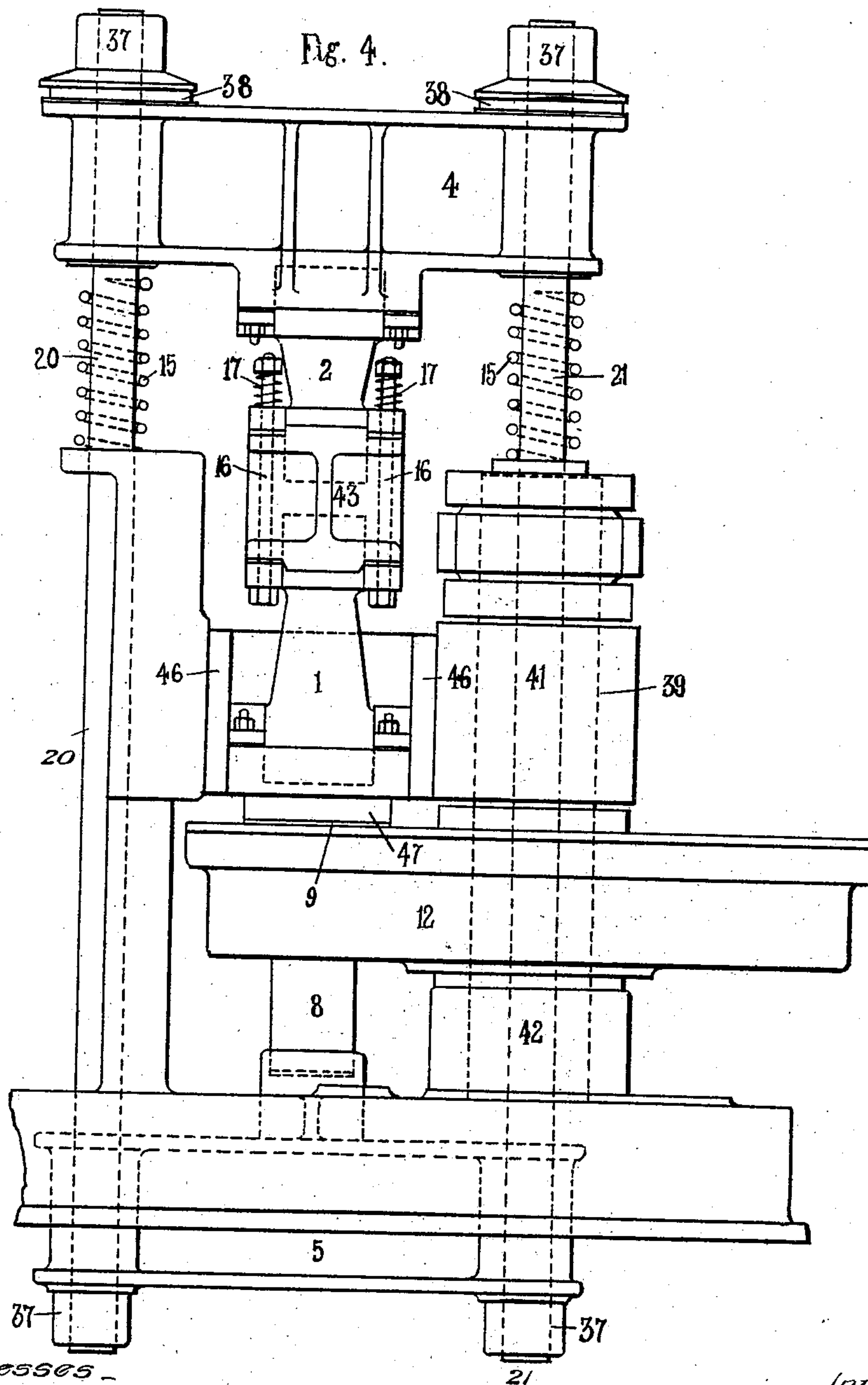
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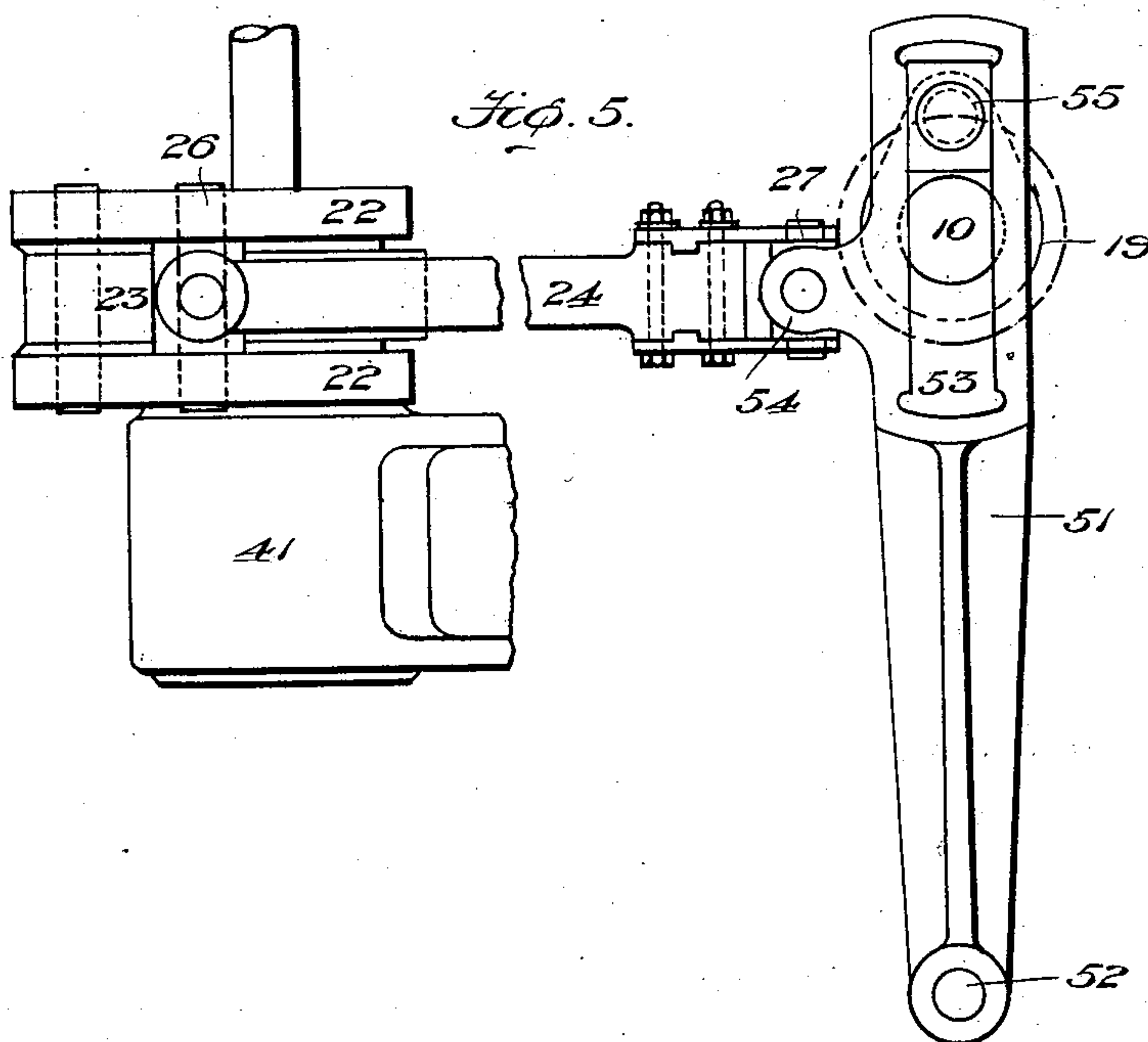
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NO MODEL.

5 SHEETS—SHEET 5.



Witnesses

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UNITED STATES PATENT OFFICE.

EDGAR ROUSE SUTCLIFFE, OF LEIGH, ENGLAND.

BRICK-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 744,430, dated November 17, 1903.

Application filed January 6, 1903. Serial No. 138,045. (No model.)

To all whom it may concern:

Be it known that I, EDGAR ROUSE SUTCLIFFE, a subject of the King of Great Britain, residing at Leigh, in the county of Lancaster, England, have invented a new and useful Brick-Making Machine, of which the following is a specification.

My invention relates to improvements in brick-making machines in which a toggle pressing system operates in conjunction with plungers adapted to work in the molds of a rotating mold-table.

The objects of my improvement are, first, to provide means whereby a more regular brick may be made than heretofore and of equal density on both its top and bottom face; second, to prevent the sticking of the material to the press-head; third, to economize the power required to drive the machine, and, fourth, to arrange that the liability to breakage of the parts under the great pressure used is reduced to a minimum.

In the accompanying drawings, forming part of this application, Figure 1 is a side elevation of a concrete-brick press to which my invention is applied, the parts being in the positions they occupy when the toggle connections are acting under the molding pressure. Fig. 2 is a plan of the brick-press. Fig. 3 is a detail view partly in section to show the connection of the tension system with the preliminary pressing-plunger, the parts being in the positions shown in Fig. 1. Fig. 4 is an end elevation showing the operation of the tension system, and Fig. 5 shows a method of obtaining a quick return motion on the rotating gear for the table.

Referring first to Figs. 1 and 2, the framework 40 of the machine has two projecting bearings 41 42, carrying a shaft 39, (seen in dotted lines in Fig. 1,) to which is attached the table 12, so that it can rotate, and which is provided with passages 29, which form the molds in which the bricks are pressed. Plungers, such as 7 8, enter the molds at the bottom and are caused to press upward with a heavy pressure when the material to be pressed reaches the position beneath the tension system shown separately in Figs. 3 and 4. The table is caused to rotate intermittently by means of the crank 19, on the main double-crank shaft 10, and the ratchet 25, at-

tached to the shaft 39. The shaft and the ratchet are connected by the rod 24, provided at each end with a universal joint 26 and 27, which allows of its movement in the vertical plane of rotation due to the crank-pin 28 and also of its movement in the horizontal plane of rotation of the pawl-carriers 22 22, to which the end 26 of the rod is connected. The pawl 23 actuates the ratchet 25 to move the table, which is held stationary between each movement by means which form no part of this invention. The tension system consists of two cross-heads 4 and 5, connected by strong steel bolts 20 and 21, the latter passing through the center of the table and its shaft. The bolts are secured to the cross-heads by threaded nuts 37 37, and flexible washers or cushions 38 38 are provided under the top nuts, so that they will give slightly in the event of any undue pressure coming upon the bolts, which would otherwise break or extend them. Working between the cross-heads is the toggle pressing system composed of the compression members 1 and 2, connected centrally by a knuckle-joint formed by the ends 44 45 of the members 1 and 2 and the end 43 of the connecting-rod 3. The top cross-head is guided by the swinging link 11 and the press-head 47, carrying the press-plate 9, which works in the guides 46 46, the whole being operated by the revolution of the crank 18 on the main shaft 10 and the rod 3.

Figs. 3 and 4 show the position with the pressure on, the dotted circles showing the position of the respective joints when the toggle is bent, and consequently the pressure is off. It will be seen that a bracket is formed on the bottom member 1, carrying the auxiliary joint 14, guided so that it works by the operation of the toggle about the joint 13 as a pivot. By this means the tapered plunger 6 effects a preliminary pressure on the material in the previous mold between itself and the plunger 7.

Referring to Fig. 3 and to the plungers therein shown, it will be noted that when in its lowest position the plunger is supported hanging in the mold upon lugs at the four corners on the inner walls at the open bottom of the mold, as shown by dotted lines in said figure, the lugs being also shown in a detail top view, Fig. 3^a, of a portion of the table

and the molds thereon. In their operation the plungers are all carried around in their respective molds and are never retracted therefrom. In this Fig. 3 the plunger 8 is
 5 seen as carried by the lower cross-head within the mold, and when the toggle is in the position shown by the full lines the cross-head 5 will be in its top position and the plunger 7 hanging on the mold-lugs when receiving the preliminary pressure. In the
 10 position shown by dotted lines the bottom of the plunger is above the level of the cross-head block *a* when the latter is in its lowest position, as then the plunger 7 is carried round
 15 by the revolution of the table and comes vertically over the cross-head, which raises the plunger 7 off the lugs into the position 8, and the molds in this Fig. 3 are intended to show the relation of the preliminary to the final
 20 pressing of the plungers.

The operation is as follows: When the mold to be pressed reaches the tension system, the toggle is drawn into its straight position, pressing upward the top cross-head 4 and raising, therefore, the bottom cross-head 5 and the plunger 8. The material in consequence is compressed between the plunger 8 and the press-head plate 9, the whole of the tension to counteract this compression being taken
 30 by the rods 20 21, which are in simple tension. At the same time pressure is put on the material between the plungers 6 and 7 in the previous mold. An important feature is that the dead-weight only of the system rests
 35 on the table no matter what compression is exerted, and this is utilized to obtain a great advantage in that the continued revolution of the shaft 10 causes the crank 19 to effect the rotative movement of the table just before the weight of the tension is taken off it, and thus sticking of the material to the press-head is prevented. In a similar manner the descent of the press-head may be used to brake the table. The further revolution of the
 45 crank-shaft bending the toggle outward lowers the top cross-head until it comes to rest on the springs 15 15, which will thereby be compressed upon their seats, one of which is a fixed part of the frame, and the other seat is
 50 formed by the fixed guide for that tension-rod which passes through the fixed hollow shaft of the table, and when the toggle is at the limit of its flexure then the press-head will be raised free of the table. In order to
 55 avoid the shock which might occur with the weight thus taken off the driving-shaft and also to assist the action when the weight is again taken up, springs 15 are interposed between bearings on the cross-head and the stationary parts of the machine. For the same reason and to neutralize the wear thereon, springs, such as 17, may also with advantage be placed on the bolts 16, connecting the parts of the toggle-joints, thus keeping the work-
 65 ing faces always in contact.

Referring to Figs. 3 and 4, it is seen that the upper member of the toggle terminates in

a cylindrical bearing which fits a socket-bearing formed in the under side of a plate fastened to the upper cross-head, and this member is held within this socket-bearing by trunnions and a cap for each trunnion screwed to the socket-plate. The lower end of this toggle member also terminates in a cylindrical bearing which is fitted and held in a socket
 75 formed on the knuckle end of the toggle-connecting rod by means of a spring-pressed cap. The lower toggle member also terminates at each end and is fitted and secured in socket-bearings formed on the under side of the
 80 knuckle end and to the press-head by suitable caps. The caps of the knuckle end are secured by the bolts 16 16, which pass through the knuckle end on each side of the bearings of the toggle members, and these rods extend
 85 above the cap, which fastens in its socket the lower end of the upper toggle member to receive coil-springs 17, which by means of nuts are caused to constantly press this cap down upon the knuckle end, and it is this spring-
 90 pressed cap which cushions the connection of the upper toggle member with the knuckle end and compensates for any wear at this toggle-joint. These toggle-springs also cooperate with the springs of the toggle pressing
 95 system to prevent shock in the working of the toggle.

The machine is usually fed from a pan, such as 50, placed over the molds on the table, and the compressed bricks are pushed
 100 up out of the table-molds by a plunger 36, connected to levers 33 and 35, worked by a cam 34, which latter and also the whole machine is preferably driven through gearings, such as 31 32, by a first-motion shaft 30; but
 105 as these details form no part of the present invention they need not be further described.

Fig. 5 of the drawings shows a modification of the table-rotating gear in which a quick return movement is introduced. The ratchet-
 110 wheel and pawl are the same and also the connecting-rod 24, with universal joints 26 27 at either end, except that in the case of the joint 27, instead of being connected directly to the crank 19, it is now connected to
 115 brackets 54 on one side of a rocking lever 51. The rocking lever is fulcrumed about a pivot 52, attached to the bed-plate of the machine, and a slot 53 is provided in the upper part of the lever, in which works the crank-pin 55 of
 120 the crank 19. The table is turned during the upper portion of the stroke of the crank, and though a longer time is taken more power is brought to bear on the table-ratchet owing to the longer leverage, the return stroke taking
 125 place also much quicker, owing to the slant of the rocking lever. This is further advantageous in that the motion of the table will be greatest in the middle of its movement, and as such a piece is of considerable weight
 130 in this class of machinery the gradual slowing of the motion is desirable in order to prevent the jar of a sudden stoppage.

It should be noticed that the effect of the

tapered plunger 6 is to press the material to the sides of the top of the mold. When the material, therefore, comes to receive its final pressure, the outside edges of the brick are very dense and sharp, and it may be that the middle part of the top face does not quite fill up again. This, however, is not altogether a disadvantage, as such an indentation, technically known as a "frog," is of considerable use on such a brick. Further, it is a requirement which is very difficult of accomplishment in the ordinary manufacture.

It must be understood that the invention herein described may be used for pressing blocks of other shape than an ordinary brick and that it may be arranged to give the final pressure on the material in two molds instead of one at the same time. Also though the machine is usually made use of for pressing bricks of materials requiring a binding-cement it may also be used for clay and similar materials not requiring a cementing medium.

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

1. In a brick-press and in combination, a rotatable table provided with mold-openings, a cross-head above the table and a cross-head beneath the table, bolts connecting the cross-heads, a plunger carried by the lower cross-head within the table-mold, toggle mechanism pivoted to and suspended from the upper cross-head, a press-head suspended by the toggle mechanism, means above the table for operating the toggle-connected parts, means below the table for operating the mold-plunger independent of the toggle mechanism, and means for rotating the table.

2. In a brick-press, a rotating mold-table provided with plungers in the bottom of the molds, a press-head, a tension system of upper and lower cross-heads connecting the bottom plunger and the press-head, a toggle system operating between the press-head and the tension system cross-heads, a bracket and supplementary plunger connected with the bottom member of the tension system, so that it will exert a top pressure on material in an adjoining mold, and means for working the toggle system.

3. In a brick-press, and in combination, a toggle system for effecting the pressure on the material in the mold, a supplementary tapered plunger connected to and working with one of the members of the toggle system, a connecting-rod having one of its ends formed as a knuckle-joint, and means for reciprocating its other end, substantially as shown, for the purpose specified.

4. In a brick-press and in combination a frame, a rotatable table provided with mold-openings, a cross-head above the table, a

cross-head beneath the table, bolts connecting the cross-heads, a spring on each bolt seated on fixed bearings, for cushioning the descent of the cross-heads, a plunger carried by the lower cross-head within the table-mold, toggle mechanism pivotally mounted on the upper cross-head and depending therefrom, a press-head pivotally mounted on and suspended from the toggle mechanism, a double-crank shaft, a rod connecting it with the toggle mechanism, a lever connecting said shaft and the plunger for operating the latter independent of the toggle mechanism, and means for rotating the table.

5. In a brick-press, a loosely-carried tension system and a toggle pressing system resting with their dead-weight on the table when pressing, means for operating the same so as to move the table slightly before the weight is raised from the table, and stationary frame parts arranged to take the weight of the tension and toggle systems during the return portion of the stroke.

6. In a brick-press, and in combination, a rotating mold-table having bottom plungers in each mold, a toggle pressing system and a loosely-carried tension system resting on the table, a connecting-rod and ratchet-gear operated to move the table intermittently, and a double-cranked shaft having its cranks so arranged as to move the table before the weight of the toggle and tension systems are raised therefrom.

7. In a brick-press, and in combination a rotating mold-table, means for rotating the same, consisting of a connecting-rod having at each end a universal joint, and a rocking lever interposed between the driving means and the connecting-rod for the purpose of effecting a quick return motion, substantially as described.

8. In a brick-press and in combination, a frame, a rotatable table provided with mold-openings, a cross-head above the table, a cross-head beneath the table bolts connecting the cross-heads, springs for cushioning the descent of the upper cross-head, a mold-plunger carried by the lower cross-head, toggle mechanism pivotally mounted on the upper cross-head and depending therefrom, a press-head pivotally mounted on and suspended from the toggle mechanism, a crank-operated rod connected to the toggle mechanism, a crank-operated lever connected to the mold-plunger, and means for rotating the table.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

EDGAR ROUSE SUTCLIFFE.

Witnesses:

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A. NUTTING.