

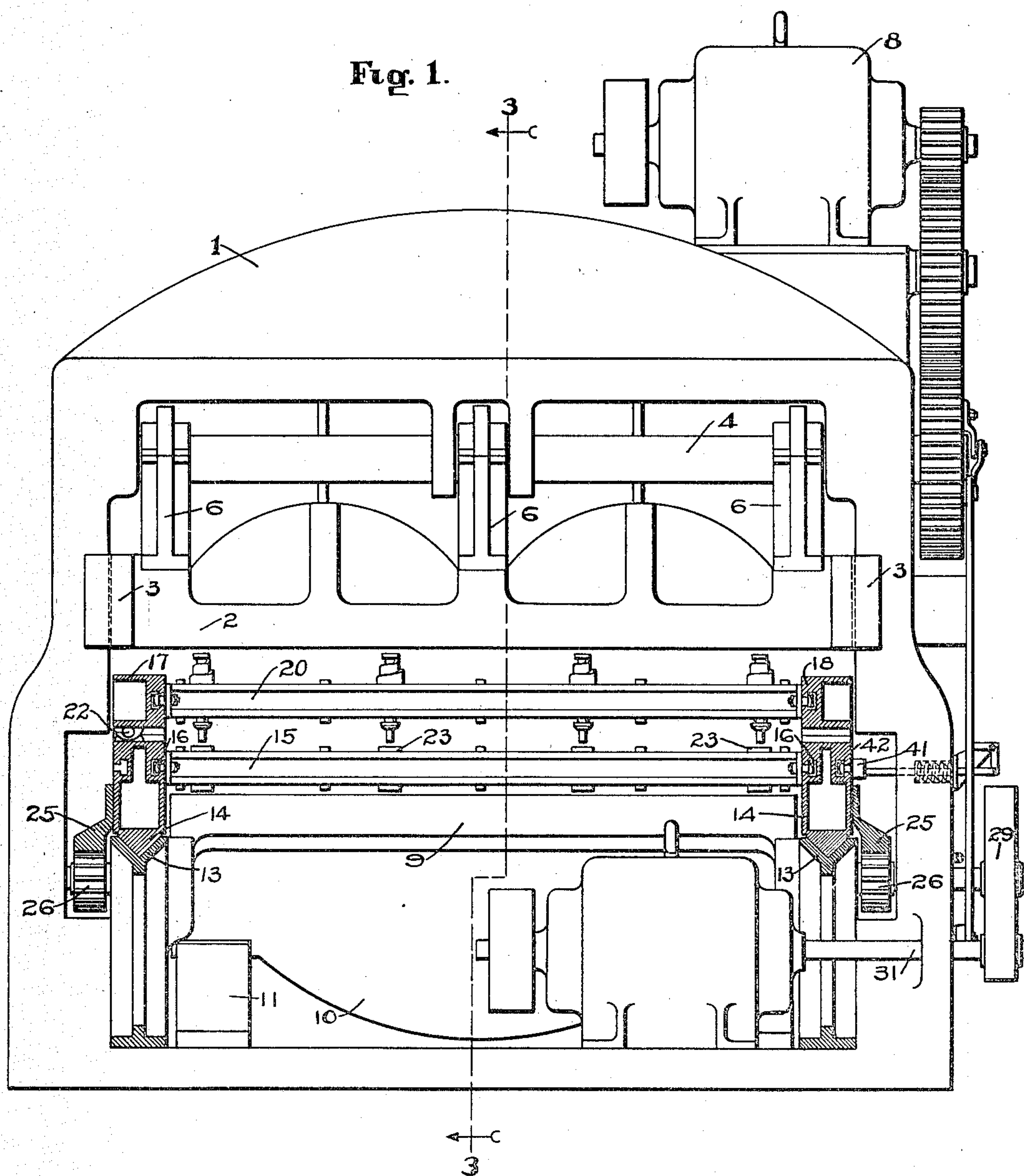
No. 860,266.

PATENTED JULY 16, 1907.

E. W. SUMMERS.
PLATE PUNCHING MACHINE.

APPLICATION FILED JAN. 24, 1907.

4 SHEETS—SHEET 1.



WITNESSES:-
R. N. Lowry.
Chas. H. Hall

INVENTOR:-
E. W. Summers.

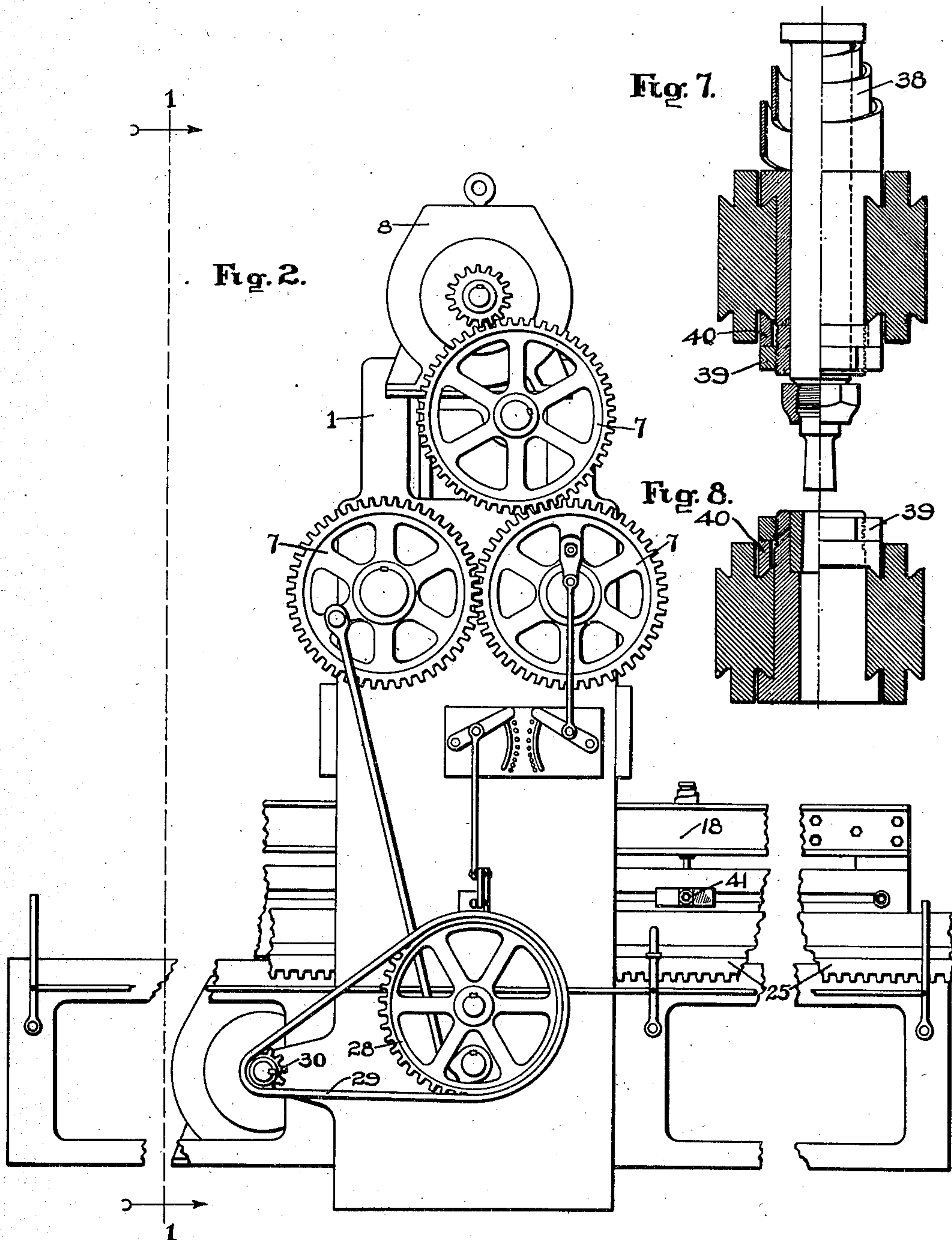
No. 860,266.

PATENTED JULY 16, 1907.

E. W. SUMMERS.
PLATE PUNCHING MACHINE.

APPLICATION FILED JAN. 24, 1907.

4 SHEETS—SHEET 2.



WITNESSES:-

R. N. Lowry.
Chas. Clark.

INVENTOR:-

E. W. Summers.

No. 860,266.

PATENTED JULY 16, 1907.

E. W. SUMMERS.
PLATE PUNCHING MACHINE.

APPLICATION FILED JAN. 24, 1907.

4 SHEETS—SHEET 3.

Fig. 5.

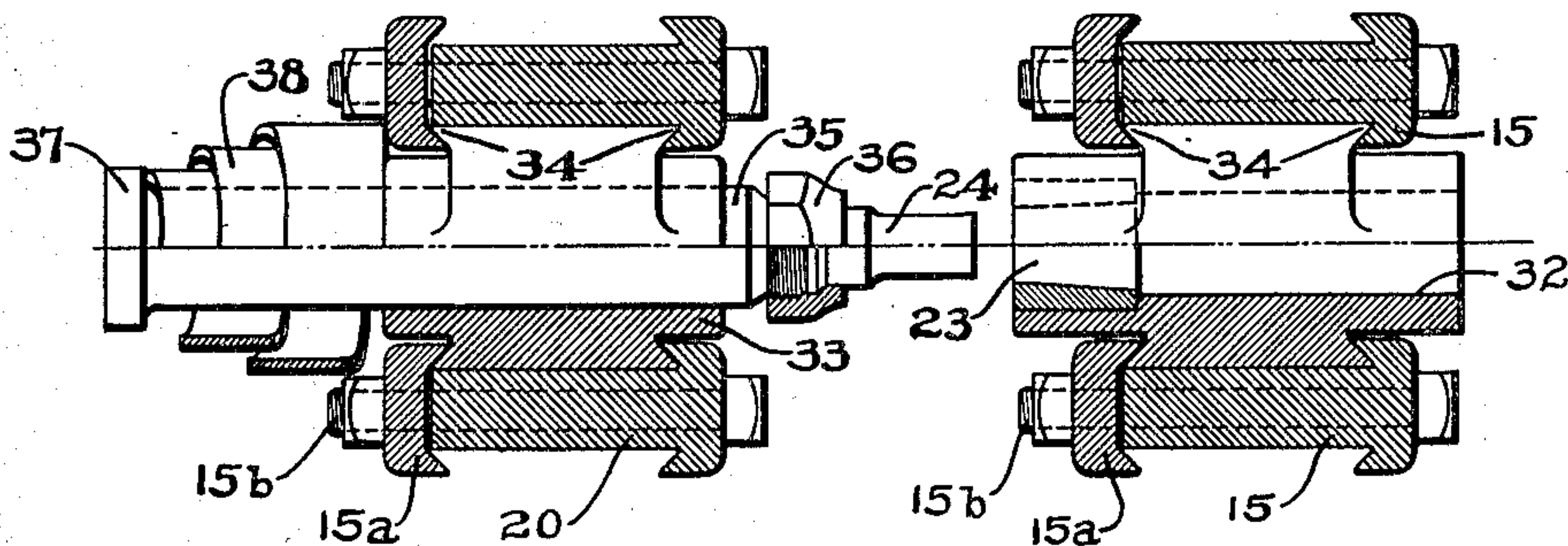


Fig. 6.

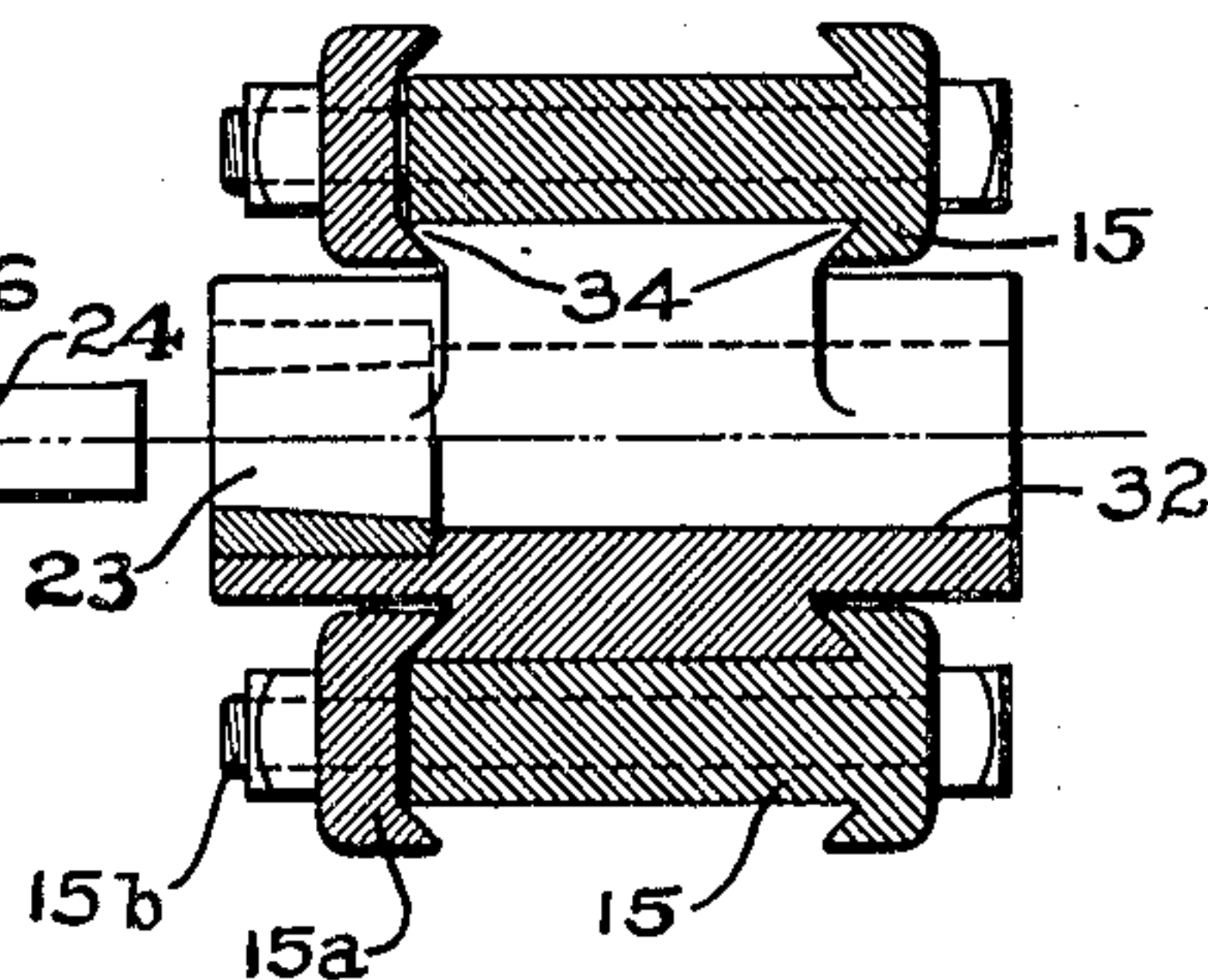
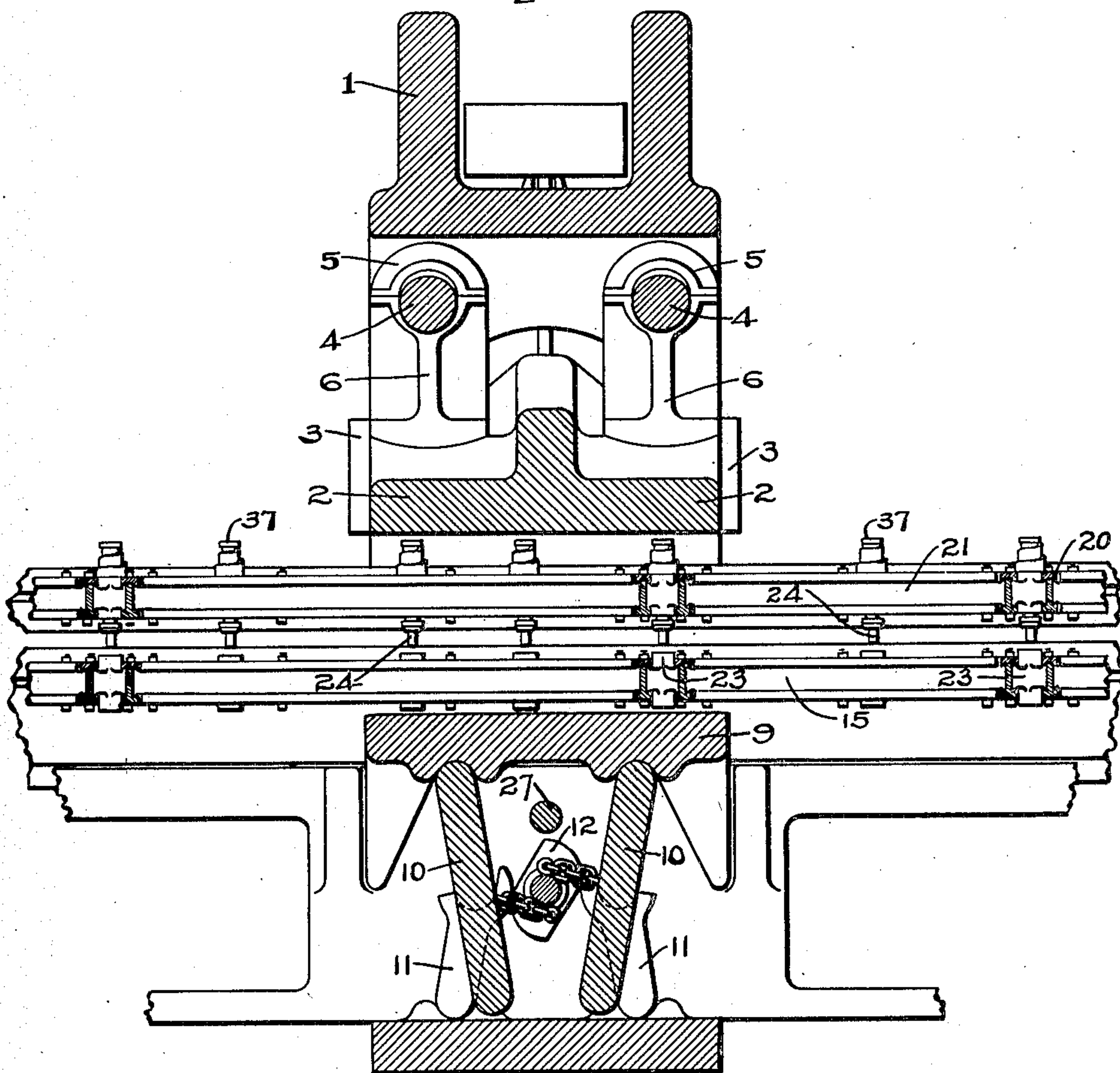


Fig. 3.



WITNESSES:-

R. N. Lowry.
Chas. Clark

INVENTOR:-

E. W. Summers.

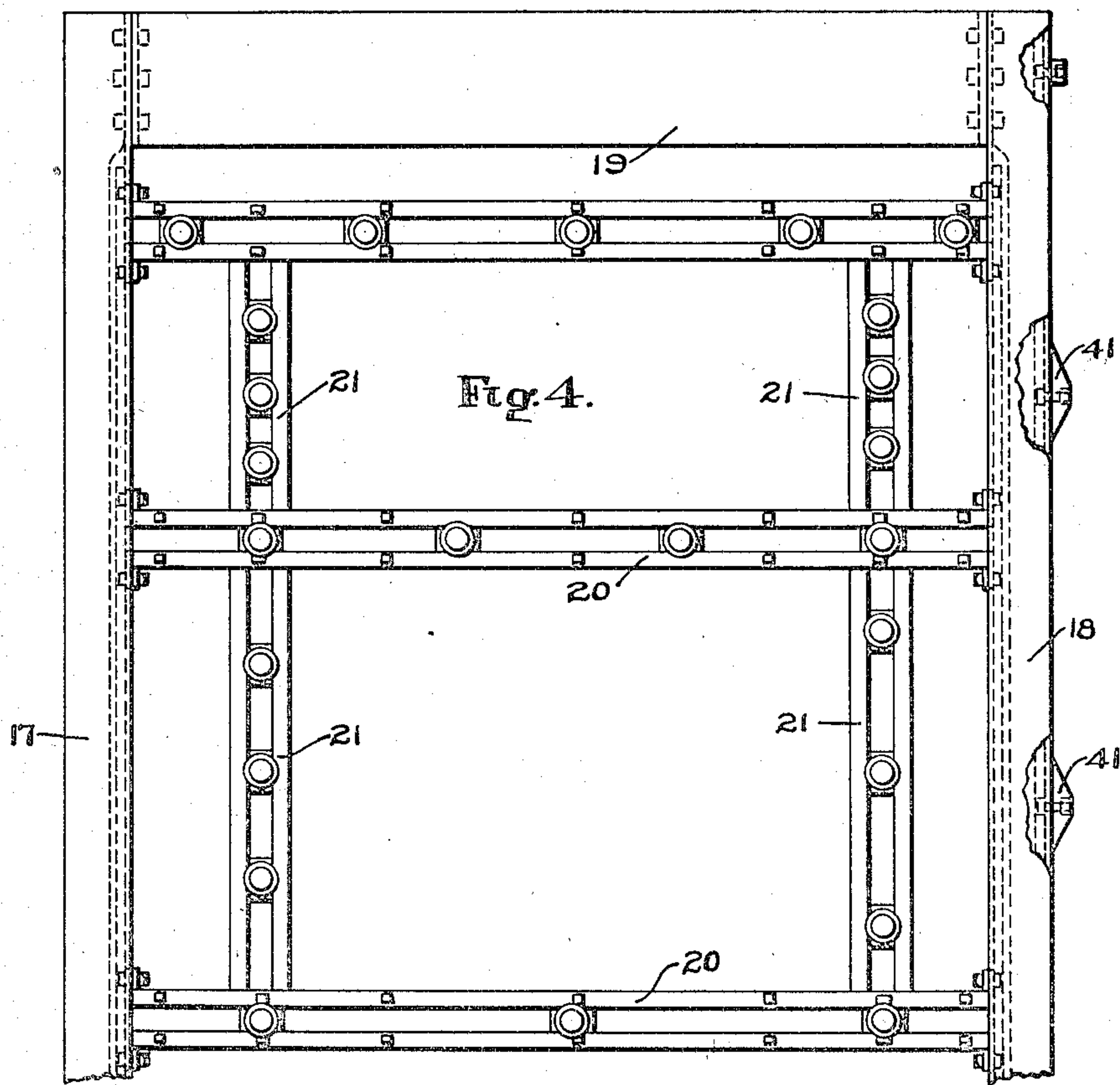
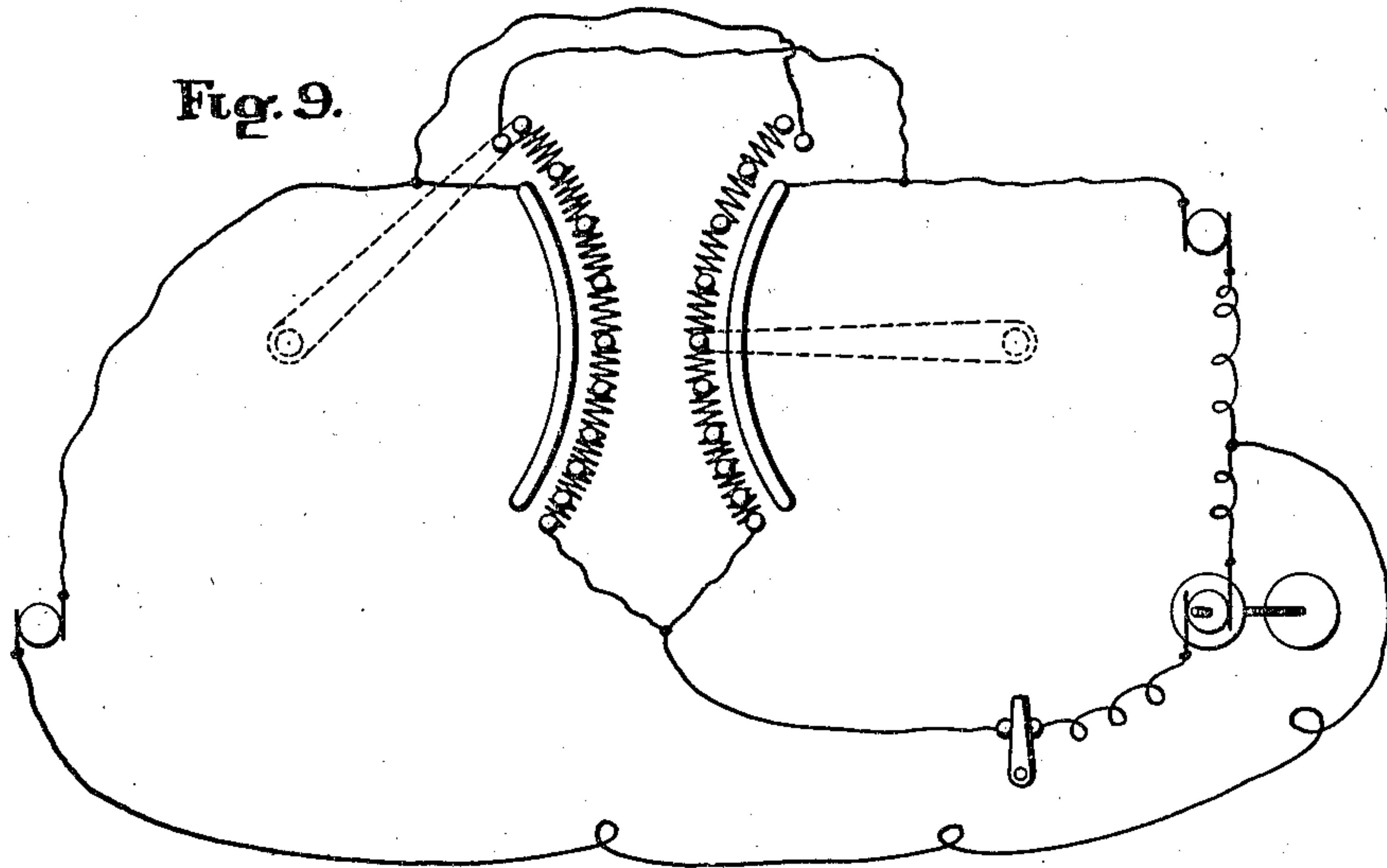
No. 860,266.

PATENTED JULY 16, 1907.

E. W. SUMMERS.
PLATE PUNCHING MACHINE.

APPLICATION FILED JAN. 24, 1907.

4 SHEETS—SHEET 4.



WITNESSES:-

R. N. Lowry.
Chas. Clark

INVENTOR:-

E. W. Summers.

UNITED STATES PATENT OFFICE.

EDGAR WEBSTER SUMMERS, OF WILKINSBURG, PENNSYLVANIA.

PLATE-PUNCHING MACHINE.

No. 860,266.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed January 24, 1907. Serial No. 353,914.

To all whom it may concern:

Be it known that I, EDGAR WEBSTER SUMMERS, of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Plate-Punching Machines, of which improvement the following is a specification, reference being had to the accompanying drawings, forming part of this specification, in which—

Fig. 1. Is a partial transverse elevation of my improved plate punching machine, taken in line 1—1 in Fig. 2;

Fig. 2. Is a partial longitudinal elevation of the same, with a portion broken away between the center and each end;

Fig. 3. Is a longitudinal vertical section, with each end broken away, taken in line 3—3 in Fig. 1;

Fig. 4. Is a partial plan view of the punch and die-holding frame;

Fig. 5. Is a section through one of the bars of the punch-holding frame, showing a punch in detail;

Fig. 6. Is a cross section through one of the bars of the die-holding frame showing the die and holder in detail;

Figs. 7 & 8. Show an alternative arrangement of the clamping device for the punch and die-holding frame;

Fig. 9. Shows a diagram of the electric transmission device for controlling the operations of the punching machine.

My invention relates to apparatus for punching a multiplicity of holes in metallic sheets or plates, such as rivet holes wherein a great number of plates are to be punched duplicates of each other in the arrangement and location of the rivet holes, such as plates for steel car construction and other similar fabrication, to do which I have arranged to locate a punch and its corresponding die for each hole to be punched in the plate or in other words to have as many punches and dies as there are holes to be punched and further, to provide for a change in location of the punches so as to punch any arrangement of holes required in any plate. In operation the plate is placed in the machine between the punches and dies and in the operation of passing the plate through the machine all of the holes are punched in the exact location required without depending on the operator for adjustment or care in the location of the holes. Further explanation of the operation will be given hereafter.

In the drawings I show a machine having an upright framework 1, similar to the ordinary press frame. I show a vertically reciprocating-head 2, the guide-bars 3, the eccentric shaft 4, the eccentric straps 5 and connecting bars 6, the gear transmission 7 and motor 8 all of which provide the actuating means for driving the punch through the plate. I show the bed-plate 9 which is arranged vertically under the reciprocating-head 2, the toggle-beams 10 and toggles 11, the eccentric

12 which actuates the toggle arrangement causing a vertical movement of bed-plate 9, and furnishes vertical support for bed-plate 9. I show the guide-ways 13, which are similar to the V shaped guide-ways on the ordinary metal planer. These guide-ways extend continuously out each side of the main frame 1 for such a distance as is required for handling and supporting the maximum length plate to be operated upon or punched. I show the side-bars 14 of the die-holding frame which has a V shaped bottom to conform with the top part of guide-ways 13. I show the cross-bars 15 which are bolted between the side-bars 14 and which may be located in any position from end to end of side-bars 14 by means of clamping or bolting in the continuous T slot 16. These bars 15 are the die-holding bars and are provided and arranged both transversely and longitudinally the same as 20 and 21 as shown in Fig. 4, the object being to locate a die for each hole that is to be punched in a particular plate, fixing these dies in position so as to punch a great many duplicate plates, changing the whole arrangement or location of dies when punching a different arrangement of holes. I show the side frame-bars 17 and 18, which are the longitudinal pieces of the upper or punch carrying-bars and also the end cross-bar 19 which connects 17 and 18 at the outer ends of the punch carrying frame. A similar cross-bar may be used at the outer end of the side-bars 14 of the die carrying-frame. Cross-bars 20 and longitudinal-bars 21 of the punch carrying-frame are of similar construction to bars 15 and have their attachments to side-bars 17 and 18 adjustably connected, the same as in 16. The bars 20 and 21 are arranged so as to carry the punches vertically over the dies and registering therewith. The side-bar 17 is hinge connected to one of the side-bars 16, the upper frame can be rotated about this hinge connection 22 thus permitting the upper or punch carrying frame to be raised at one edge for the purpose of inserting the plate to be punched, which when in position rests on top of the dies 23. By lowering the upper frame over the plate, the punches 24 are then in position registering over the dies 23. I show the rack 25 attached to side frames 14 and the pinion 26 which is located on cross-shaft 27 and is gear connected by means of gear-wheel 28, drive-chain 29 and pinion 30 to motor-shaft 31, which motor furnishes the operating power for moving the die-holding frame 16 along the ways 13. I show the large sized detail of the punch and die in Figs. 5 and 6. In this detail the die holding-bar 15 and punch holding-bar 20 are of similar construction. The die holding-block 32 and the punch guide-block 33 have dove-tailed sides 34 which are locked in position by cap-bars 15^a and bolts 15^b. The dies 23 are of the usual form and rest in a recess in the upper part of 32. The punch 24 is of the usual form and is attached to the special punch-carrying-shank 35 by means of the usual flange-nut 36. The

punch carrying-shank 35 is provided with a head 37, which engages the upper end of the spiral-spring 38, which spring is provided for the purpose of assisting in the removal of the punch from the plate after the hole is punched. Figs. 7 and 8 are similar to Figs. 5 and 6, differing however in the arrangement for clamping the die holding-block and punch guide-block to the frames for carrying the same. In Figs. 7 and 8 I use a nut threaded to the blocks which nuts 39 are turned up against dovetail blocks 40, thus clamping each individual punch or die holder in its place, and doing away with bolts 15^b. These are alternative ways for clamping. The electric controlling device in Fig. 9 and shown partially in detail in Fig. 2 is the usual arrangement in use on machinery having intermittent motion, for which I make no claim.

In operating the machine the die and punch holding-frames with their side bars, which for convenience as a whole I will call the platen, this platen is moved towards one end of the ways until the end of the platen is past the main frame 1, the whole platen being clear and free from this said main frame, so as to permit of raising the upper or punch carrying portion of the platen. The plate then to be punched is placed on the lower frame or die portion of the platen, shoving the plate against stops that have been located to suit the particular plate which adjusts it in position to receive the holes where wanted. The punches or upper part of platen is then lowered on top of the plate and is ready for the operation. The machine is then started which causes the platen to move into frame 1 until the punches at the end of the platen come under the reciprocating head 2. The platen is then stopped and by any suitable actuating mechanism the power is turned on causing head 2 to move downward engaging punch shanks 37 and thereby forcing the punches through the plate. The head 2 returns to its upper position and by any suitable operating mechanism has its power cut out while the power is applied to driving the platen forward until another lot of punches and dies come under the head 2. The platen is again brought to rest while the punching operation is performed the same as above described for the first lot of punches coming under head 2. This operation is repeated throughout the length of the platen, or of the plate within the platen which is being punched. When all of the punches have been driven through the plate the platen is run out from under head 2. The upper or punch portion of the platen is rotated upward, permitting the removal of the plate and the insertion of another one. By this means any number of plates may be punched, having the assembled location of punch-holes exact duplicates of each other. This is a difficult matter to perform with machines in use previous to this invention, and especially so where the holes must be arranged irregularly over the surface of the plate. The

toggle-beams 10 and toggles 11 supporting bed-plate 9 are for the purpose of lowering bed-plate 9 during the time when the platen is moving, and it is lowered for the purpose of freeing the lower end of the dies from obstruction. The bed-plate 9 is brought up in contact with the bottom of the dies during the punching operation. The wedge blocks 41 in Figs. 2 and 4 are adjustably arranged in T slot 42 in Fig. 1 for the purpose of actuating any power controlling device for controlling the starting and stopping operation.

Many variations may be made in the form and arrangement of the machine, the punch and die carriers, the power actuating mechanism, the die and punch holders, and the stopping devices, without departing from my invention:

I claim:—

1. In a plate punching machine, a press having a reciprocating head, a movable frame in which a plurality of punches and dies are adjustably located over an area greater than the area of the reciprocating head and means for moving the frame relatively to the reciprocating head so as to bring all of the punches within the area of action of the reciprocating head.
2. The combination with a press, of a table in the press, punches and punch-dies located on the table means whereby the punches and punch dies may be adjusted to any desired position and a means for moving the table laterally step by step through the press.
3. A punching machine having a punch and die for each hole to be punched in the plate, the punches and dies being adjustably located on a framework moving laterally step by step through the machine.
4. A punching machine having a plurality of punches and dies, the punches and dies located on a movable platen having a framework of bars to which the punches and dies are adjustably clamped.
5. The combination with a press, of a platen carrying punches and dies and moving under the press, the platen having a top hinged along one edge to the platen-frame.
6. The combination with a press, of a platen movable transversely thereof, punches mounted on the platen yieldingly held in retracted position, and dies on the platen for cooperating with the punches.
7. The combination with a press having a head, of a platen movable transversely thereof and provided with punches and dies, and a bed on which the dies are supported in alignment with the punches during the punching operation.
8. The combination with a press having a head, of a platen movable transversely thereof and provided with punches and dies adjustably carried thereon, and a bed on which the dies are supported in alignment with the punches during the punching operation.
9. In combination, a press provided with a movable ram and a movable bed, and a table provided with punches and punch dies and guided to move transversely between the ram and the bed.

In testimony whereof, I have hereunto set my hand.

EDGAR WEBSTER SUMMERS.

Witnesses:

R. N. LOWRY,
CHAS. H. CLARK.