

(No Model.)

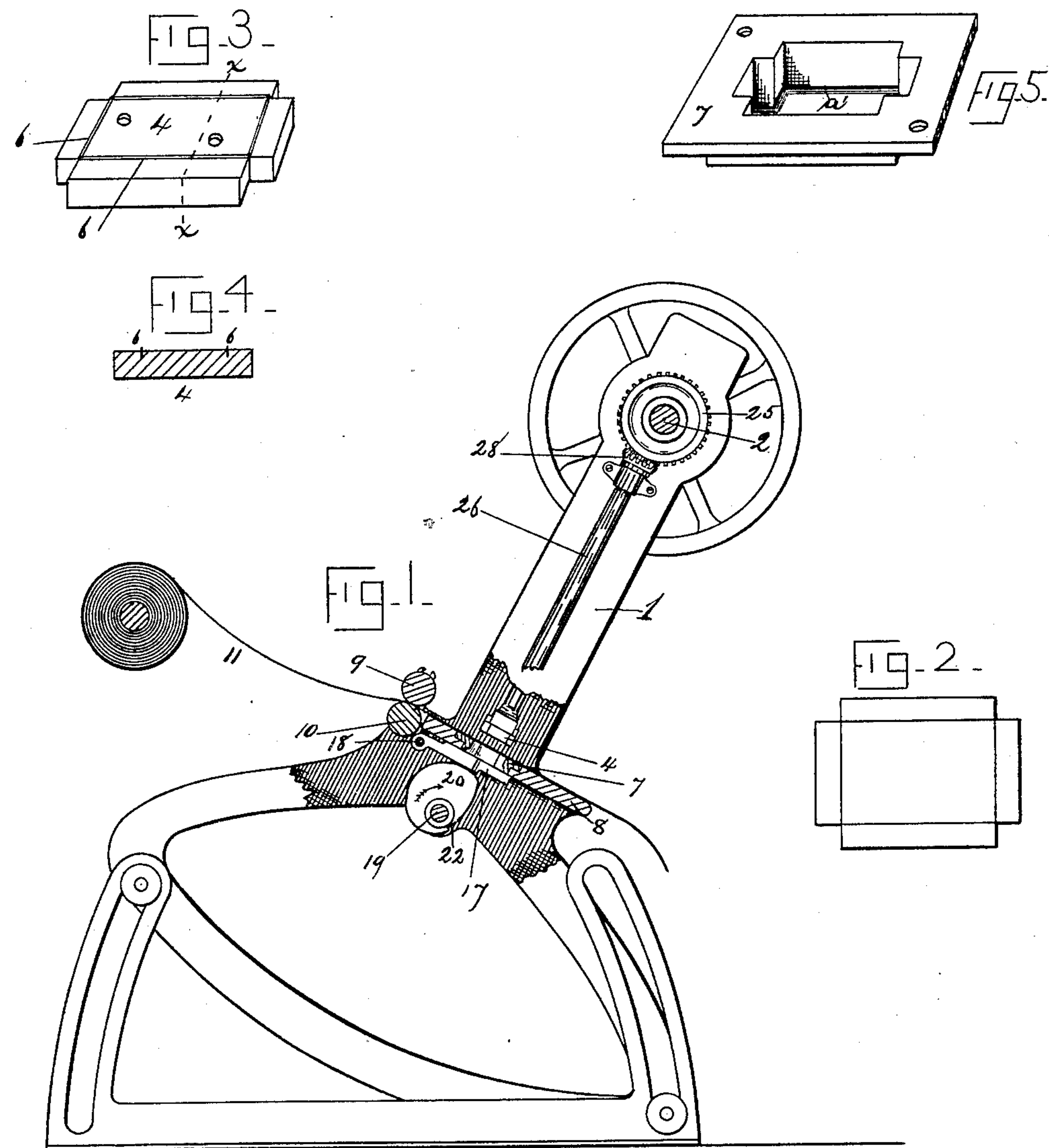
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F. H. ALLEN.

MACHINE FOR CUTTING AND SCORING PAPER BOX BLANKS.

No. 358,955.

Patented Mar. 8, 1887.



Witnesses  
*Tyler J. Howard.*  
*A. J. Coultas.*

Inventor  
*Frank H. Allen.*



(No Model.)

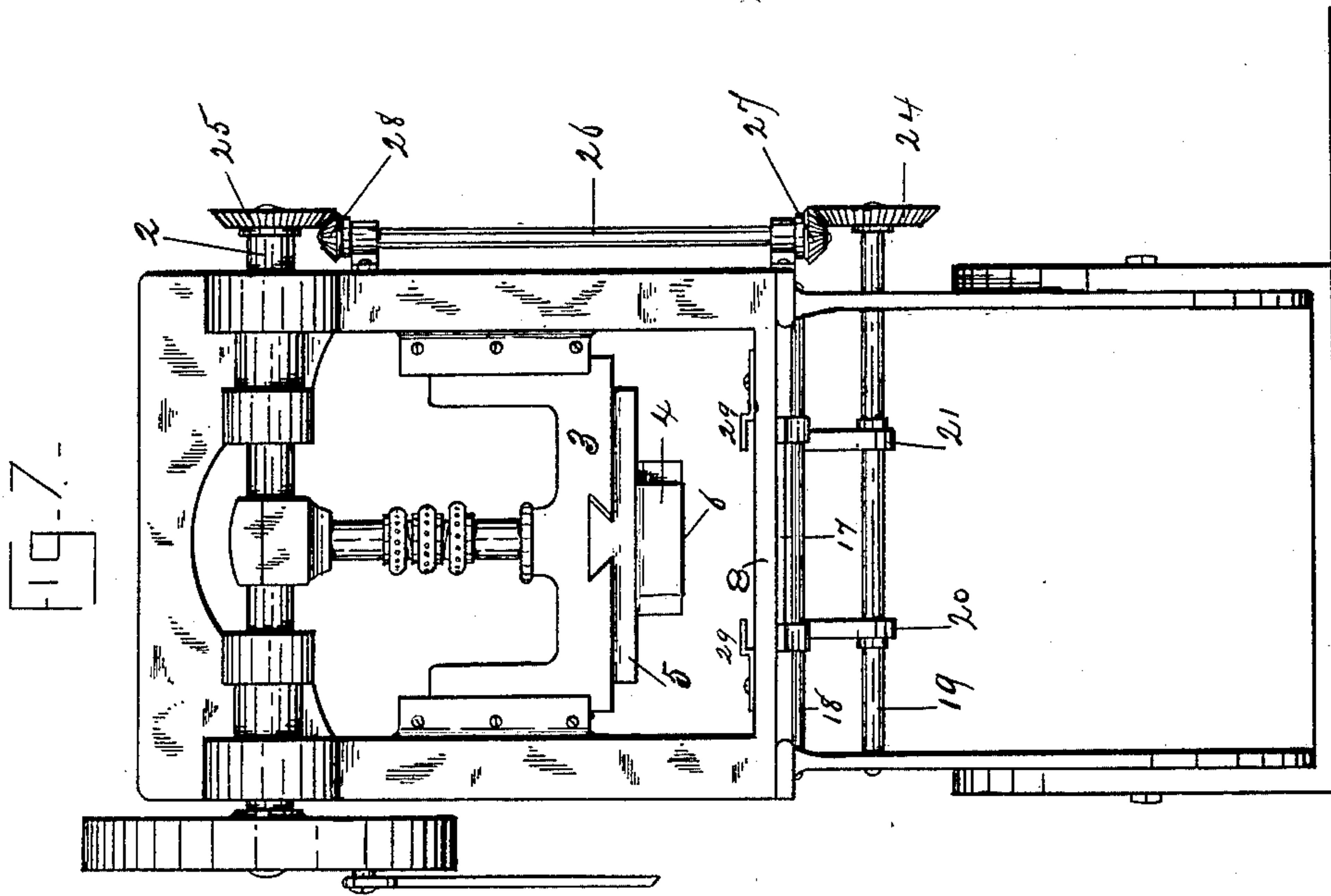
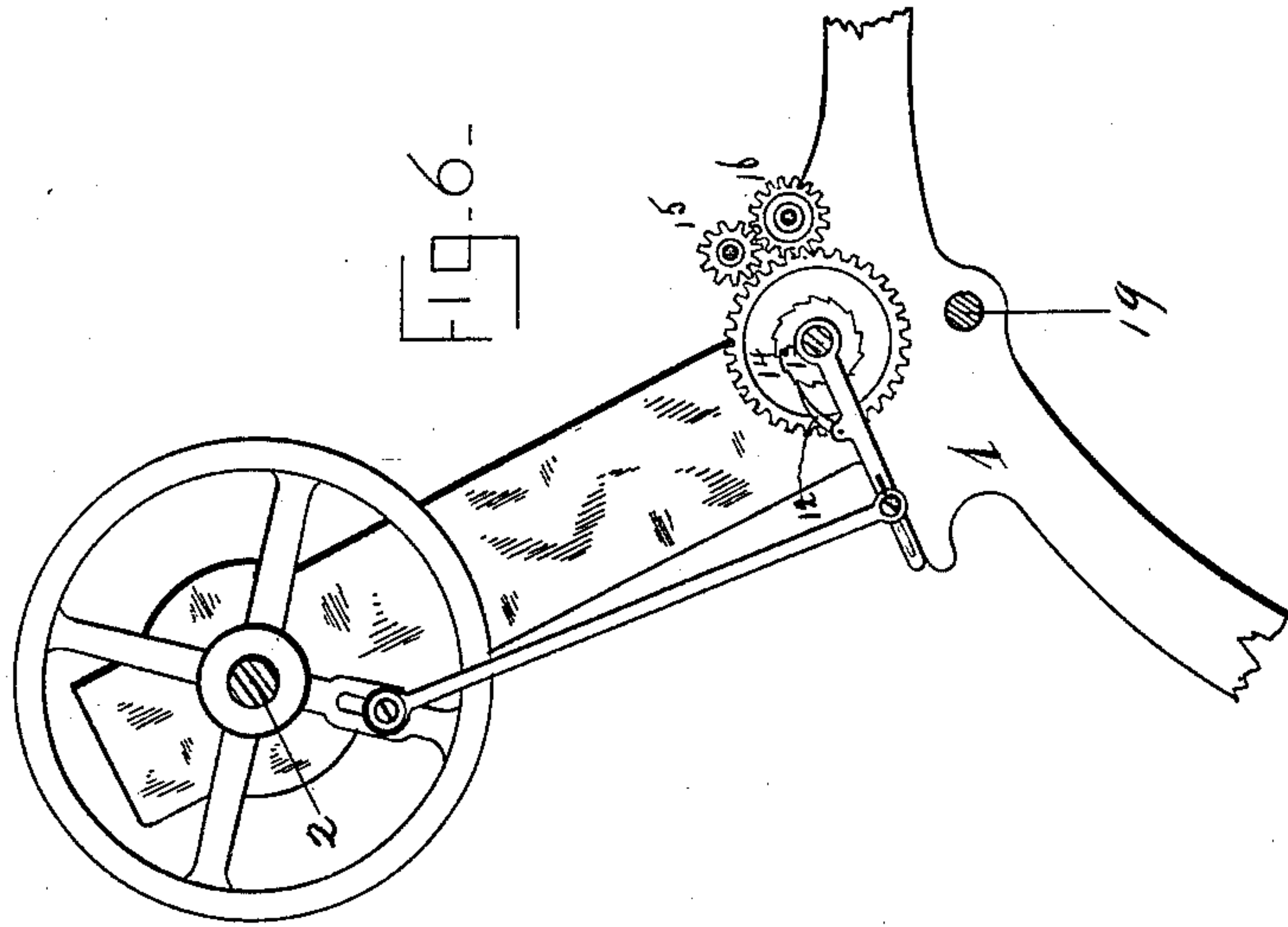
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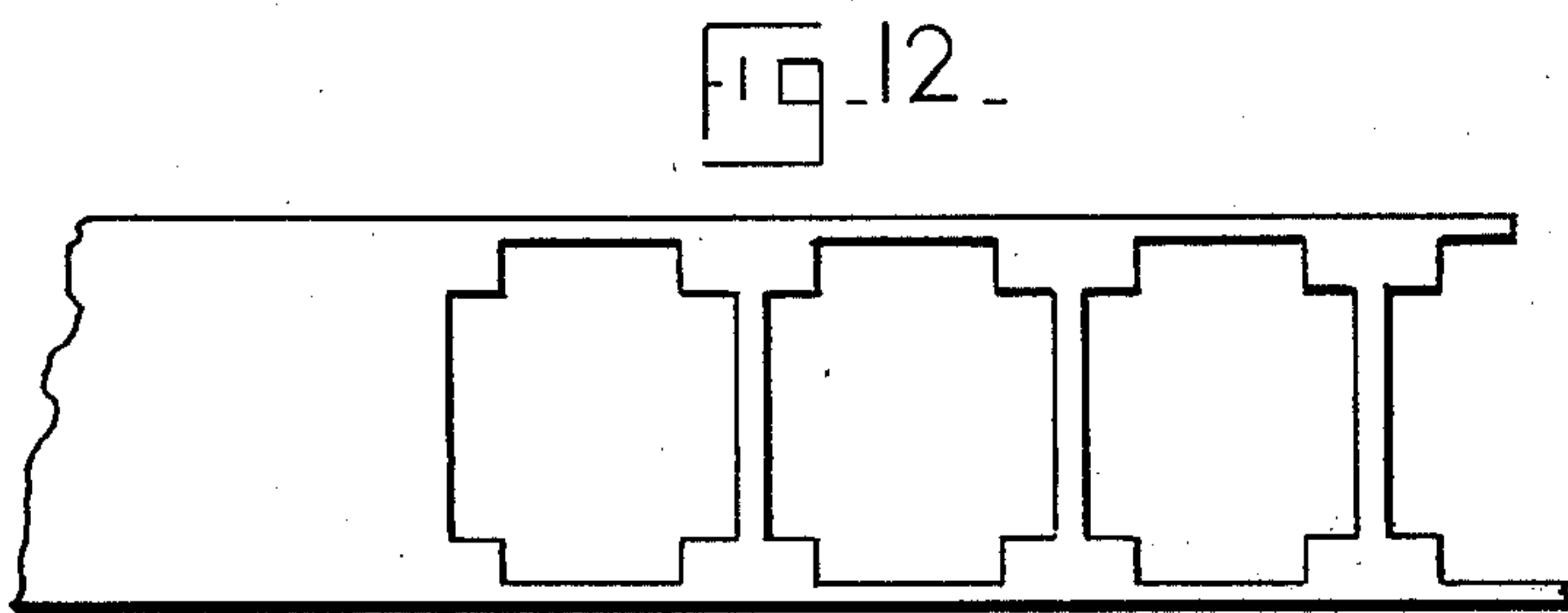
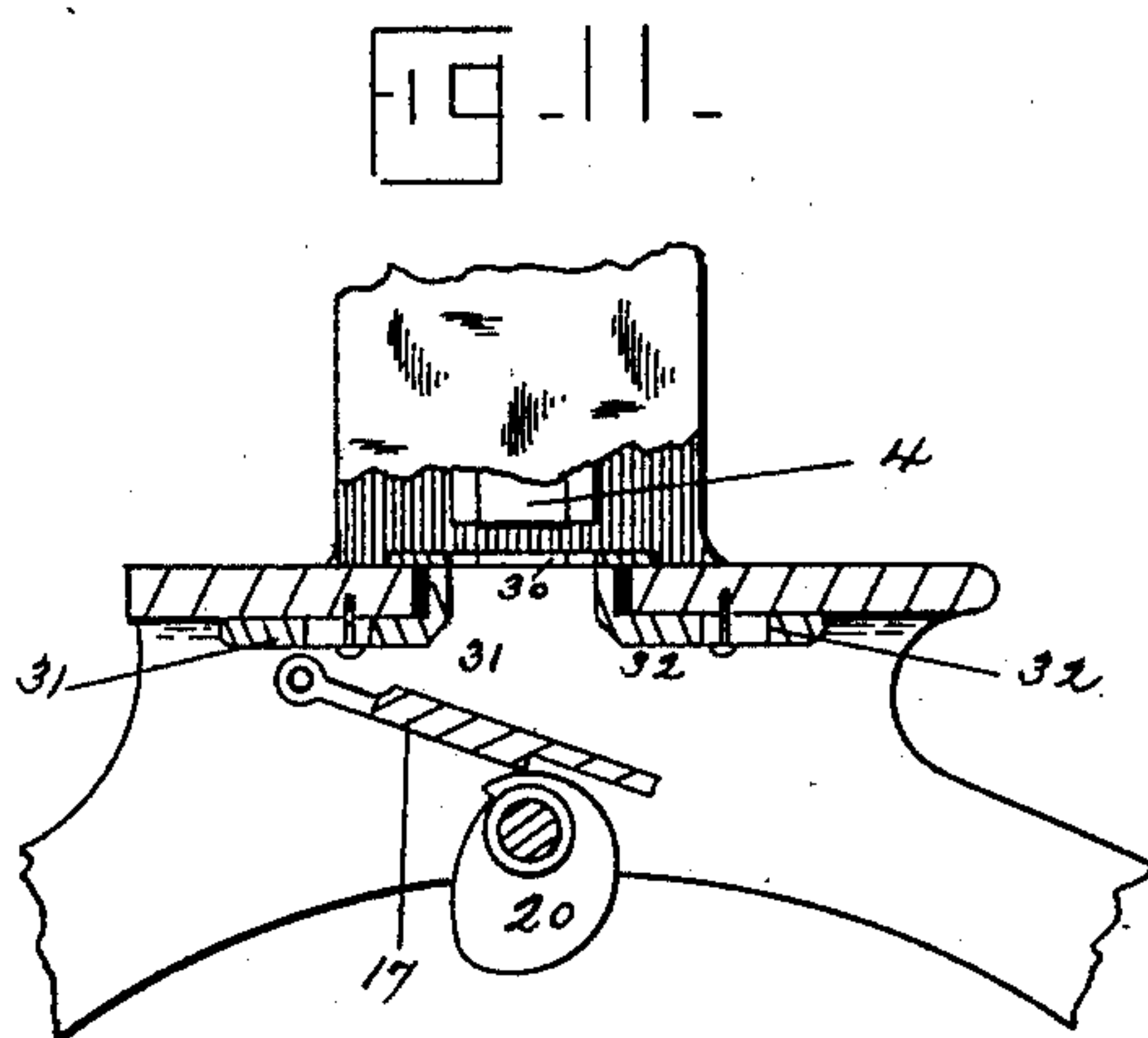
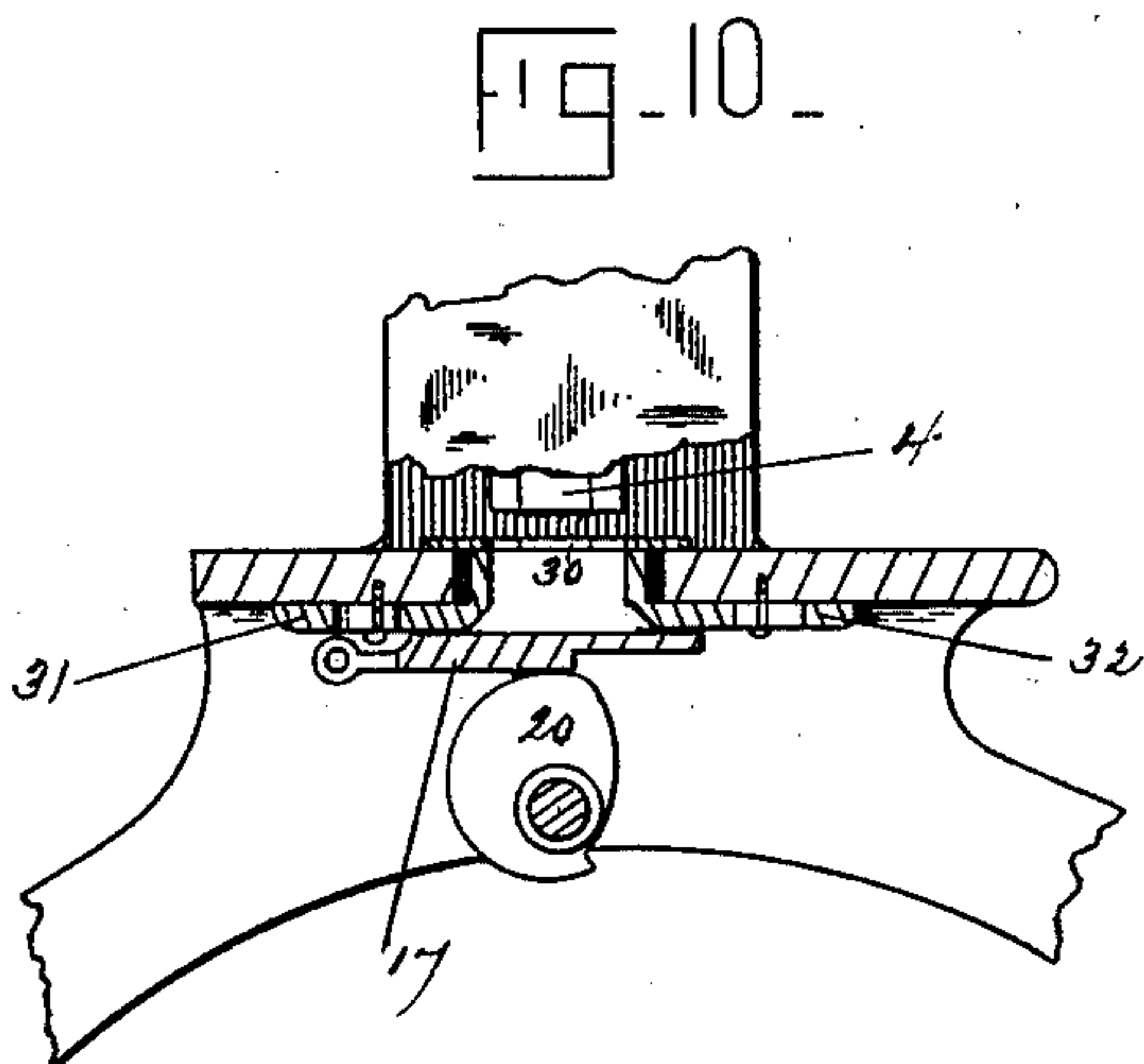
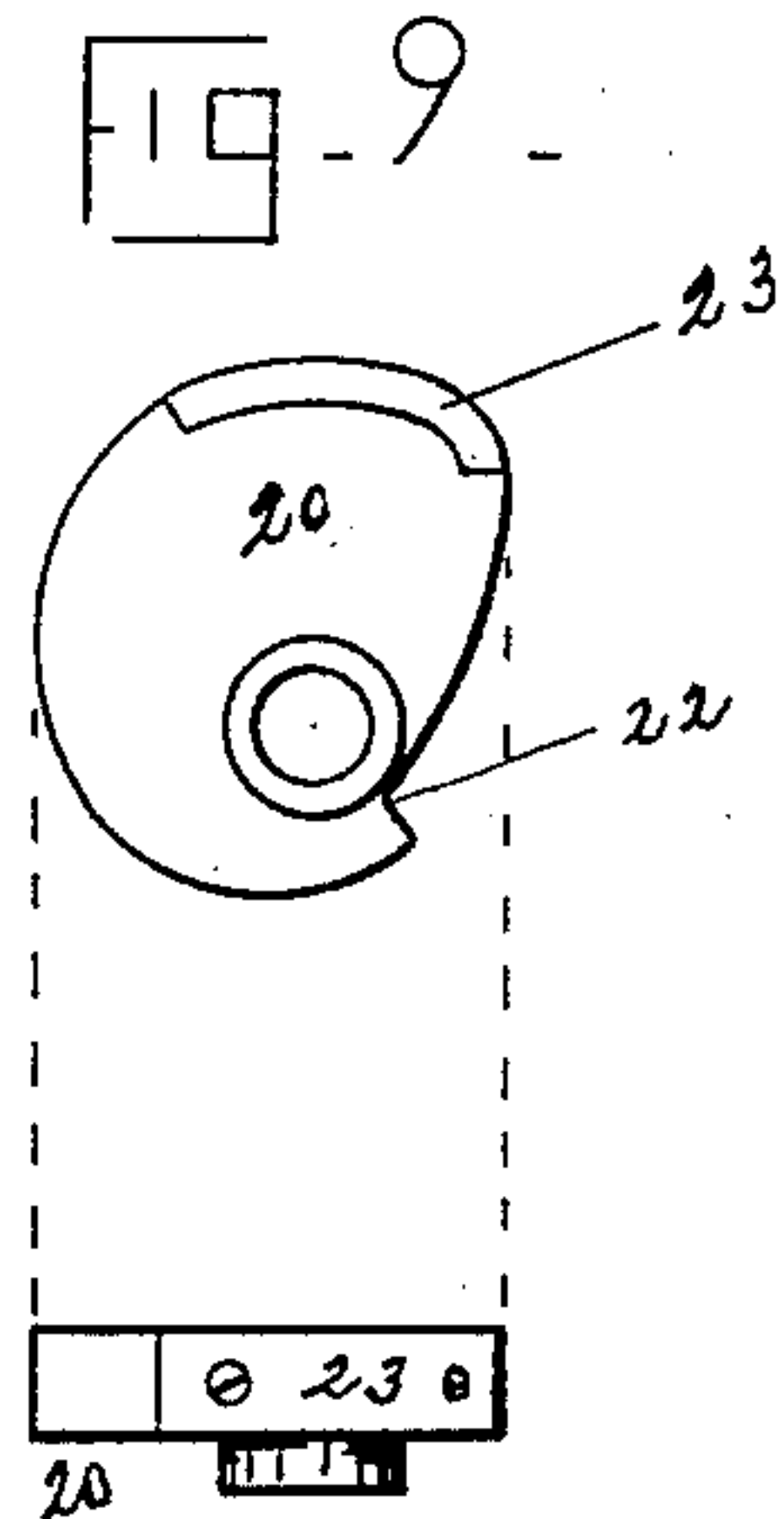
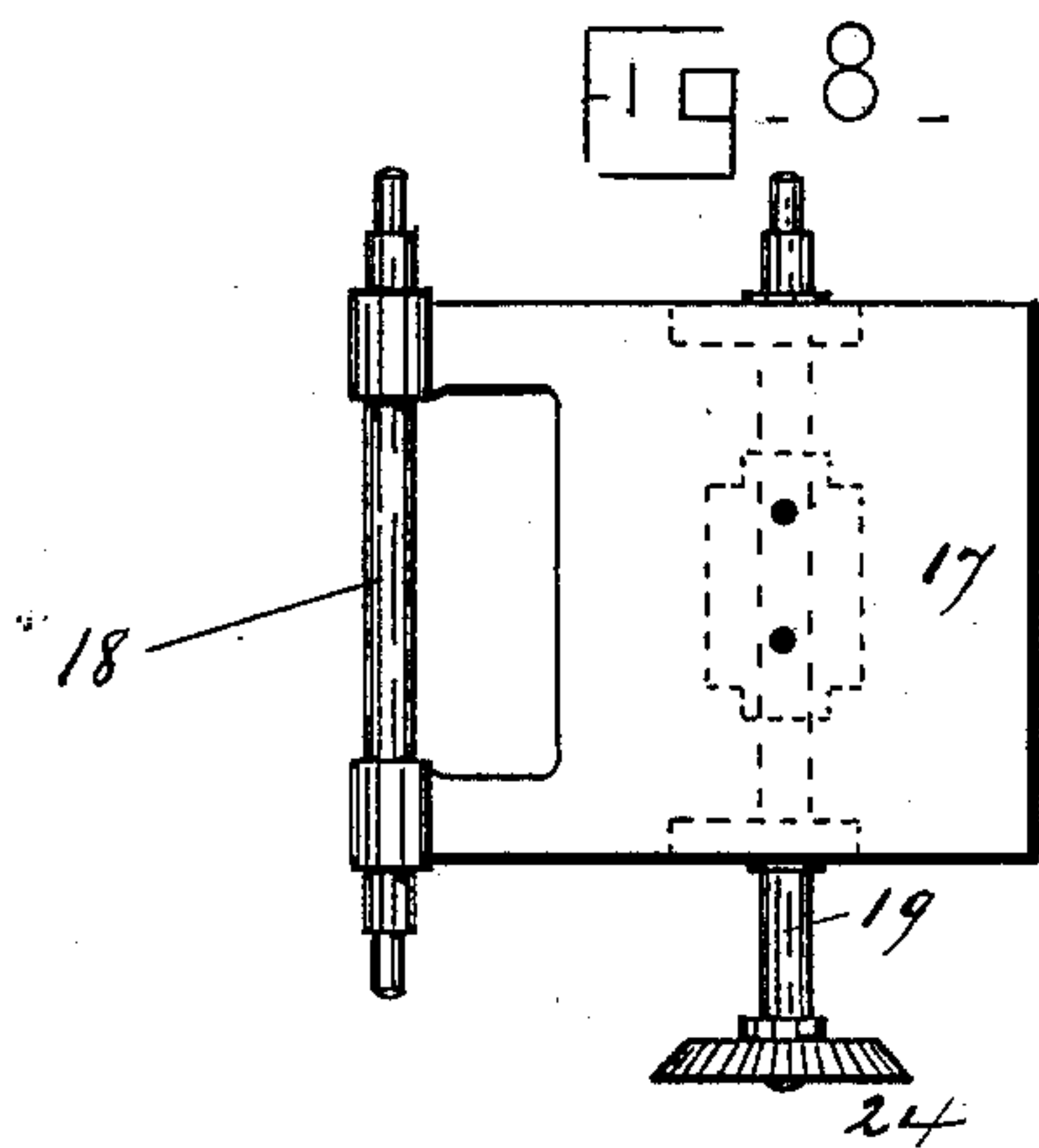
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Fig-13-

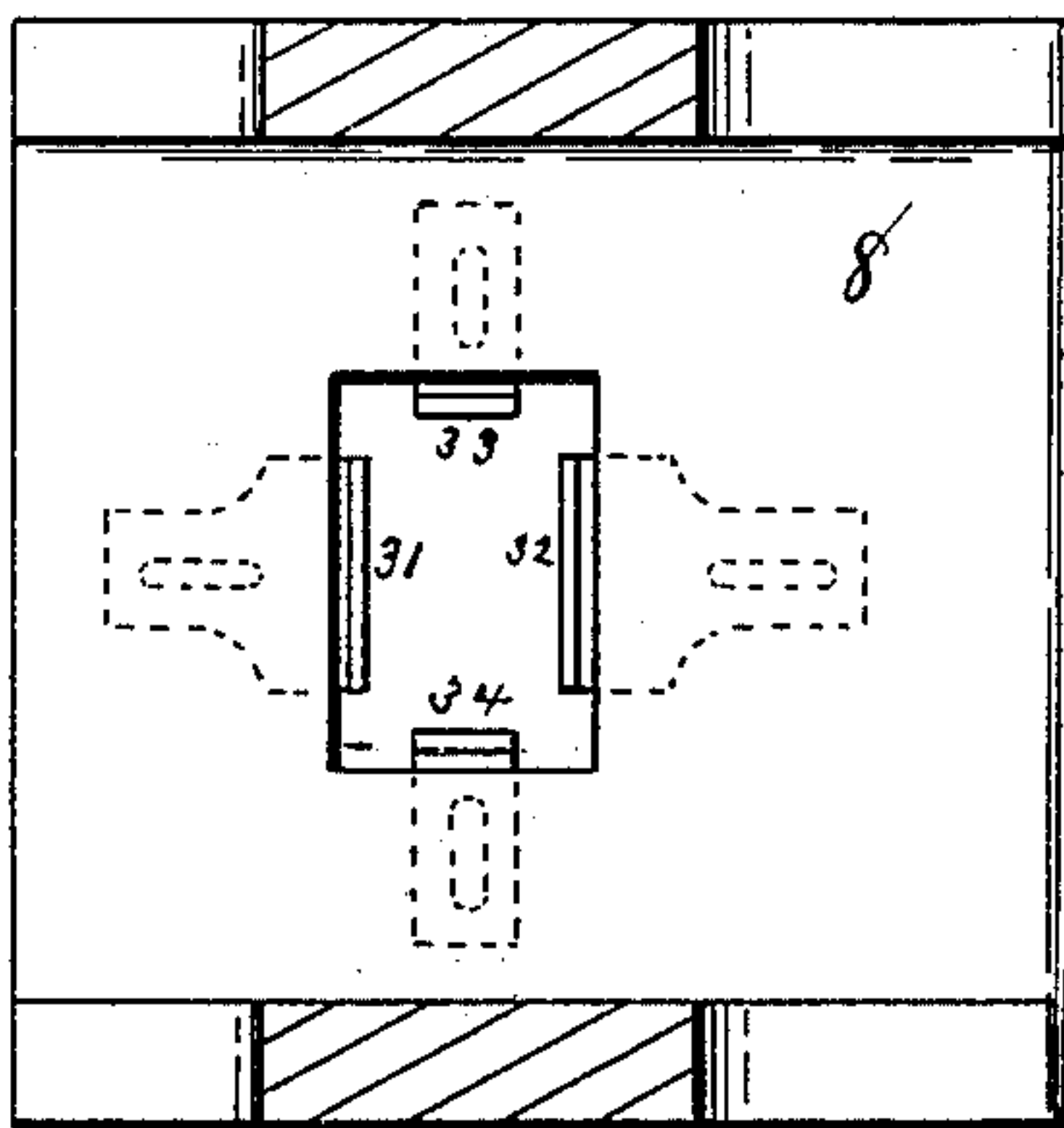


Fig-14-

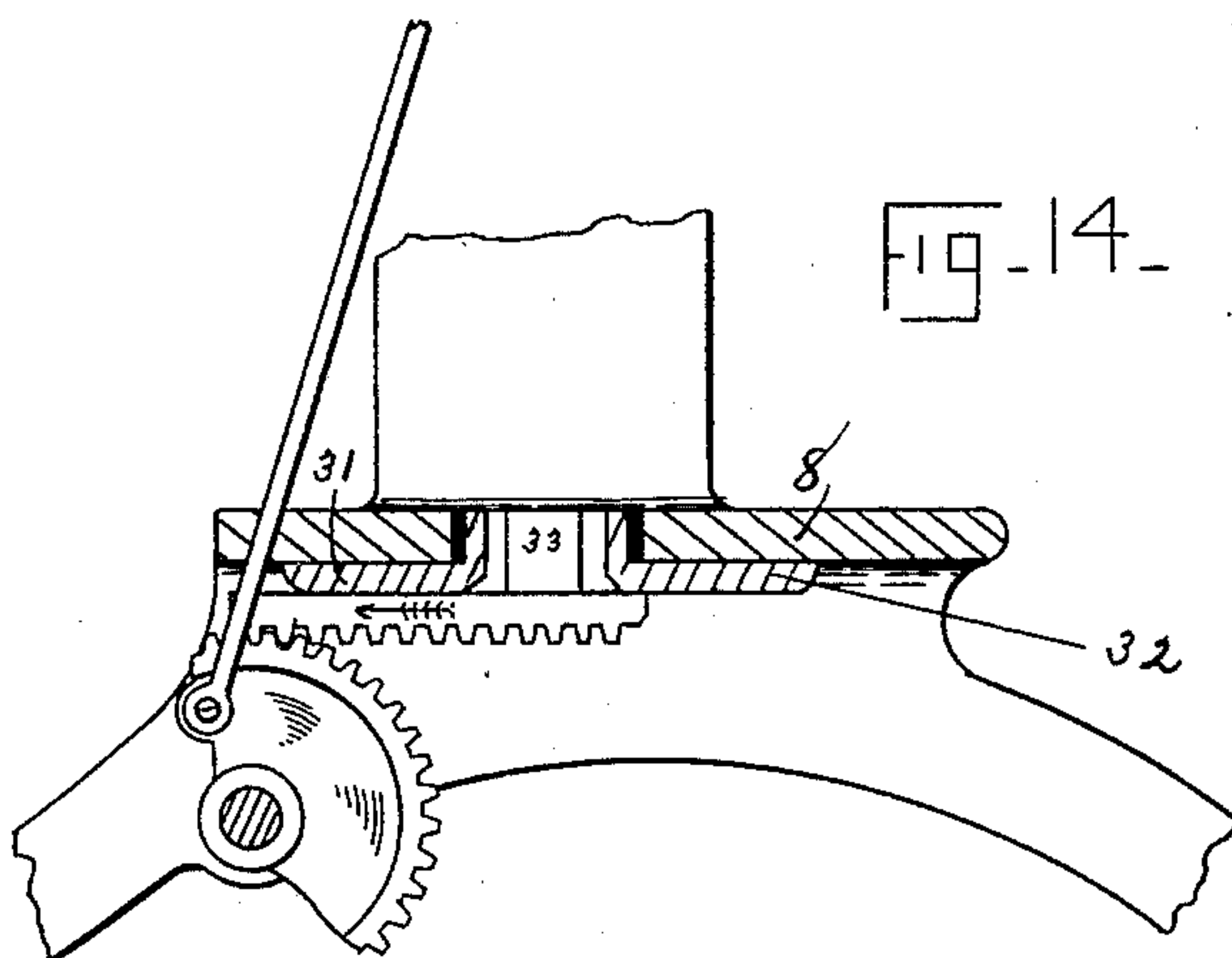
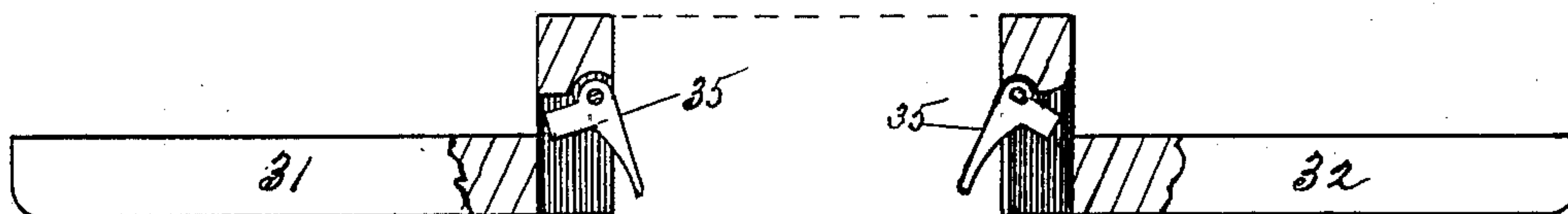


Fig-15-



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# UNITED STATES PATENT OFFICE.

FRANK H. ALLEN, OF NORWICH, ASSIGNOR TO ADDISON KINGSBURY, OF SOUTH COVENTRY, CONNECTICUT.

## MACHINE FOR CUTTING AND SCORING PAPER-BOX BLANKS.

SPECIFICATION forming part of Letters Patent No. 358,955, dated March 8, 1887.

Application filed May 20, 1886. Serial No. 202,716. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK H. ALLEN, of the city of Norwich, county of New London, and State of Connecticut, have invented certain new and useful Improvements in Machines for Cutting and Scoring Paper-Box Blanks, which improvements are fully set forth and described in the following specification, reference being had to the accompanying drawings.

My invention relates to that class of machines which (being supplied with a roll or continuous strip of card-board or similar paper-box stock) automatically feed said stock to devices which cut or punch therefrom box-blanks of any predetermined outline and also score or indent the same at the place or places which are to form the angles of the complete box.

My purpose is to produce certain new combinations of mechanical movements whereby the desired result may be attained in a simple manner, and to so construct the devices by which said movements are to be accomplished that they may be applied to so-called "punches" or "presses" as now commonly constructed.

In order to more clearly explain my invention I have annexed hereto four sheets of drawings, in which Figure 1 is a side elevation of the simplest form of my improved machine, a considerable portion of the same being cut away to show the relative arrangement of the working parts. Fig. 2 represents (enlarged) a box-blank of the form produced by said machine. Figs. 3 and 5 represent, respectively, the punch and die by which said blank is punched from a continuous strip of card-board; and Fig. 4 is a cross-section of said punch taken on line *xx* of Fig. 3. Fig. 6 is a reverse view of the upper portion of the machine illustrated in Fig. 1, showing the paper-feeding mechanism; and Fig. 7 is a rear view of said machine elevated to a perpendicular position, the feeding mechanism having been removed. Fig. 8 is a detached plan view of the hinged platen 17, and Fig. 9 shows side and edgewise views of one of the cams provided to operate said platen. In Figs. 10 and 11 I have shown a modification of my invention whereby I am able to form the female die of a plate of metal of uniform thick-

ness. In Fig. 10 platen 17 is shown as raised to meet the punch as it descends, and in Fig. 11 said platen is dropped to release a finished blank. Fig. 12 shows a section of the card-board strip after several blanks have been punched therefrom. Fig. 13 is a plan view of the bed of the press shown in Figs. 10 and 11, (with die removed,) and is intended to show the positions occupied by the adjustable guide-pieces. Fig. 14 illustrates a reciprocating movement to release the finished blanks; and Fig. 15 shows, considerably enlarged, two of the adjustable guide-pieces, 31 and 32, provided with so-called "pickers," to prevent the blank from adhering to the punch as said punch moves upward.

In order to avoid any tendency to confound those elements of this present machine which are old with those which are believed to be new, I will state that I do not claim the press proper to which I have applied my device; nor do I claim, broadly, the mechanism by which I move the strip of card-board forward to the punch and die.

My particular invention consists, first, in combining with a die and a punch having scoring-cutters (as hereinafter described) a bed or platen which receives the blank and holds it until pressed by the scoring-cutters and which, as the punch recedes, moves from its normal position and allows the finished blank to drop. Said platen then returns to its normal position, ready to meet the punch on its next downward stroke.

My invention further consists in mechanism for automatically moving said platen and in certain details of construction which are necessary or desirable in this form of machine.

Referring to the drawings, Fig. 1 represents the press to which I have attached my improvements. Said press has the usual shaft, 2, formed with an eccentric, to which is attached a vertically-movable carriage, 3. To this carriage is secured a punch, 4, by any of the means in common use; but for convenience I prefer to screw said punch to a removable section, 5, of said carriage.

The punch and die illustrated in Figs. 3 and 5 vary in two essential particulars from punches and dies as commonly used. First, the punch has cutting or indenting ribs 6, extend-



ing from the angle of each corner to the angle next adjacent, and, second, the die, instead of being "backed off" or enlarged below the cutting-edge, is formed with substantially parallel walls, so that the blank may be carried through it without deflecting. In attaching the ribs 6 to the face of the die I have found it both practicable and cheap to plane a groove from corner to corner and then drive in strips of thin sheet-steel slightly wider than the depth of the grooves, as will be understood by referring to Fig. 4.

The die 7 is preferably undercut on two or more sides, so that it may fit into corresponding recesses in the bed 8 of the press, thus leaving the face of the die flush with the upper face of said bed. When so formed, the paper may slide smoothly over the die, there being no projecting corners or edges to arrest it.

In order to prevent the blanks from sticking to the die, I have found it desirable in practice to chamfer the lower inner edges of said die a distance slightly higher than the thickness of the blank, as shown at *a* in Fig. 5, so that the blanks are free to drop with the platen as the punch leaves them.

At the left-hand side of the machine in Fig. 1 are contact-rolls 9 and 10, between which the strip 11 of card-board passes. These rolls are rotated at each revolution of shaft 2 by a pawl, 12, ratchet-wheel 13, and system of gears 14, 15, and 16. (See Fig. 6.)

As now described, we have a machine which if put in operation would feed the strip of card-board and also punch out box-blanks properly cornered, but without the scoring-cuts. To produce said cuts at the same operation I have secured to the under side of bed 8 an auxiliary bed or platen, 17. Referring still to Fig. 1, said platen is hinged beneath bed 8 on a shaft, 18, extending from side to side of the press. (See Fig. 7.) A considerable distance below platen 17 is a shaft, 19, to which are secured cams 20 and 21, on which said platen rests. While the punch 4 is passing its lowest point the highest point of cams 20 and 21 is uppermost and acts as a wedge to hold the platen rigidly in engagement with the descending blank and punch, and it will be understood that the scoring-ribs 6 are thus forcibly pressed into the blank, which then lies between said punch and platen. The punch now recedes and, as the cams continue their round, platen 17 drops down until the blank (which meanwhile rests on its upper face) slides off into a suitable receptacle or onto the floor. In order to overcome any inclination on the part of the blanks to adhere to the platen I have perforated said platen to admit air between the engaging surfaces, and have also formed the cams with an abrupt angle, 22, which allows the platen to drop suddenly at the proper instant, and thus jar the blank from its position on the platen.

I prefer to form that part of cams 20 and 21 which engages the platen at the instant of

scoring with a segment of steel, (see 23, Fig. 9,) so that it may be unscrewed and a piece of paper or card-board inserted behind it whenever it becomes worn.

As a convenient and positive means for communicating a continuous rotary motion to the cam-shaft 19, I have placed a bevel-gear, 24, on said shaft and a similar gear, 25, on the end of shaft 2, and have connected said gears by a vertical shaft, 26, carrying at its ends bevel-gears 27 and 28, which engage gears 24 and 25. (See Fig. 7.) It will now be understood that at each revolution of shaft 2 the cam-shaft 19 will also make a complete revolution. The strip of card-board, as it passes under the punch, is guided by adjustable guides 29. (See Fig. 7.)

The die 7, which I have already described, should be made of stock fully as thick as the bed of the press, so that it may extend through the bed and be reached by the upper face of the platen; but I have found it practicable and much cheaper, when several dies of different sizes are to be used with a single press, to make said dies of thinner plates of steel, as at 30, Figs. 10 and 11, in which case adjustable pieces 31, 32, 33, and 34, having rectangular lugs reaching upward through the bed 8, are provided. After a die of any desired size has been secured to the bed of the press, these guide-pieces are adjusted until their inner vertical faces are in line with the inner walls of said die. They are then fastened to said bed by suitable screws or bolts. I have found in some cases a slight tendency on the part of the blank to stick to the face of the punch as said punch turns to move upward, caused principally by the scoring-ribs which are firmly embedded in the blank; and to overcome such tendency I pivot (when necessary) pickers 35 in the inner wall of two of the guides 31, 32, 33, and 34, which, being counterbalanced, as shown in Fig. 15, act automatically to check the upward movement of the blank, as will be understood by referring to said figure.

Although I have described platen 17 as being hinged beneath bed 8 and as being moved up and down by cams 20 and 21, I am aware that it could be moved and supported in other ways and a fairly satisfactory result attained—as, for instance, said platen could be supported in ways and arranged to be moved longitudinally by a rack and reciprocating pinion, as shown in Fig. 14, said pinion being operated by a pitman whose upper end is connected to a crank on shaft 2. While such a modification could be adopted without departing from the spirit of my invention, I prefer the construction first above described, for reasons which would be obvious to a practical mechanic.

Having thus described my invention, I claim—

1. In a machine of the class referred to, in combination with a suitable supporting-frame, a die whose cutting-edge is identical in shape with the outline of the blank to be punched,



5 a reciprocating punch adapted to engage said die, having projecting scoring-ribs, substantially as described, and a platen located at the base of said die adapted to check the blank, in the manner and for the purpose specified.

10 2. In combination with a die of the form described, a corresponding punch having scoring-ribs, substantially as set forth, a platen hinged beneath said die and capable of coacting with said punch to check and score each blank, and mechanism, substantially as described, for moving the platen to release the finished blank, substantially as described.

15 3. In a suitable supporting-frame, in combination with a die whose cutting-edge con-

forms in shape to the outline of the blank to be cut, a reciprocating punch capable of engaging said die, having scoring-ribs, as described, a series of guide-pieces secured to said supporting-frame and capable of adjustment to conform to the main outline of the die, as described, and a platen hinged beneath said guide-pieces and capable of coacting with said punch to check and score each blank, all being substantially as herein described.

FRANK H. ALLEN.

Witnesses:

F. L. ALLEN,  
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