

No. 656,335.

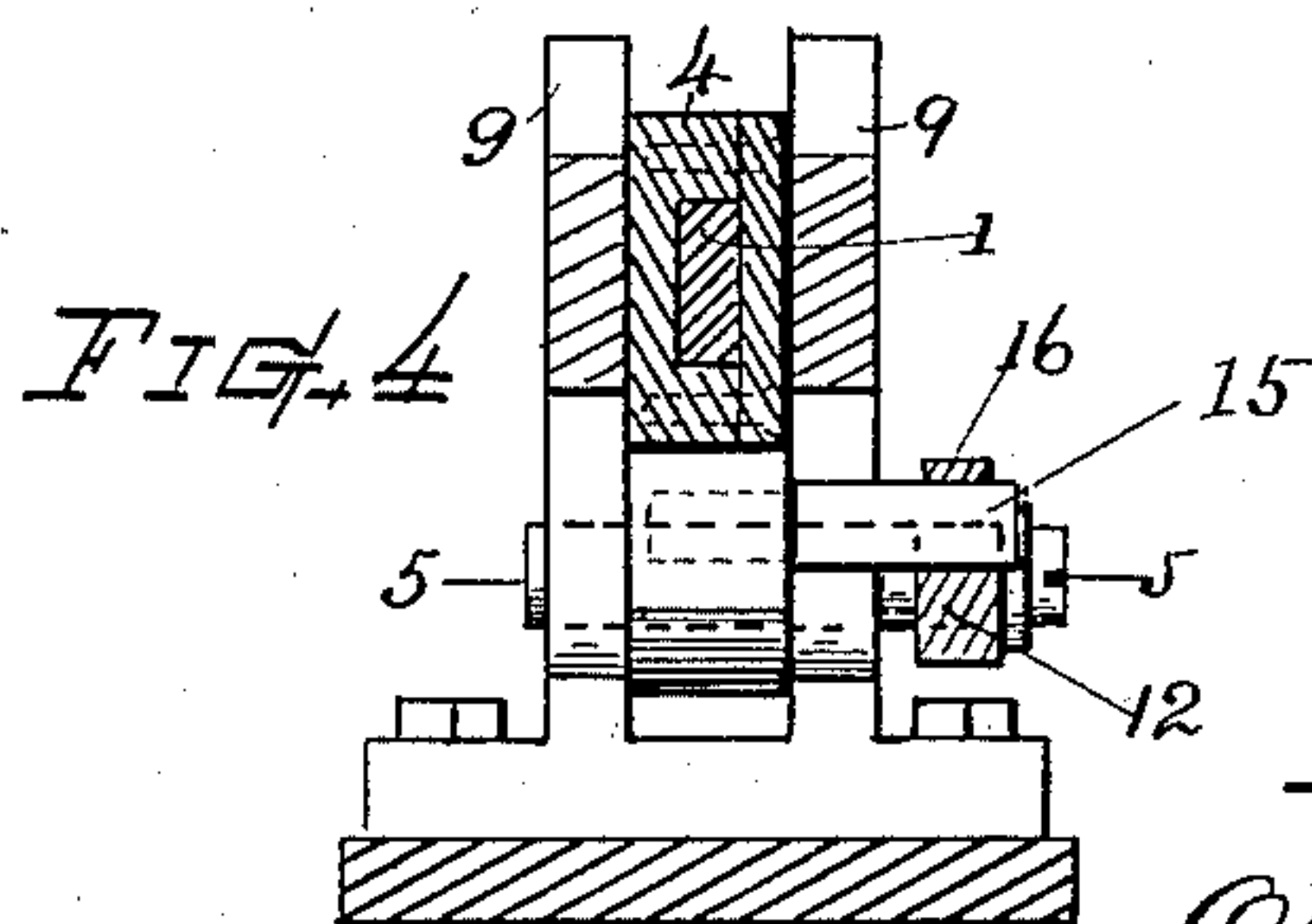
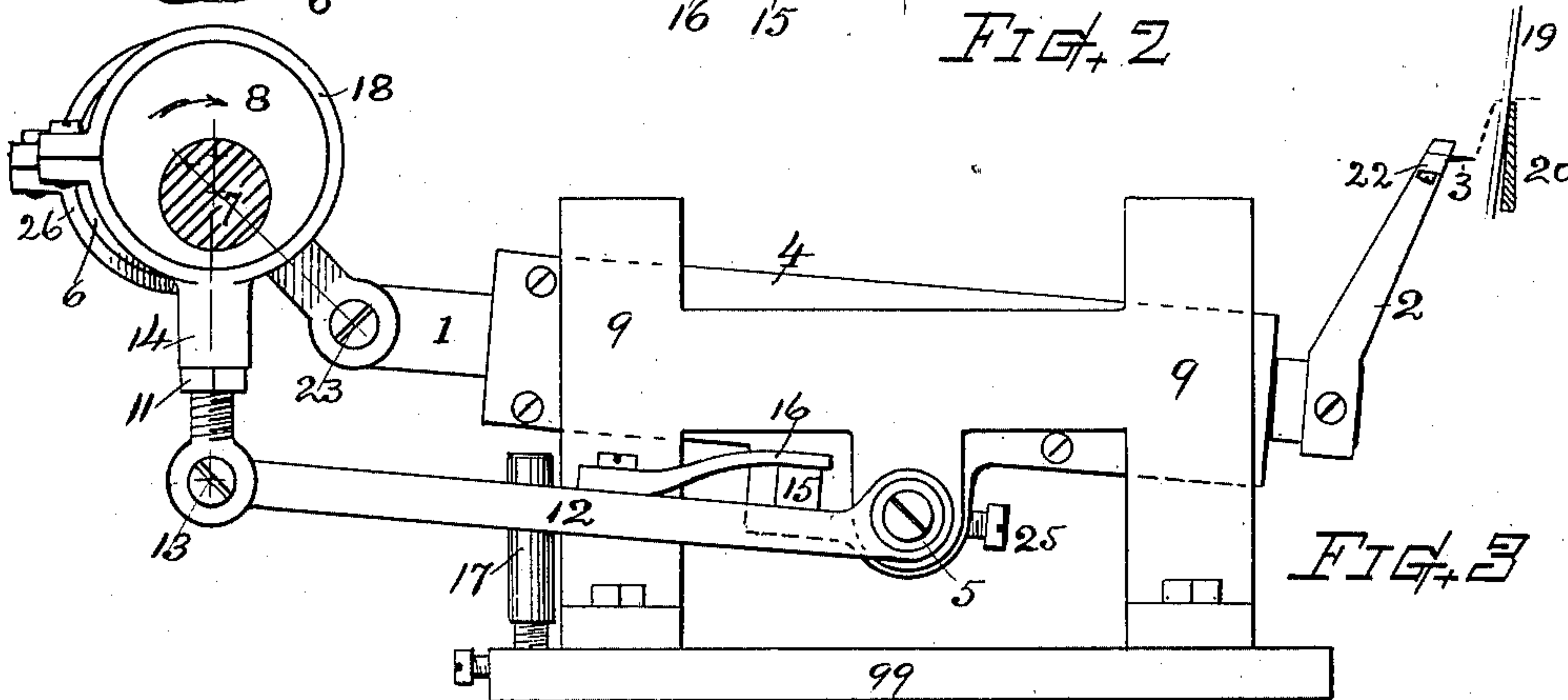
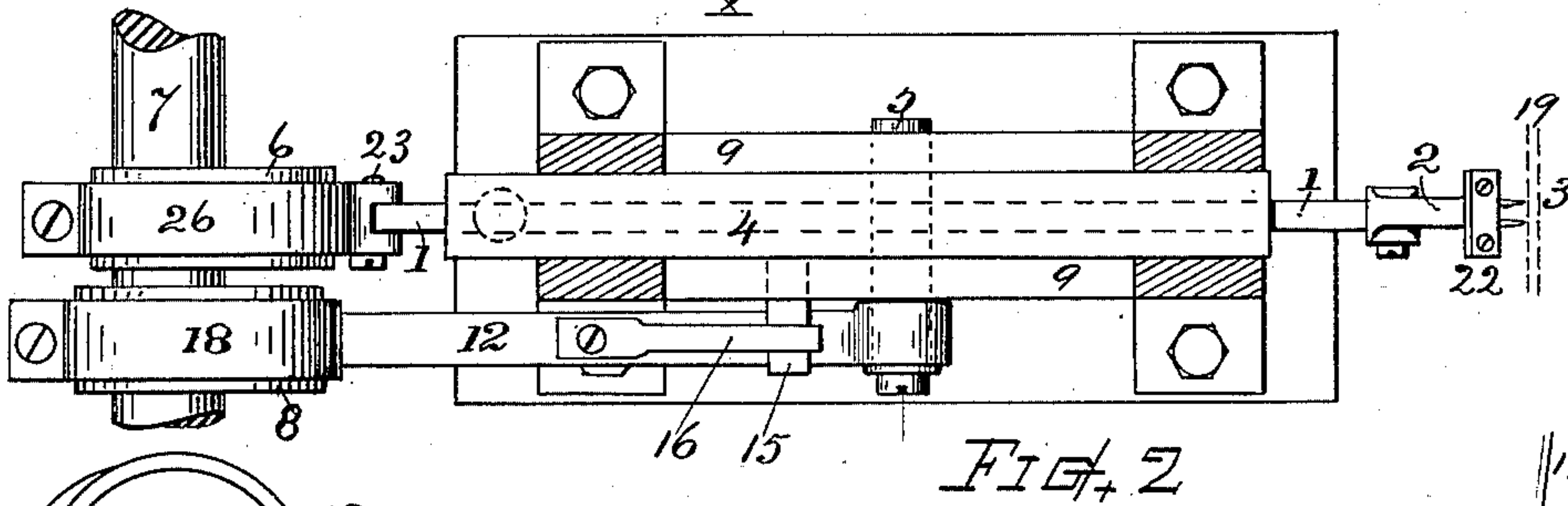
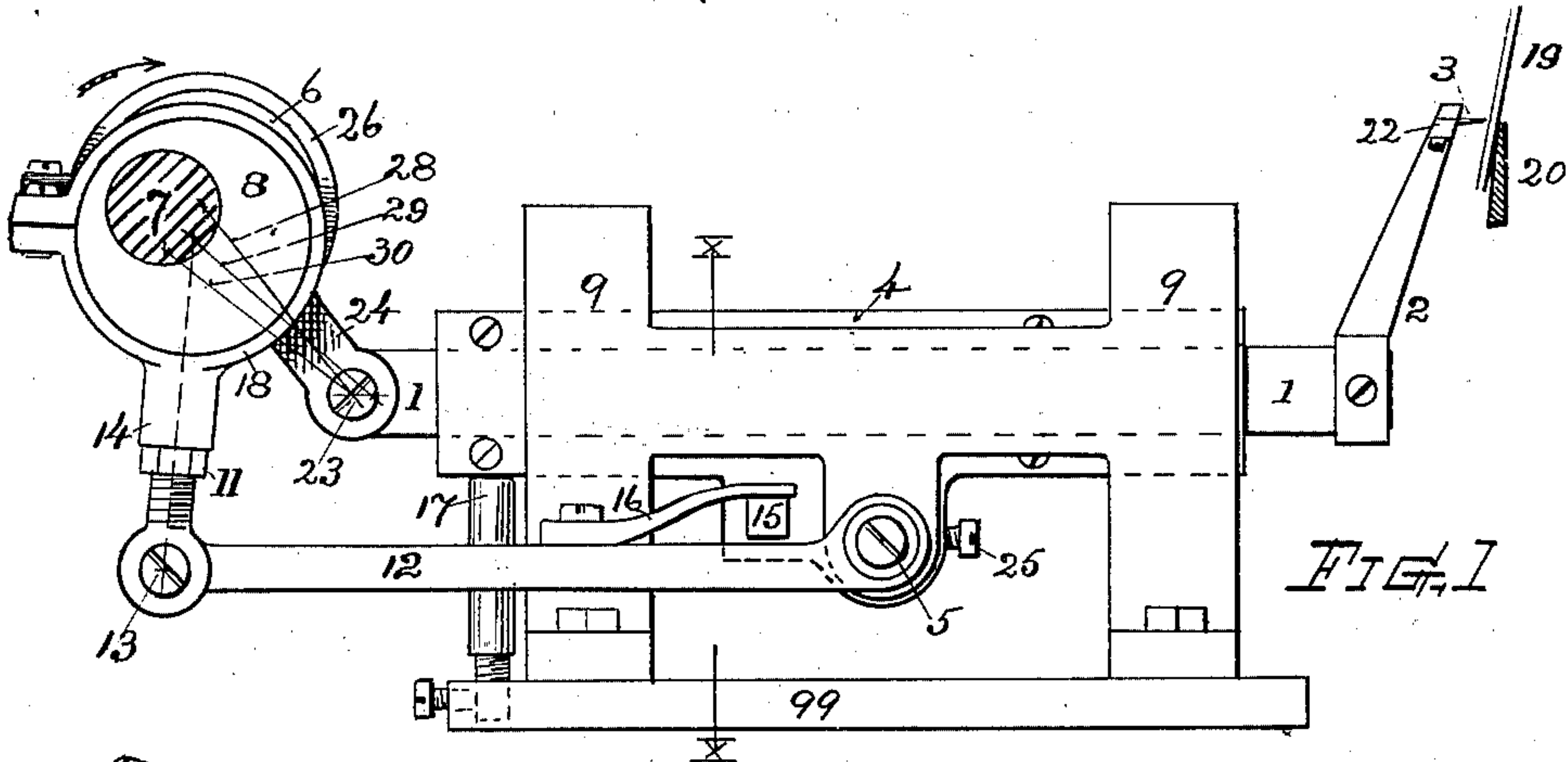
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PERFORATING MECHANISM FOR CARD SETTING MACHINES.

(Application filed Jan. 2, 1900.)

(No Model.)



Witnesses.

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PERFORATING MECHANISM FOR CARD-SETTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 656,335, dated August 21, 1900.

Application filed January 2, 1900. Serial No. 33. (No model.)

To all whom it may concern:

Be it known that I, OLIVER ARNOLD, a citizen of the United States, residing at Leicester, in the county of Worcester and State of Massachusetts, have invented a new and useful Perforating Mechanism for Card-Setting Machines, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

My present invention relates to that portion of a card-setting machine whereby the holes are formed in the leather or card-backing fabric for receiving the wire teeth; and it consists in a novel construction and combination of the perforating appliances and means for controlling and operating the perforator-bar and its guide, and in which eccentric circular cams are employed for actuating the said parts, the objects of my improvements being, first, to provide a smooth and positive motion both forward and backward; second, to reduce or eliminate friction by doing away with springs in the moving powers, and, third, to afford a punching or pricking mechanism that can operate with a high degree of speed and perfect accuracy of motion. I attain these objects by the mechanism illustrated in the drawings, wherein—

Figure 1 represents a side view of my improved perforating mechanism. Fig. 2 is a plan view of the same. Fig. 3 is a side view similar to Fig. 1, but showing the perforators at retracted position; and Fig. 4 is a transverse vertical section at line X X on Fig. 1.

The mechanism as illustrated in the drawings is mounted in a special frame of its own adapted to be attached to the main frame of an ordinary card-setting machine (not herein shown) by screws or bolts through its bed-plate; but if in any instance preferred the operating parts may be mounted on the card-setting machine in any suitable manner of attaching, the nature and operative action of my improved devices being substantially as herein explained.

My improved mechanism consists of an endwise-reciprocating perforator-bar 1, preferably of rectangular cross-section, carrying at one end the upwardly-inclined head or arm

2, having the perforating-needles or pricking-points 3 secured thereon, and a rocking controlling-guide which I call the "cradle" 4, upon or within which said bar is arranged to slide endwise, but otherwise to move with the cradle. Said cradle is centrally supported within the frame by a shaft, journals, or pivoting-axis 5 to have vertical oscillative movement. A circular eccentric cam 6 is fixed on the operating-shaft 7 and provided with connections for imparting endwise-reciprocative motion to said perforator-bar 1, and a second circular eccentric cam 8 is arranged on the operating-shaft and provided with connections for effecting oscillation or rocking movement of said guide-cradle. The shaft 7 may be the usual cam-shaft or operating-shaft in the card-setting machine. The circular cams are eccentric to each other, and the connections and relations of the various parts are such that the punches, needles, or prick-points 3 are caused to rise, advance through the fabric or backing-strip, retract therefrom, and descend out of the way by a quick, smooth, and easy motion and without shock or jar in any part of their movement.

The rocking guide or cradle 4 is supported between the parts or sides of the frame 9 and horizontally pivoted by the axis pin or shaft 5 which passes through suitable bearings on the frame, and said pin projects at one end to form the fulcrum of a lever or connecting-bar 12, the end of which is pivoted at 13 to the connecting-arm 14 upon the ring or eccentric strap 18, that surrounds the cam 8. A laterally-projecting arm, coupling-stud, or suitable connection 15 unites the cradle 4 with the lever 12 in such manner that the action of the lever imparted by cam 8 effects rocking movement of the cradle 4. Preferably the arm 15 has an angular end that rests upon the lever 12 and is normally retained thereto by a strong spring 16, which spring while maintaining connection allows a slight yield between the parts to overcome discrepancies in movement or when the end of the rocking cradle strikes upon the stop 17, which stop is preferably a screw-threaded stud arranged beneath its rear end and serves for regulating the limit of upward movement of the pricking-points or needles 3 to bring them exactly into proper alinement for their advance

through the card-backing fabric 19 immediately above the rest 20, which is the usual rest in the card-setting machine. The stop 17 is preferably made to adjust by screwing it into the bed-plate 99 more or less.

The end of the perforator-bar 1 is pivotally attached at 23 to the arm 24 of the connecting-strap 26, that surrounds the eccentric cam 6. The operating-shaft 7 and the cams 6 and 8 are disposed in such relation to the parts operated therefrom that the connecting-arm 14, carried by the cam 8, stands nearly at a right angle with the lever 12, to which it is pivotally attached, so that the cam exerts a direct lifting and depressing movement of the end of said lever, which is transmitted for rocking the guide-cradle; but the connecting-arm 24, carried by the cam 6, stands at an angle of about forty-five degrees, more or less, in relation to the horizontal or plane of the bar 1, to which its end is pivoted. Hence a peculiar compound movement among the parts is effected. The eccentric cams 6 and 8 are best peripherally grooved for the straps or rings running thereon, and said straps are made suitably adjustable for taking up wear. The arms 14 and 24 can, if desired, be made either solid or with a threaded extensible end and a check-nut 11, as shown on the arm 14. The head 2, which is carried in rigid connection with the end of the bar 1 or suitably secured thereto, is provided at its upper end with clamp devices or jaws 22 for holding the perforating-punches or needle-points 3 firmly in position therein with their points projecting forward, as shown.

The guide-cradle 4 is best made fast to the axis-pin 5 by a set-screw 25, said pin being free to turn in the bearings of the frame.

In the operation, assuming that the parts are at position, as in Fig. 1, with the shaft 7 rotating in the direction indicated by the arrow, the cradle 4 is then at a position of rest upon the stop 17 and the prick-needles at their highest position. When the cam 6 is at the position shown, Fig. 1, the angle of the connecting-arm 24 relatively to the bar is at line 28. Then as the cams move forward one-eighth of a revolution of the shaft 7 the position of arm 24 changes to the line 29, thereby moving the bar 1 and needle-holder 22 forward a sufficient distance for carrying the puncher or pricking-needles 3 through the card-backing fabric 19 over the edge of the rest 20. Another eighth of a revolution of the shaft and cams changes the position of the connecting-arm to the line 30, thereby moving back the bar 1 and holder 22 and withdrawing the needle-points to the position they occupied when the arm 24 was at line 28, thus performing in a rapid, smooth, and positive forward-and-backward motion the stroke necessary for effecting the perforation of the card-back fabric. During the movement above noted the eccentric cam 8 is practically executing a dwell or giving so little movement to the connection 12 that it is ac-

commodated by yield of spring 16 and imparting no movement to the cradle, which is held on the rest 17. During the remaining three-fourths revolution of the shaft 7 the cam 6 farther retracts and returns the bar, while the cam 8 is occupied in lowering the bar and needle-holding head to the position shown in Fig. 3 and in again lifting the same in time to perform the next perforating action, this being effected by the rocking of the cradle or guide 4 upon its pivot-axis 5 by means of the lever 12 in connection with the arm 14 of the eccentric-actuated ring 18 and the transverse connection 15. This lowering action of the needle-holder is necessary in order to avoid collision therewith of the tooth forming and inserting mechanism, as will be understood by persons conversant with card-setting machinery. The tooth forming and bending mechanisms being well known and not of my present invention it is unnecessary to describe them herein.

The raising of the rear end of the cradle 4 by rocking action on its journals or axial shaft 5 simultaneously with the rearward movement of the bar 1 when the needles are released from the card-backing fabric 19 detracts by forward swing of the upwardly-inclined head 2 from the backward movement, and the two motions united cause the peculiar and desirable path of motion in which the needles travel, as shown by dotted line on Fig. 3. The relative location of the axis 5, together with the capacity of the cams 6 and 8, governs the precise scope in movement and path of the needles, and since these may be varied in their degree and proportional relation I do not therefore confine myself to any fixed conditions in that respect.

What I claim as of my invention, and desire to secure by Letters Patent, is—

1. In a perforating mechanism for card-setting machines, the circular eccentric cam 6, its ring or strap 26 having the connecting-arm 24, in combination with the endwise-movable bar 1 pivotally attached to said arm at one end, and carrying the needle-holding head 2 on its other end, the perforating-needles on said head, a movable guide for said bar, and means for moving said guide to raise and depress the needle-holders, substantially as set forth.

2. In a perforating mechanism for card-setting machines, the circular eccentric cam 8, its ring or strap 18 having the connecting-arm 14, and a lever pivotally attached to said arm; in combination with the needle-operating bar, a rocking guide therefor, and a coupling device connecting said guide and said lever for operation, substantially as set forth.

3. A perforating mechanism for card-setting machines; comprising in combination with the frame and operating-shaft, two circular eccentric cams 6 and 8, ring-straps for said cams each having an arm, the oscillating guide or cradle mounted on an axis in the frame, the endwise-movable perforator-bar

slidably supported within or upon said guide and connected to the cam-actuated arm of cam 6, said arm approaching the plane of the bar at an angle of about forty-five degrees, more or less, a head or arm provided with needle-holding devices fixed on said bar, the perforating-needles secured in said holder, a lever operatively connected with said oscillating guide, the end of said lever pivoted to the cam-actuated arm of cam 8, the arm and lever being at about right angles in relation to each other, and a stop-rest beneath the end of said oscillating guide, for the purposes set forth.

4. A perforating mechanism for card-setting machines, comprising a tubular oscillating guide, an endwise-movable bar supported non-rotatably within and by said guide and carrying a needle-holding head at one end, an operating-shaft having two circular eccentric cams thereon, one cam provided with a strap or arm pivotally attached to said bar, the other cam provided with a strap and arm having a connection therefrom for rocking said guide, substantially as set forth.

5. In combination with the supporting-frame, the rocking guide-cradle pivoted on a transverse axis for vertical oscillative action; and supported laterally between the frame sides, a reciprocating bar mounted in said cradle and carrying an upwardly-inclined head with point-holding clamp thereon, a lever pivoted or fulcrumed on the axis-shaft, a coupling-stud uniting for operation said guide-cradle with said lever, a spring yieldingly confining said coupling-stud upon said lever, the operating-shaft, a pair of eccentric circular cams fixed on said shaft, ring-straps for said cams, one connected with said reciprocating bar, the other connected with said lever, and a limiting-stop for the swing of said cradle-guide, all substantially as and for the purposes set forth.

Witness my hand this 28th day of December, 1899.

OLIVER ARNOLD.

Witnesses:

CHAS. H. BURLEIGH,
ELLA P. BLENUS.