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E. D. ACKERMAN.

APPARATUS FOR TRANSMITTING, REGULATING, AND REVERSING MOTION.

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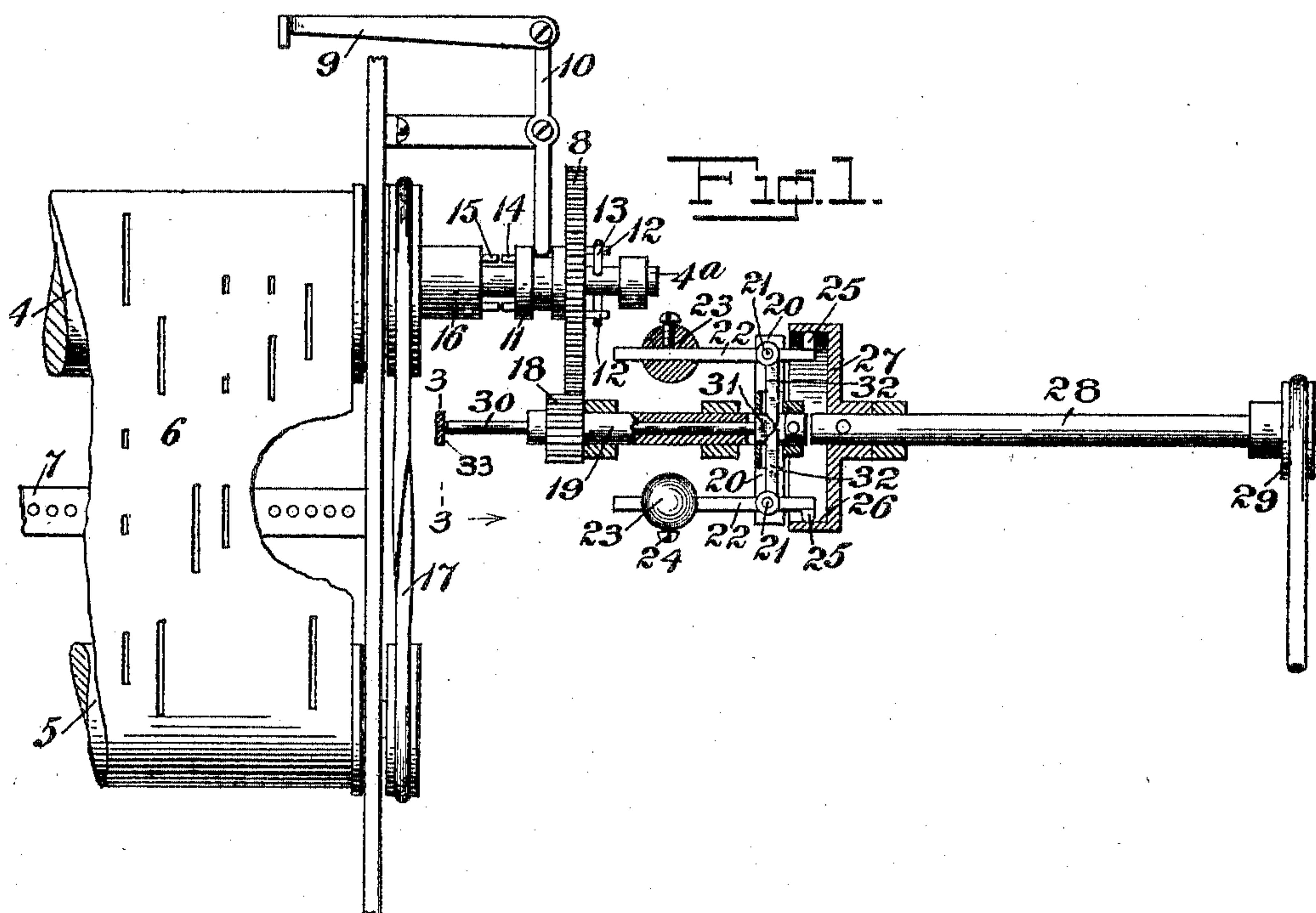


Fig. 2.

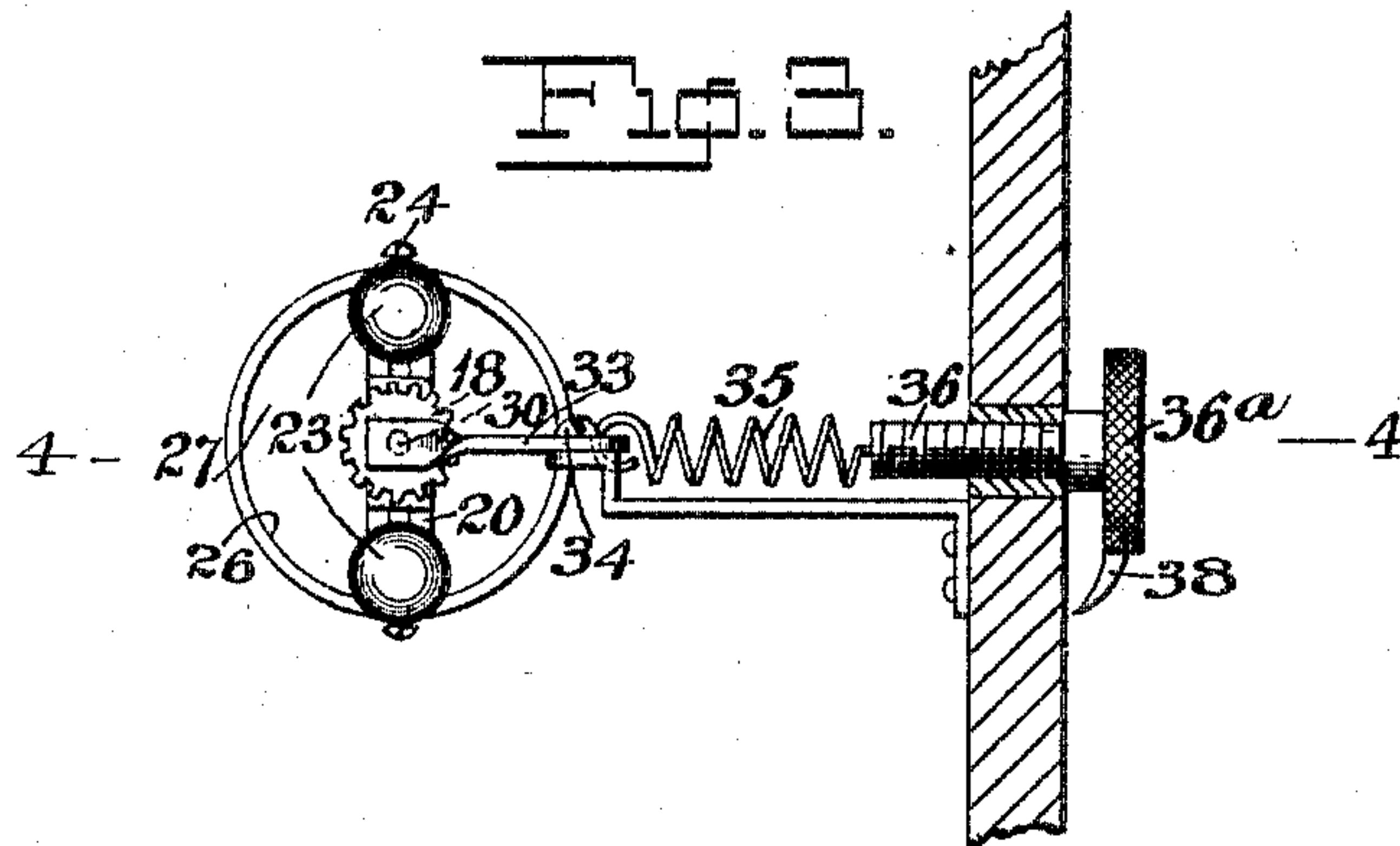
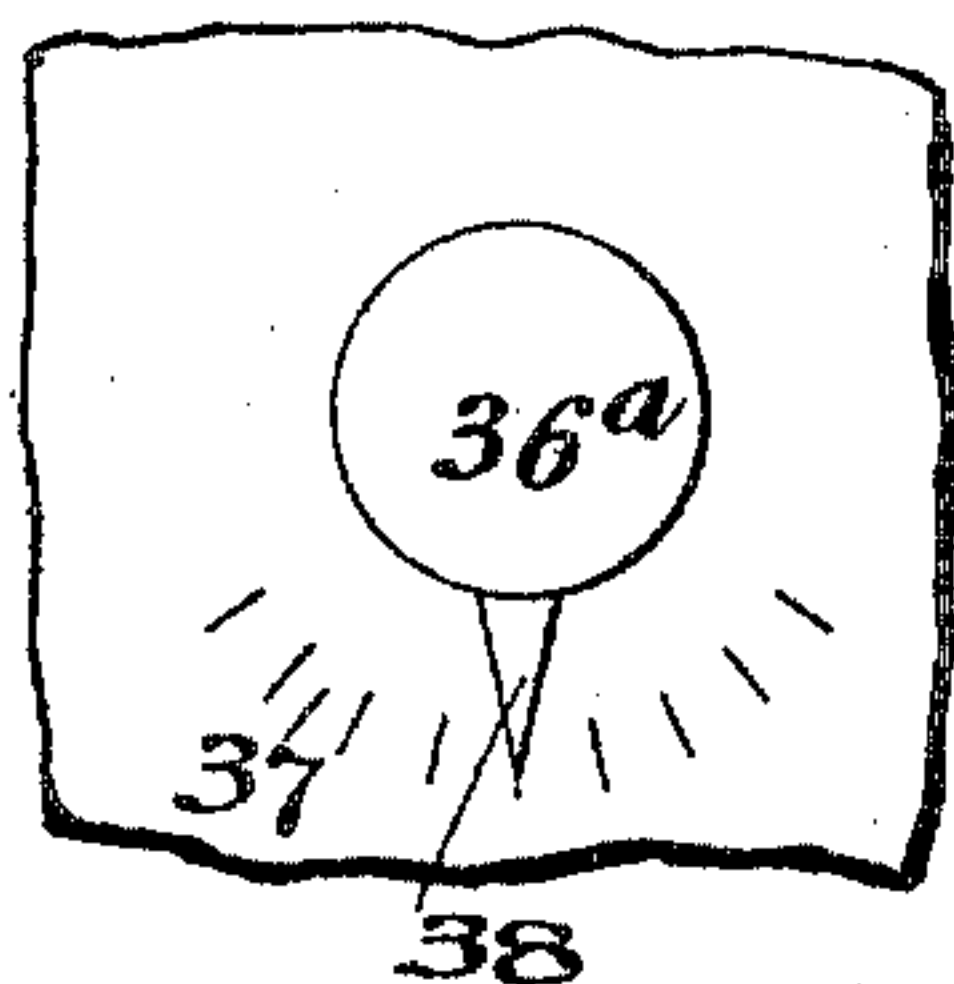
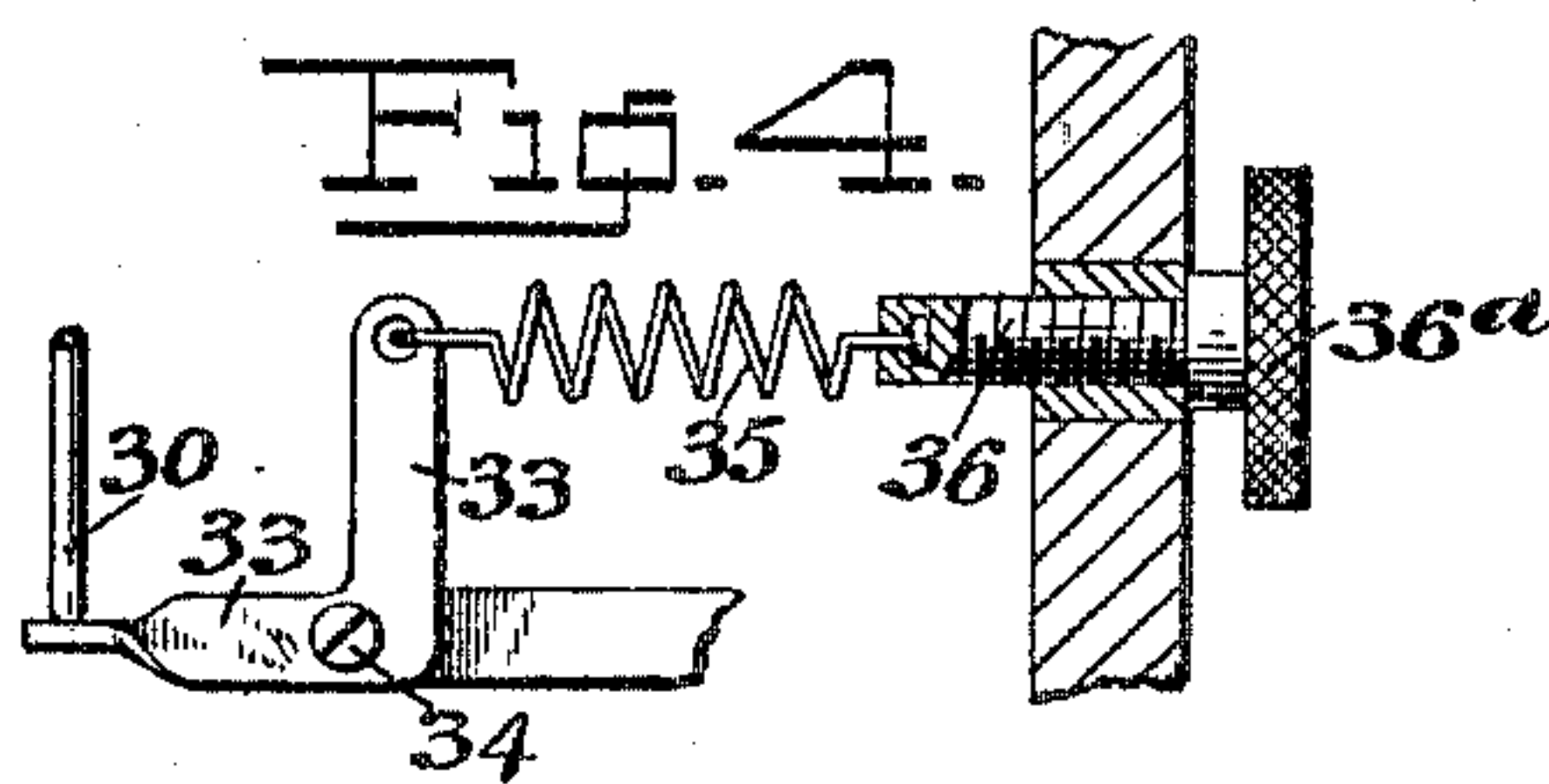


Fig. 4.



Witnesses

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APPARATUS FOR TRANSMITTING, REGULATING, AND REVERSING MOTION.

No. 797,543.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EDWIN D. ACKERMAN, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Transmitting, Regulating, and Reversing Motion, of which the following is a specification.

The subject of this invention is an apparatus for transmitting motion to a band or sheet coiled on a pair of rollers in alternate directions and at regulated speed.

In the accompanying drawings, Figure 1 is an elevation, partly in section, illustrating my invention applied to transmitting motion to a perforated tune-sheet for self-playing attachments for musical instruments. Fig. 2 is a detail elevation of an adjusting knob and scale omitted in Fig. 1. Fig. 3 is a detail view, partly in section, on the line 3 3, Fig. 1. Fig. 4 is detail section on the line 4 4, Fig. 3.

4 and 5 represent a pair of reels or rollers, and 6 a connecting-band coiled by its ends on the respective reels or rollers, so that when one of said reels is driven the band will be wound thereon and off the other, and vice versa.

In adapting the speed regulating and reversing gear which is the subject of my invention to the purposes of a tempo governor and rewinding apparatus for playing attachments for musical instruments the rollers 4 and 5 constitute, respectively, the playing or feed reel and the rewinding-reel, and the connecting-band 6 constitutes a perforated music-sheet which is drawn over a tracker-bar 7 to operate or control the note-selecting devices either through pneumatic or mechanical connections in a manner which is well understood in the art.

The selecting mechanism forms no part of my present improvement; but I have described suitable selecting mechanism in another application of even date herewith.

The feed-reel 4 and rewinding-reel 5 are driven alternately by a gear-wheel 8 through the medium of a clutch device shifted in either direction by means of a system of levers 9 10, engaging with a sliding pulley 11, which is fixed to and turns with the gear-wheel 8. Pins 12, projecting from one face of the gear-wheel 8, engage with pins 13, projecting radially from the shaft 4^a of the feed-reel, so as to turn this reel when the parts are in the position shown in Fig. 1. To disconnect the feed-reel 4 and connect the rewinding-reel 5,

the clutch-pulley 11 and gear-wheel 8 are shifted to the left, so as to disconnect the pins 12 from the pins 13 on the feed-reel shaft and cause pins 14, projecting from the clutch-pulley 11, to engage pins 15, which project from a loose pulley 16, from which a crossed belt 17 transmits rotation to the rewinding-reel 5.

The toothed wheel 8 gears with a pinion 18 of sufficient length to permit the longitudinal sliding movement of the gear-wheel 8 above referred to without passing out of gear with said pinion. The pinion 18 is keyed on a hollow shaft 19, on the outer end of which is fixed a wheel or spider 20. Within this wheel 20 are mounted on fulcrum-pivots 21 a pair of parallel governor-arms 22, carrying balls 23, which are slidable on the said arms and fixed in any position thereon by set-screws 24, so as to afford any desired force of leverage. The extremities of the governor-arms 22 on the opposite side of their fulcrum-pins 21 from the centrifugal balls 23 are fitted with friction-shoes 25, which engage on the inner periphery of the flange 26 of a pulley 27, fixed on the power-shaft 28, which is mounted in line with the shaft 19, but independently thereof, and is rotated constantly from any source of power—through the medium of a belt and pulley 29, for example. It will thus be understood that the rotation of the power-shaft 28 is transmitted, through the friction-pulley flange 26, friction-shoes 25, and wheel 20, to the hollow shaft 19 and thence by the pinion 18 to the gear-wheel 8, which rotates the feed-reel 4 while the apparatus is in operation and on the shifting of the clutch mechanism rotates the rewinding-reel 5.

The centrifugal action of the governor-balls 23 tends to retract the friction-shoes 25 from close frictional contact with the pulley-flange 26, so that excessive speed of rotation derived from the power-shaft 28 will be reduced in the rotation communicated to the gear-wheel 8. By this means the tempo of the music-feed may be automatically controlled at any rate required by the adjustment of the governor-balls 23.

In order to place the tempo under control of the operator, so that it may be regulated and varied at will, I employ a device for controlling the centrifugal action of the governor-balls 23. This device consists of a rod 30, sliding within the hollow shaft 19 and having on its inner end a beveled collar 31, which engages the adjacent ends of radial arms 32, which project rigidly from the governor-arms

22. The rod 30 is pressed inward longitudinally against the pressure of the radial arms 32, produced by the centrifugal action of the governor-balls by means of a bell-crank lever 33, fulcrumed at 34 (see Figs. 3 and 4) and connected at its opposite end with a spring 35, attached to the extremity of a tempering-screw 36, so that by turning said screw in one direction the tension on the spring 35 is increased and resistance to the centrifugal action of the governor-balls is correspondingly increased and greater friction thereby produced between the friction-shoes 25 and the pulley-flange 26, thereby producing a quicker movement in the music. If the tempering-screw 36 be turned in the other direction, so as to slacken the spring 35, the pressure against the rod 30 being reduced, the centrifugal action of the governor-balls 23 is less resisted, and hence the friction between the shoes 25 and the pulley-flange 26 is lessened and slower movement is thereby transmitted to the music-feed reel. When the clutch 11 is shifted so as to drive the reel 5 for rewinding, the tempering-screw 36 can be turned so far as to apply sufficient tension to the spring 35 to overcome the centrifugal force of the balls 23 and prevent slip between the pulley-flange 26 and shoes 25, so that the rewinding-reel will be turned at the full speed of the power-shaft. The temper-screw 36 is turned by means of a milled head 36^a and is preferably provided with an index 38, working over a circular scale 37, as shown in Fig. 2, to indicate the adjustment of movement.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of a driving-shaft 28 a transmitting-shaft 19, the elongated pinion carried by shaft 19, the longitudinally-adjustable gear-wheel 8, the coöperating driven elements, 4 and 5 the band 6 coiled on said driven elements and suitable clutch devices and connections effecting the rotation of said coöperating driven elements in reversed directions determined by the different positions of longitudinal adjustment of the gear-wheel 8, substantially as described.

2. The combination of a driving-shaft 28, a transmitting-shaft 19, the elongated pinion carried by shaft 19, the longitudinally-adjustable gear-wheel 8, the coöperating driven elements 4 and 5, the band coiled on said driven elements, the sliding clutch-sleeve 11 on which the gear-wheel 8 is carried, clutch-pins 12, 13, 14, 15, loose pulley 16 and belt 17, effecting the rotation of said coöperating driven ele-

ments in reversed directions determined by the different positions of longitudinal adjustment of the gear-wheel 8, substantially as described.

3. The combination of a driving-shaft 28, a driven shaft 19 an interposed frictional driving connection through the medium of which the shaft 19 is driven, a centrifugal governor device varying the friction between the engaging parts of the frictional transmitting medium and thereby regulating the speed of rotation transmitted to the shaft 19 from the shaft 28, an elongated pinion 18 on the shaft 19 a longitudinally-adjustable gear-wheel 8 meshing with the pinion 18 in both positions of longitudinal adjustment and clutch connection whereby motion is communicated to either of the two elements to be driven, determined by the longitudinal adjustment of said wheel.

4. The combination of the shaft 19 elongated pinion 18 carried thereby gear-wheel 8 longitudinally adjustable and meshing with the pinion 18 in both positions of its longitudinal adjustment, a driven member 4 and clutch and reversing mechanism and suitable connections between the gear-wheel 8 and member 4 by which said member is driven in opposite directions in the different longitudinal positions of the wheel 8, substantially as described.

5. The combination of a driving-shaft, a driven member, an interposed frictional transmitting device through which rotary motion is communicated from said driving-shaft to the driven member, a centrifugal governor modifying the frictional contact between the parts of the transmitting device and thereby regulating the speed of rotary motion transmitted to the driven member, a manually-operated reversing-clutch and connections between the frictional transmitting device and the driven member for reversing the direction of rotation communicated to the driven member, and a manually-operated controlling device connected to the centrifugal governor mechanism whereby the speed of rotation of the driven member is normally regulated automatically by the centrifugal governor mechanism and may be changed at the will of the operator, and whereby said driven member may be rotated at different speeds in opposite directions, substantially as described.

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Witnesses:

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