

No. 769,013.

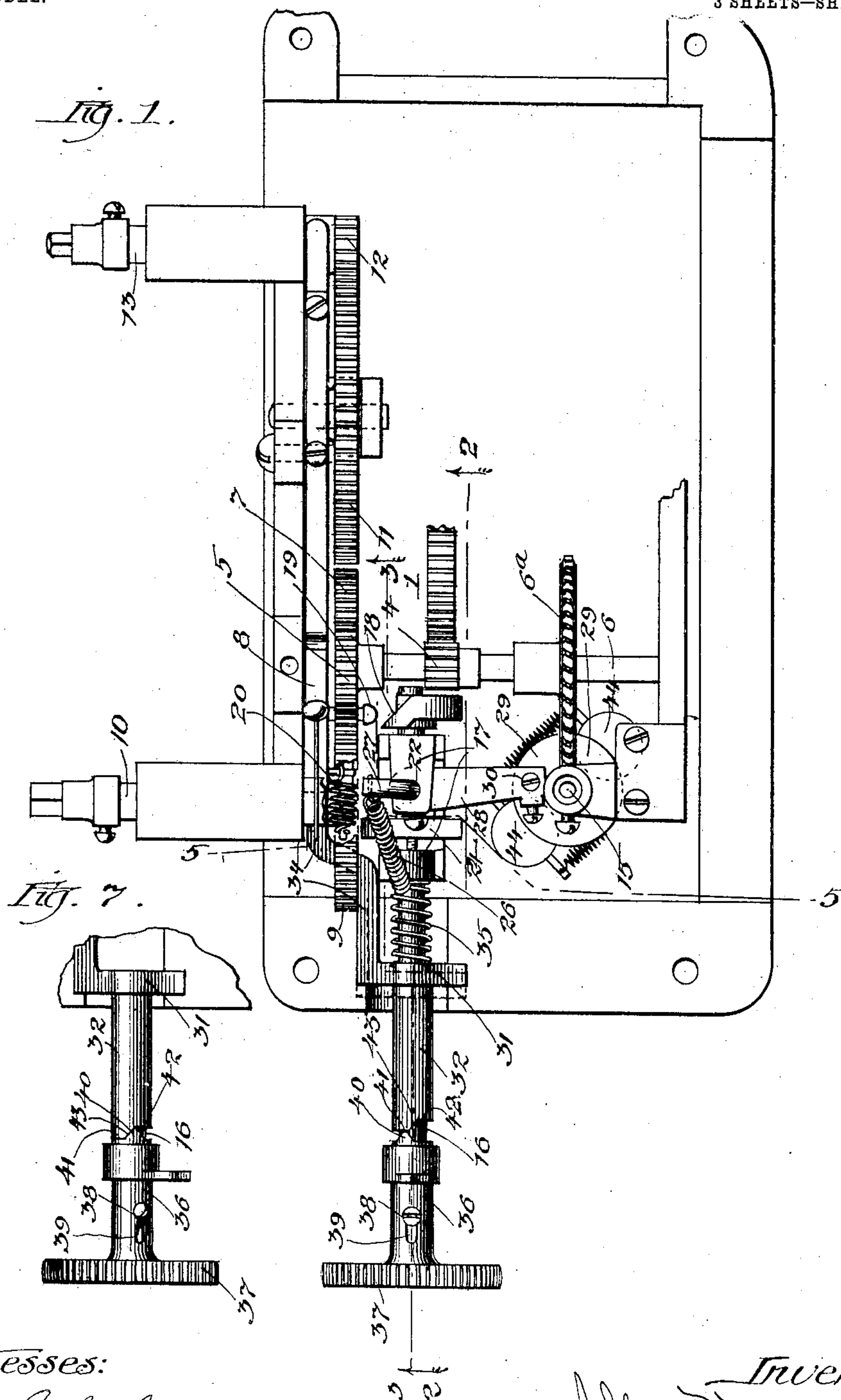
PATENTED AUG. 30, 1904.

A. D. PALMER.  
CONTROLLING DEVICE FOR AUTOMATIC PLAYERS.

APPLICATION FILED MAR. 14, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:  
Frank Blanchard  
Fred G. Fischer

Inventor:  
Albert D. Palmer  
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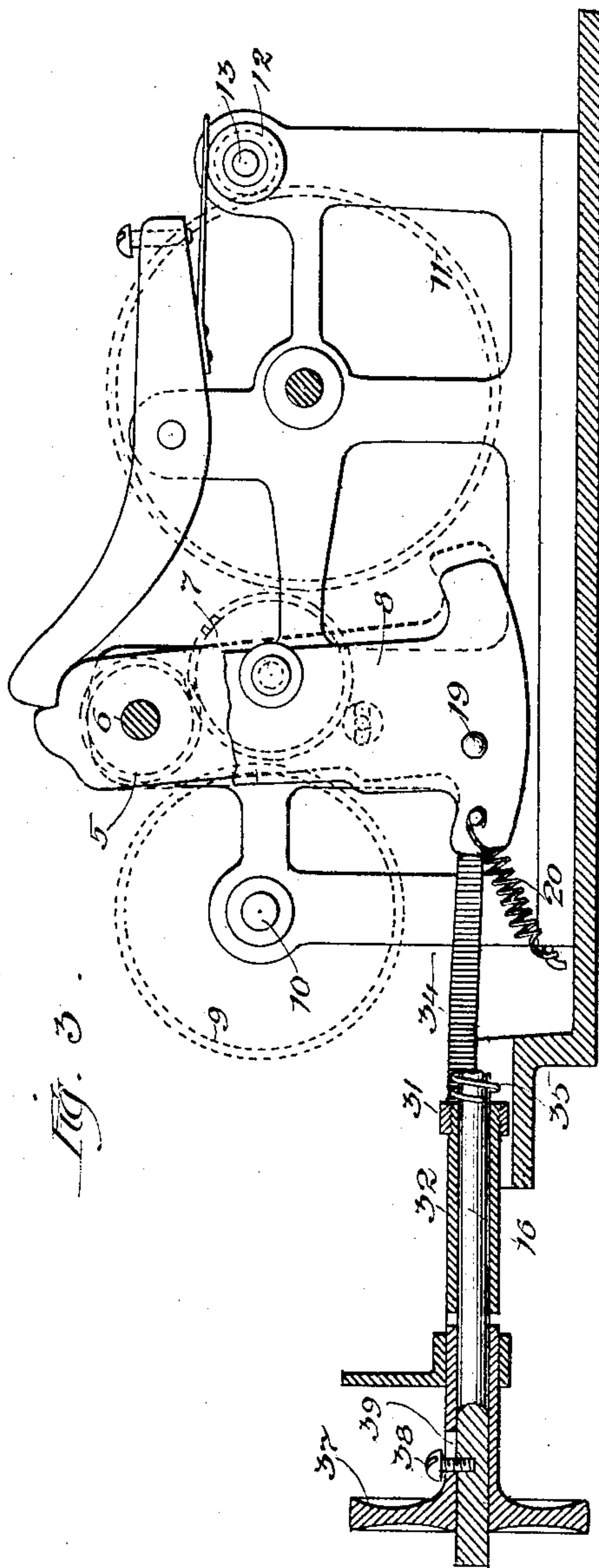
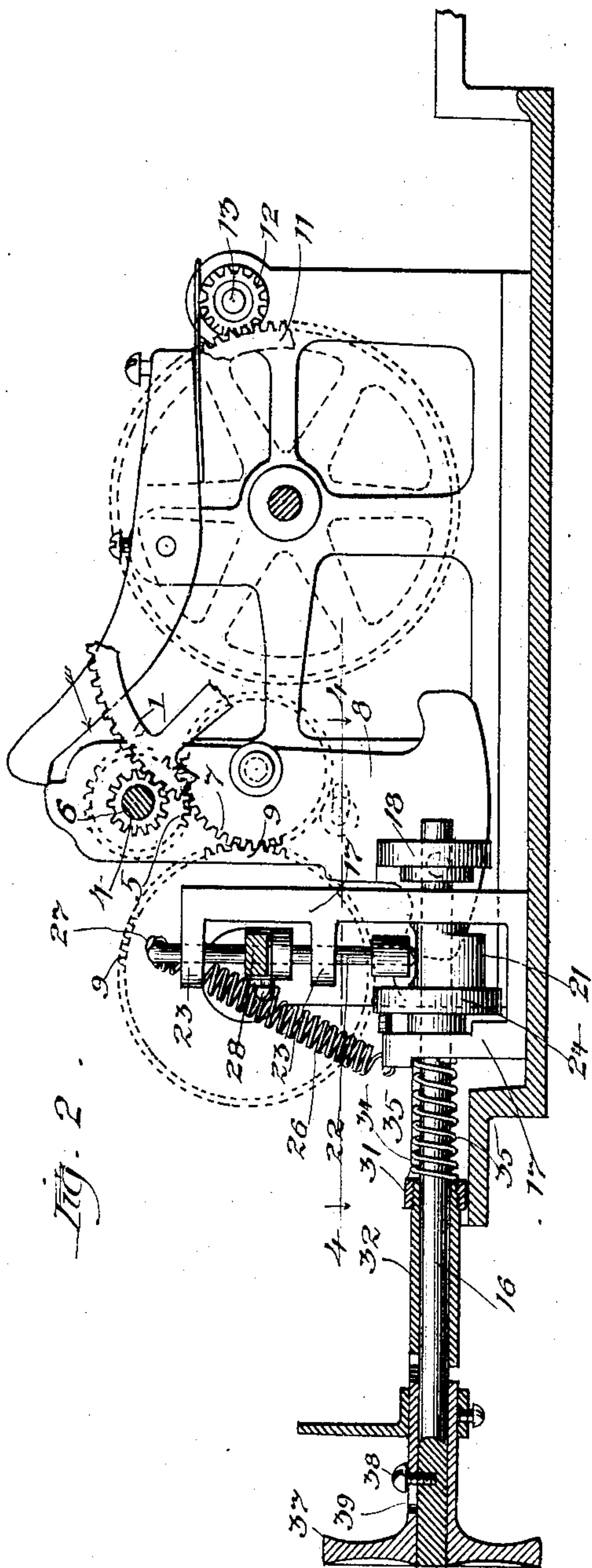
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

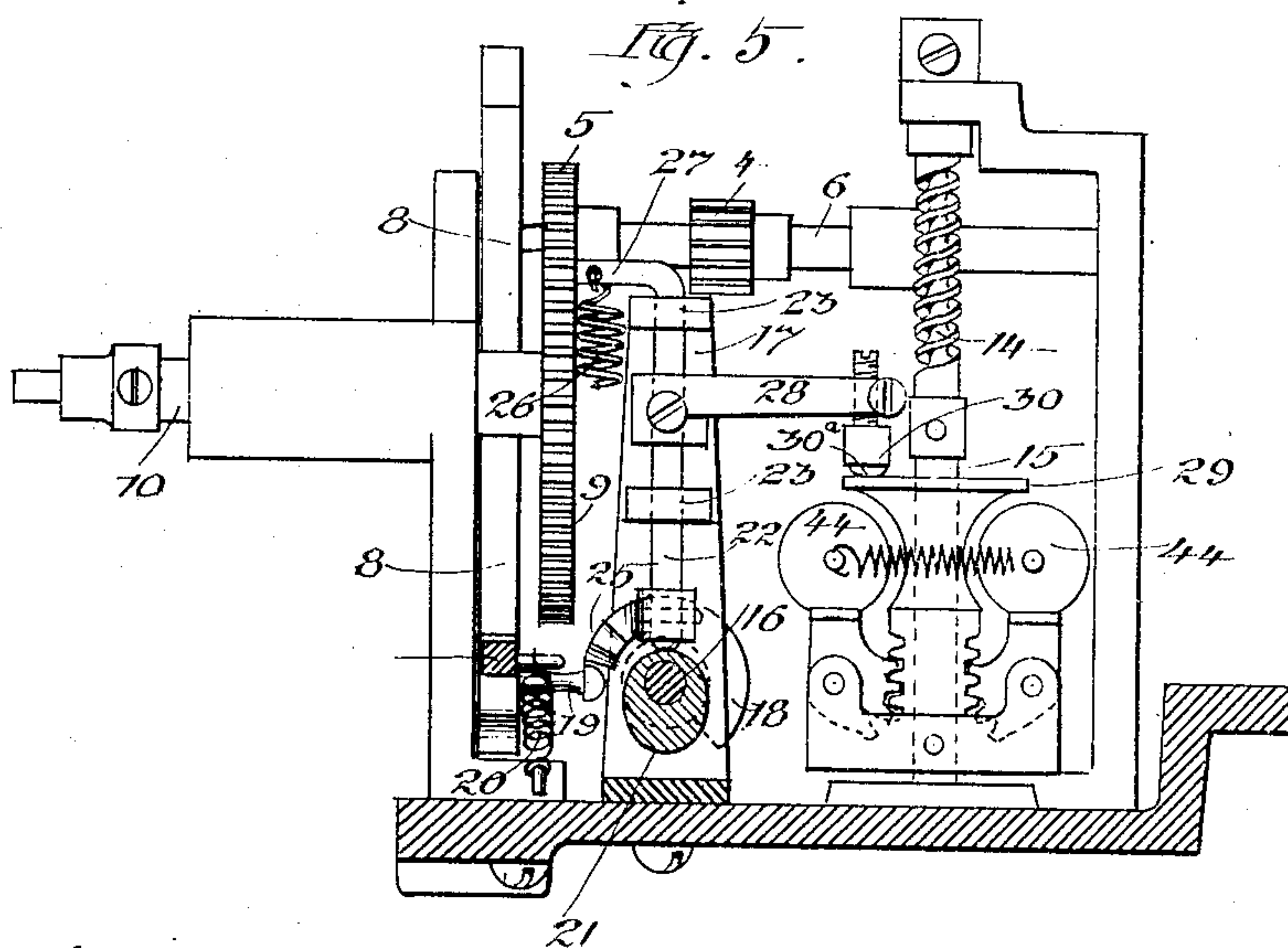


Fig. 4.

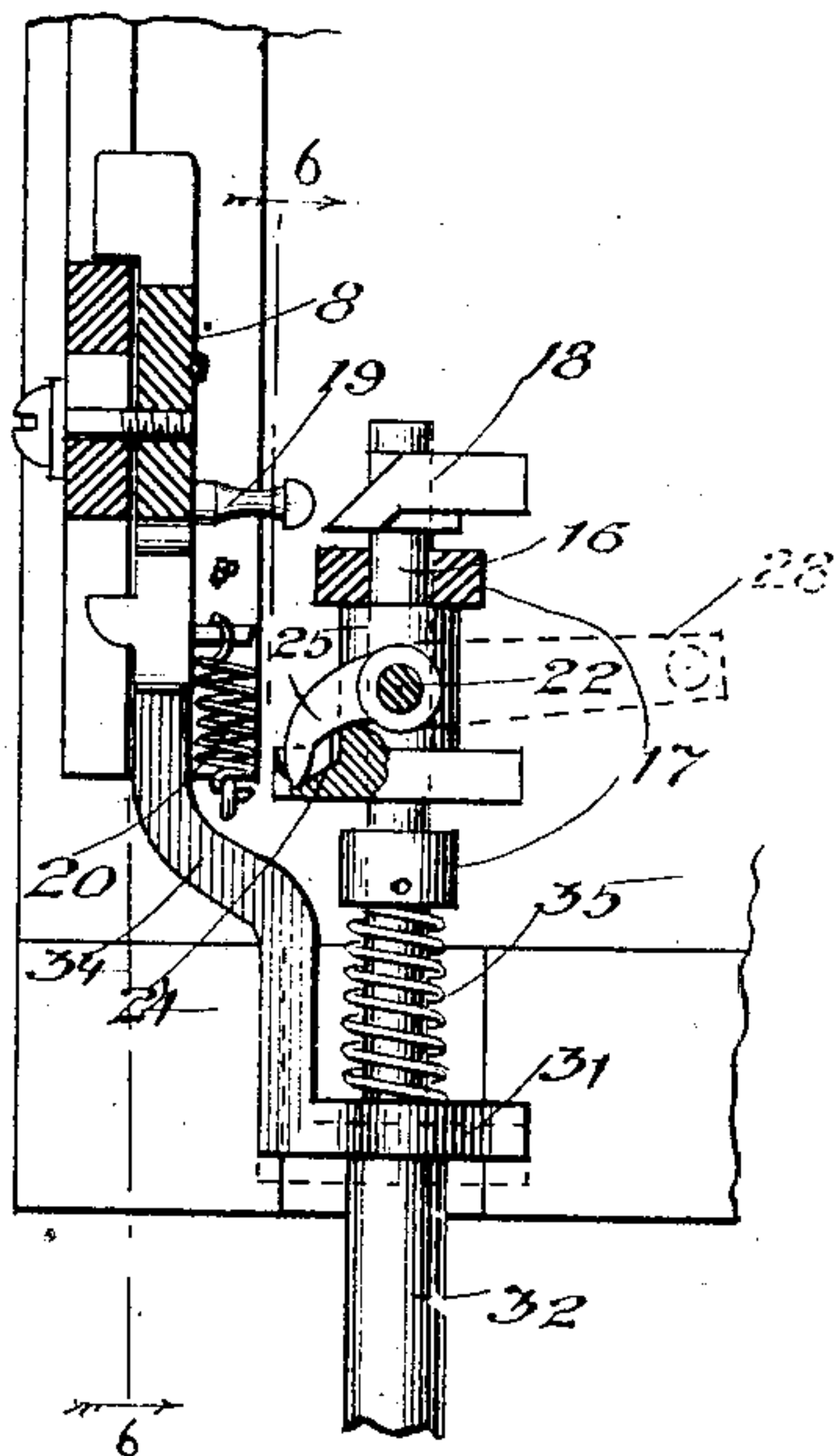
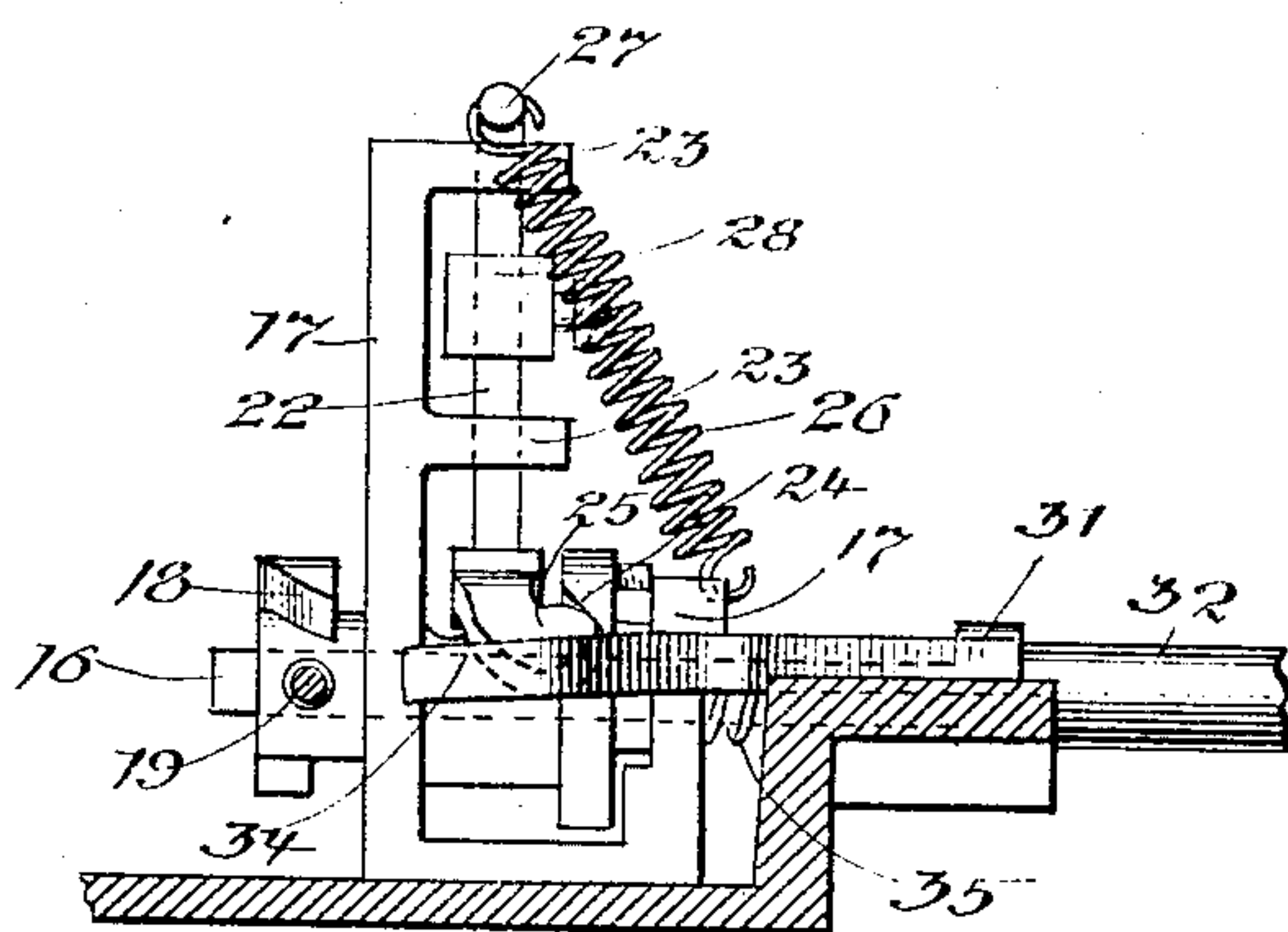


Fig. 6.



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# UNITED STATES PATENT OFFICE.

ALBERT D. PALMER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO  
MELVILLE CLARK, OF CHICAGO, ILLINOIS.

## CONTROLLING DEVICE FOR AUTOMATIC PLAYERS.

SPECIFICATION forming part of Letters Patent No. 769,013, dated August 30, 1904.

Application filed March 14, 1903. Serial No. 147,770. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT D. PALMER, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Controlling Devices for Automatic Players, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved means for controlling the action of a mechanical motor used for actuating the perforated rolls of automatic players for musical instruments for the purpose, first, of arresting the action without losing the speed of the train, so that when started again the roll shall without sensible delay acquire the full speed which it had before stopping, and, secondly, to overcome a defect in the motors to which my improvement is applied, which as heretofore constructed do not start for rewinding when the controlling-handle is turned in the direction for rewinding until such handle is turned far enough first to disengage the winding-train and then, in addition, far enough to effect engagement with the rewinding-train, the result of which is that an insufficient turn of the controlling-handle in the direction for rewinding disappoints the inexperienced operator because the machine still continues to run in the direction for winding.

My invention consists in the devices shown, described, and specified in the claims for accomplishing these purposes.

In the drawings, Figure 1 is a plan of a motor having my improvements connected with it. Fig. 2 is a section at the line 2 2 on Fig. 1, showing the parts in position for winding at controlled speed. Fig. 3 is a section at the line 3 3 on Fig. 1, showing the parts in position for stopping the running while the train is adjusted generally for winding. Fig. 4 is a detail partly sectional plan showing the parts pertaining to my improvement in connection with the immediate cooperative parts of the mechanism, section being made at the plane of the line 4 4 on Fig. 2. Fig. 5 is a section at the line 5 5 on Fig. 1. Fig. 6 is a

section at the line 6 6 on Fig. 4. Fig. 7 is a detail showing the operating-handle thrown into position for winding.

The general construction of the motor herein shown is one that is familiar, and I will describe it only in so far as necessary to the understanding of my improvements. From any source of power, which I have not illustrated, the wheel 1 derives motion in the direction shown by the arrow, which is communicated through the intermediate wheels 4 5 on the shaft 6 to the wheel 7 on the oscillating bearing plate or lever 8, and by the last-mentioned wheel either to the wheel 9 on the winding-roll shaft 10 or by the wheel 11 to the pinion 12 on the rewinding-shaft 13, the direction of rotation of the two shafts being, as will be observed, opposite, and the one or the other being rotated according to the adjustment given to the oscillating bearing plate or lever 8, throwing the gear 7 into mesh with one or the other of the gears on either side of it. For convenience of reference to the parts the wheel 9 and its shaft 10, although but a single element, will be referred to as a "winding-train," and the wheels 11 and 12, with the shaft 13, as a "rewinding-train," and the wheels 1, 4, 5, and 7 and their respective shafts are called the "main train." On the shaft 6 there is also the worm-wheel 6<sup>a</sup>, which meshes with the worm 14 on the vertical governor-shaft 15, communicating motion thereto at the rate of one revolution of the governor-shaft for each tooth of the worm-wheel.

The lever 8 is shifted about its fulcrum, which is the shaft 6, to throw the gear-wheel 7 into mesh either with the wheel 9 or the wheel 11 for the purpose of winding or rewinding as required. For thus shifting the lever there is provided a rock-shaft 16, extending fore and aft and journaled in a bracket 17, and having at its rear end a cam 18, which as the shaft is rocked in one direction impinges on the pin 19, projecting from the lever 8, and forces that end of the lever rearward for effecting engagement with the gear-wheel 11, a spring 20 being provided to retract the lever forward for effecting engagement. The distance between the two wheels



9 and 11 is such that the gear-wheel 7 at intermediate position can rotate freely without engagement with either wheel. The same rock-shaft 16 operates the devices for controlling the governor to regulate the speed, said devices being particularly contrived with respect to regulating the speed during winding and adapted to permit a high speed up to the maximum during rewinding. These devices consist of a cam 21 on said shaft which operates a vertical shaft 22, adapted to be thrust longitudinally and also rocked in its bearings 23 23 on the bracket 17, the vertical movement being communicated by the cam 21 and the rocking movement by a disk cam 24, which is formed rigid, and, as illustrated, integral with the cam 21 on the rock-shaft.

The vertical shaft 22, has a cam-lever arm 25 projecting in a curved direction around the shaft 16, so as to be operated upon at its extremity by the face of the disk cam 24, for rocking the shaft in one direction. A spring 26, attached at one end to a lever-arm 27, at the upper end of a shaft 22, and at the other end to the lower part of the bracket 17, operates both to resist the upward thrust and to cause the downward return when the cam 24 permits, and also to resist the rearward rocking movement and cause the forward return when the disk cam 24 permits. The vertical rock-shaft 22 has a lever-arm 28, which extends in direction to overhang the disk 29 on the governor-shaft, and at the end thus overhanging said disk it has a friction-finger 30, provided at the lower end with suitable terminal 30<sup>a</sup> for contact with the upper face of the disk to produce slight friction thereon. The governor-balls 44 tend by their separation under centrifugal action through the means illustrated, which are of familiar character, to lift the disk as the speed of rotation increases, and the contact of the disk with the friction-finger tending to retard the movement limits the speed according to the distance which the disk can rise before encountering the finger.

The cams 21 and 24 are symmetrically shaped from what may be called the "middle point," at which the coöperating parts on the shaft 22 are in contact when the governor is held at rest, so that rocking the shaft in either direction gives the same movement both of vertical thrust and rocking action to the shaft 22, and said movement in either direction operates first to swing the lever-arm 28 forward, so that its friction-finger resting on the governor-disk operates to start the rotation of the latter in the proper direction, while almost simultaneously with such movement the arm is lifted, relieving the friction on the disk, so that its rotation commenced by the friction of the finger is continued by the motive power, and as the rocking of the shaft 16 continues in the same direction the friction-finger being lifted higher and higher permits

the speed of the governor to increase up to any desired limit short of the maximum which the motive power is adequate to cause.

As thus far described and as heretofore constructed the gear 7 is held normally in mesh with the gear 9 by the spring 20, so that the first movement of the rock-shaft 16 in either direction, releasing the governor and permitting the train to start, would start the winding-roll, and although the rocking action were in the direction suitable for ultimately throwing the gear 7 back into mesh with the gear 11 to start the rewinding-roll the rewinding action would not commence until the rocking in that direction had continued sufficient distance to carry the gear 7 out of mesh with the gear 9 and across the interval of its disengagement with both gears and into engagement with the gear 11.

One feature of my improvement consists in means for causing the rocking of the shaft 16 in either direction from the central or rest position to release the governor and start the main train without starting either roll, the gear 7 being brought into mesh with either the gear 9 or the gear 11 only by continuing the rocking of the shaft after the governor and main train start, and another feature utilizing the same devices which perform the function above described consists of means by which the operator can instantly at will disengage the gear 7 while running from the gear 9, and thus bring the winding-roll to instant rest without arresting the governor or the main train and without bringing the rewinding-roll into action, so that the speed of the motor may be maintained and the rewind-roll may be started again instantly at the same speed which it had when stopped, thus permitting interruption recommencing of the music without the short objectionable period of retarded "tempo." My improvements for these purposes consist of a sleeve 32, sliding on the shaft 16, having a cross-arm 31, guiding it on the bearing-frame to prevent its rotating with the shaft, and having a thrust-arm 34 extending rearward and terminating in position to operate upon the lower end of the lever 8 to force the latter rearward when the sleeve is thrust rearward. A spring 35, coiled on the shaft 16, stopped against the bracket 17, may operate at the forward end on the sleeve 32 to hold it forward to a limit determined by the rear end of the hub or sleeve 36 of the operating-handle 37; but this spring is not necessary and is only desirable for the purpose of keeping the sleeve forward against the hub of the handle when the lever 8 is thrust rearward for engaging the gear 7 with the rewind-train.

The forward end of shaft 16 receives loosely the handle 37, which is thus adapted to slide longitudinally on the shaft, and it is retained thereon by a screw 38 set into the shaft through a slot 39 in the hub or sleeve on the handle,



the length of the slot being sufficient to permit the movement hereinafter described. The end of the hub is provided at one side with a tooth 40, which has sloping sides, making it V-shaped, and the opposed end of the sleeve 32 is formed with two portions 41 42, which are straight—that is, lie in planes at right angles to the axis and which are separated by a sloping portion 43. The portion 41 is in such position that the tooth 40 bears on it a little distance from the sloping portion 43 when the shaft 16 is in the middle position or position of rest, above described. At this position of the parts the sleeve is thrust rearward far enough to hold the gear 7 intermediate the gears 9 and 11 and out of mesh with both. When the handle is turned in the direction to bring the tooth 40 to the slope 43 before said tooth passes off the straight portion 41, the rocking movement has released the governor sufficiently to permit the latter and the main train to acquire certain minimum speed, and when the tooth 40 reaches the slope 43 the sleeve is thrust forward by the spring 20 acting on the lever 8 to pull the latter forward to engage the gear 7 with the gear 9. It will be seen that the spring 35 also operates to move the sleeve in the same direction, but this is incidental and not material to the result when the arm 34 is not connected to but only bears against the lever 8. The winding-roll will thus start with a certain minimum speed which is calculated to be the slowest at which any music should be played. When the handle is reversed, the tooth 40 first encounters the slope 43, and the sleeve 32 is thereby forced rearward, causing its arm 34 to move the bearing-lever 8 rearward, taking the gear 7 out of mesh with the gear 9, bringing the winding-train to rest before the lever is at middle position and before the governor and main train are brought to rest, and while the rocking movement of the handle is continued further the tooth 40 still travels on the straight portion of the end of the sleeve 32 and keeps the gear 7 at intermediate position until the cam 18 reaches the pin 19 and operates the lever to carry said gear into mesh with the gear 11. The distances of these several movements may be such that the speed acquired by the train by the time the gear 7 is brought into mesh with the gear 11 for rewind may be as much greater than the minimum speed with which the roll starts as thought desirable.

It will be seen from the above description that during the running of the winding train and roll the tooth 40 is bearing against a straight portion 42 of the end of the sleeve 36, extending around from the foot of the slope 43, and that a rearward thrust of the handle 37, sliding it on the square portion of the shaft 16, will thrust the sleeve 32 rearward, and that this movement may be employed to instantly disengage the gear 7 from the gear

9, and thus instantly stop the winding-roll. The limit of such movement of the handle rearward is determined by the slot 39, which will be only long enough to permit the gear 7 to be thus carried out of mesh with the gear 9 and not long enough to permit it to be carried into mesh with the gear 11.

In use the operator or performer usually keeps his right hand constantly on the handle, so as to turn it in either direction to modulate the speed as required by the music, and he can thus without any change of grasp stop the playing by pushing the handle rearward at whatever position in its rocking movement it may occupy, and when he again allows it to return forward to normal position the music will be resumed at the speed at which it was interrupted.

The term "train" in the phrases "winding-train" and "rewinding-train" is not intended to denote necessarily a plurality of parts, but is used to indicate the part or parts, without regard to number, moving and resting with the roll, (winding-roll or rewinding-roll, as the case may be.)

I claim—

1. In a motor for the purpose indicated, in combination with a main train and two secondary trains, one for winding and the other for rewinding, a governor connected with the main train; governor-regulating devices; means for engaging the main train alternatively with either of the secondary trains; means adapted to be operated at will for actuating the governor-regulating devices and effecting such engagement of either of said secondary trains, said devices and operating means being adapted for effecting release of the governor in either of the movements for engaging the secondary train respectively, and means operating without actuating the regulating devices for connecting and disconnecting the winding-train from the main train.

2. In a motor for the purpose indicated, in combination with a main train and two secondary trains, one for winding and the other for rewinding, a governor connected with the main train and governor-regulating devices for starting and controlling the speed of the governor and trains; the main train having an element for connecting it with either of the secondary trains, adapted to stand out of connection with both; a rock-shaft and connections for operating governor-regulating devices which stand at certain position for holding the governor at rest, and cause release, and permit acceleration of the governor when moved in either direction from said position, and connections by which the opposite rocking of the rock-shaft moves said connecting element from its intermediate position in opposite directions for engagement with the secondary trains respectively.

3. In a motor for the purpose indicated, in combination with a main train and two sec-



ondary trains for winding and rewinding respectively, a governor connected with the main train; governor-regulating devices; a rock-shaft and accessory parts for operating said devices whose rocking movement in either direction from an intermediate position causes release and permits acceleration of the governor; the main train having an element for connecting it with either of the secondary trains, adapted to stand out of connection with both, and connections by which the opposite rocking of the rock-shaft causes movement of said element in opposite directions for connection with the secondary trains respectively, and independently-operated means for moving said connecting element into and out of connection with the winding-train.

4. In a motor for the purpose indicated, in combination with a main train and two secondary trains, one for winding and the other for rewinding, a governor connected with the main train and governor-regulating devices adapted to be operated at will; means connected with the governor-regulating devices for engaging the main train with either of the secondary trains at will when the regulating devices are operated for releasing the governor, said means comprising a rock-shaft, a sliding element on said shaft, and means operated by its sliding for engaging and disengaging the main train from the winding-train.

5. In a motor for the purpose indicated, in combination with a main train and two secondary trains, one for winding and the other for rewinding, a governor connected with the main train and governor-regulating devices adapted to be operated at will; means comprising a rock-shaft connected with the governor-regulating devices for engaging the main train with either of the secondary trains at will when the regulating devices are operated for releasing the governor; a sleeve sliding on such shaft, having connections therefrom by which its sliding causes the engagement and disengagement of the main train with the winding-train; a spring which tends to effect such engagement with the winding-train, and coöperating means on the sleeve and rock-shaft by which the rocking of the shaft causes the sliding of the sleeve in opposite directions as the shaft is rocked in opposite directions from the intermediate point to effect by such opposite rocking movement respectively the engagement and disengagement of the winding-train.

6. In a motor for the purpose indicated in combination with a main train and two secondary trains, one for winding and the other for rewinding, means for effecting the engagement of the main train with either of the secondary trains at will, comprising a movable element in the main train, a spring tending to hold it in engagement with the winding-train, a governor connected with the main train and governor-regulating devices; a rock-shaft for

operating them; a sliding element on said rock-shaft and connections by which its sliding operates said movable element for disengagement from the winding-train; means extending to the forward end of the rock-shaft for sliding the sliding element on the shaft and for rocking the shaft independently of such sliding movement while said winding-train is engaged with the main train.

7. In a motor for the purpose indicated, in combination with a main train and two secondary trains, one for winding and the other for rewinding; means for engaging the main train with either of said trains at will, comprising a movable element in the main train, a spring tending to hold it engaged with the winding-train, a governor connected with the main train and regulating devices for the same; a rock-shaft for operating said regulating devices and connections by which it is adapted to release the governor and permit it to be accelerated by the rocking of the shaft in either direction from intermediate position; a sliding element on the rock-shaft and connections by which its sliding in one direction forces said movable element against the spring and out of engagement with the winding-train; a handle operatively connected with the rock-shaft for rocking it and adapted also to slide thereon, having a hub extending into contact with the forward end of the sleeve and thereby adapted to force the sleeve rearward by the sliding of the handle independently of the rocking movement of the shaft.

8. In a motor for the purpose indicated, in combination with a main train and two secondary trains, one for winding and the other for rewinding, means for engaging the main train with either of said trains at will, comprising a movable element in the main train, a spring tending to hold it engaged with the winding-train, a governor connected with the main train and regulating devices for the same; a rock-shaft and connections by which it is adapted to release the governor and permit it to be accelerated by the rocking of the shaft in either direction from intermediate position; a sliding element on said shaft and connections therefrom by which the movable element is moved against the spring out of engagement with the winding-train; a handle operatively connected with the rock-shaft for rocking the same, having limited range of sliding movement on said shaft and forming a stop against the forward movement of the sliding element, said handle and said sliding element being relatively formed at their proximate ends so that the latter is stopped at position at which it holds the movable element disengaged from the winding-train when the handle is at position in its rocking movement at which the governor is held at rest and that its rocking in one direction permits the sleeve to advance in direction for engagement of said element with said train.



9. In a motor for the purpose indicated, in combination with a main train and a winding-train, a means for engaging the former with the latter comprising a movable element in the main train; means tending to hold it yieldingly in engagement with the winding-train; a rock-shaft and means thereon for disengaging said movable element by rocking in one direction; a sleeve on the rock-shaft having an arm adapted by the sliding of the sleeve also to operate upon said movable element for such disengagement; a handle operatively connected with the rock-shaft for rotation and adapted to slide thereon, having a hub extending into contact with the forward end of the sleeve, and thereby adapted to force the sleeve rearward by the sliding of the handle on the shaft.

10. In a motor for the purpose indicated, in combination with the main train and a winding-train, a movable element in the main train and a spring tending to hold it into engagement with the winding-train; a governor connected with the main train and means for regulating the same; a rock-shaft and connections which at one position holds the governor at rest and by movement from that position releases it and permits it to be accelerated; a sleeve on the rock-shaft having an arm adapted by the sliding of the sleeve to

operate the movable element for disengagement from the main train; a handle operatively connected with the rock-shaft for rotation and adapted to slide thereon, having a hub extending into contact with the forward end of the sleeve and thereby adapted to force the sleeve rearward by the sliding of the handle on the shaft, the hub and sleeve having at their proximate ends cooperating cam-terminals by which the sleeve is forced rearward when the handle with the shaft is rocked in one direction, said terminal being adapted, at the position at which the governor is held at rest, to hold the sleeve at position for disengaging the movable element from the winding-train, and having sloping faces by which the rocking of the handle in one direction from said position permits the sleeve to move in direction for engaging said element with the main train, and by moving back to said position crowds the sleeve rearward for disengagement.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Pittsburg, Pennsylvania, this 23d day of February, A. D. 1903.

ALBERT D. PALMER.

In presence of—

ELLA DUFF,

GEO. L. McNEMRY.