

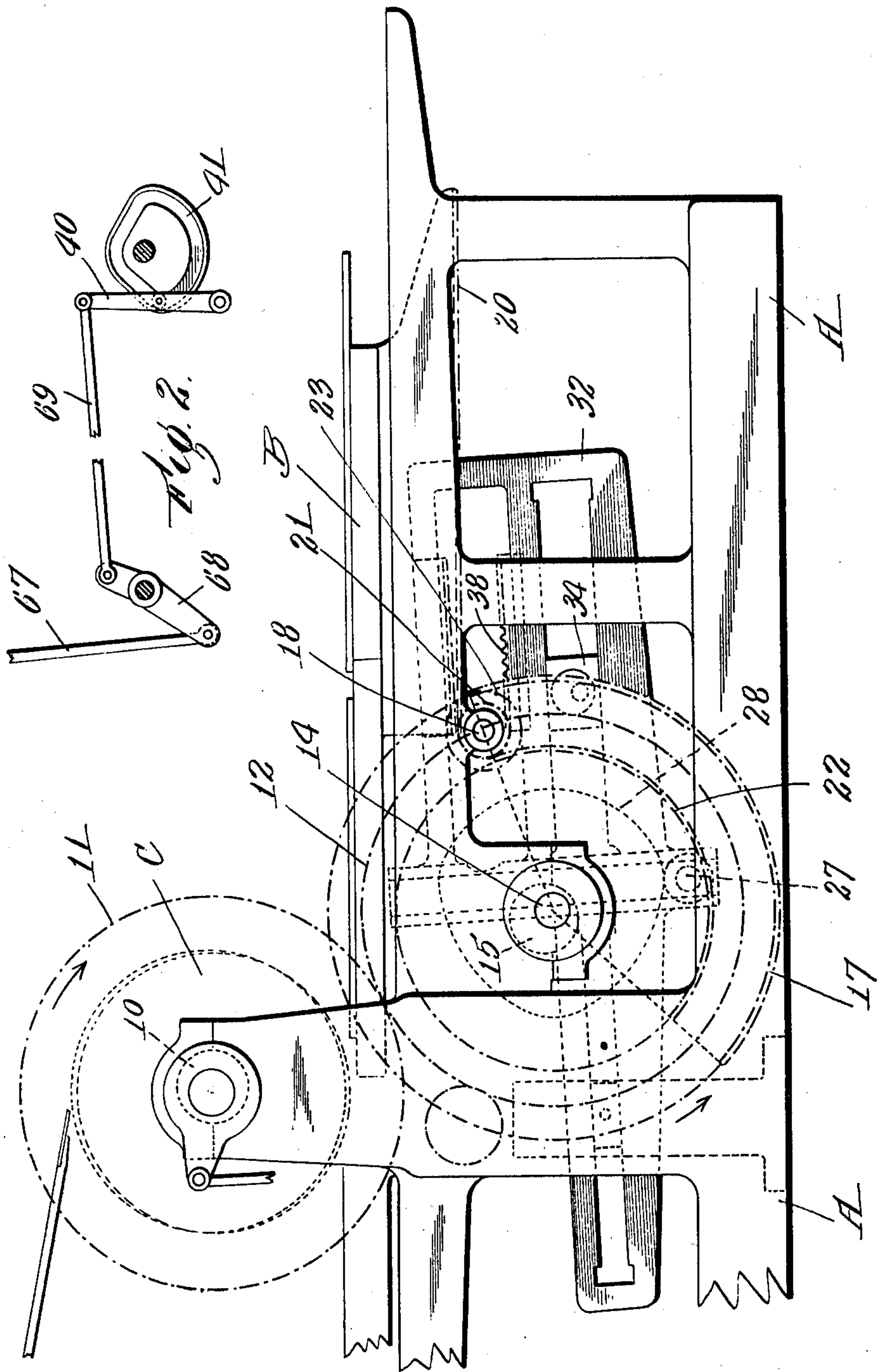
C. J. ROBERTSON.
MECHANICAL MOVEMENT.

APPLICATION FILED MAR. 21, 1905. RENEWED JUNE 4, 1909.

945,199.

Patented Jan. 4, 1910.

4 SHEETS—SHEET 1.



Witnesses:
G. F. Mason.
M. A. Regan.

Fig. 1

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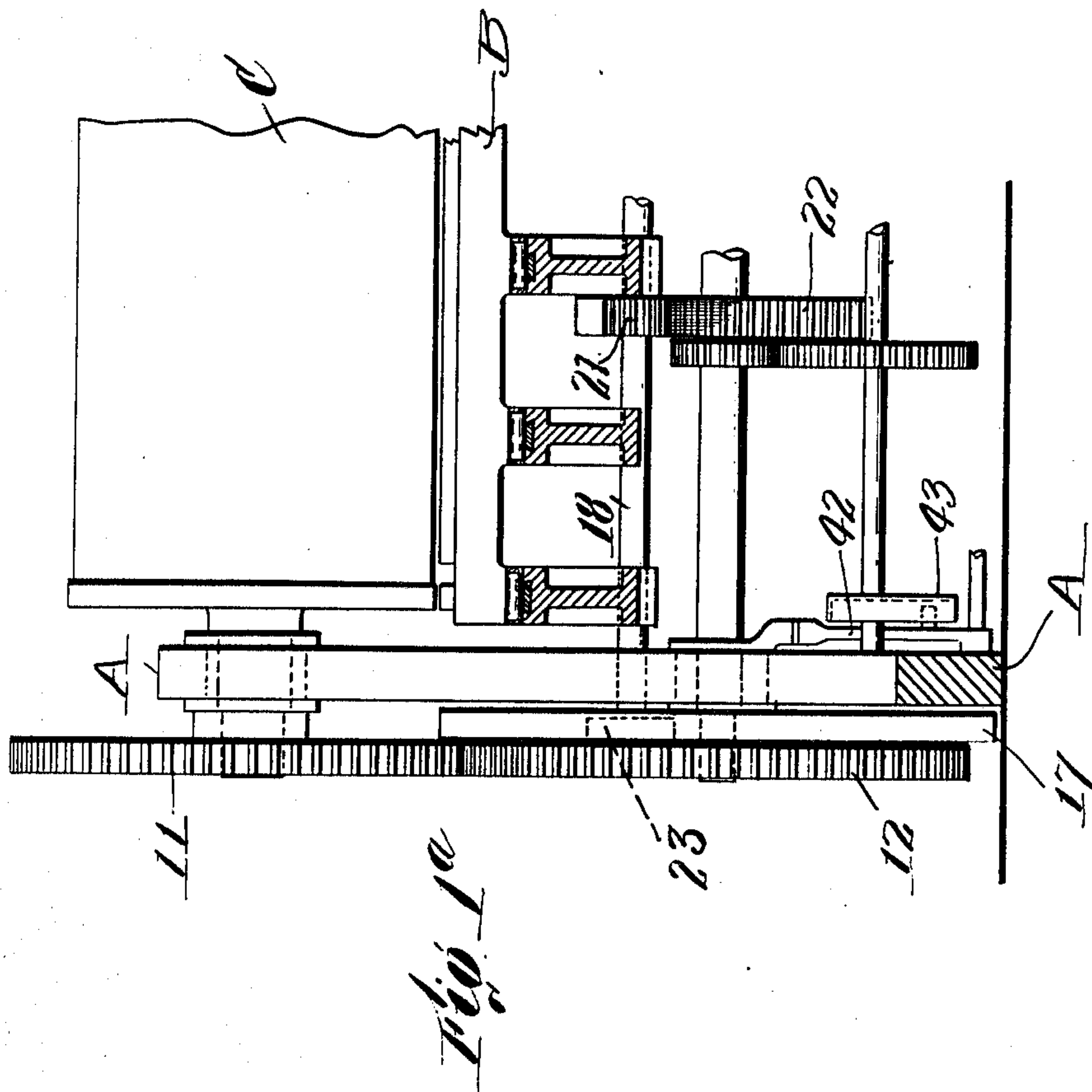
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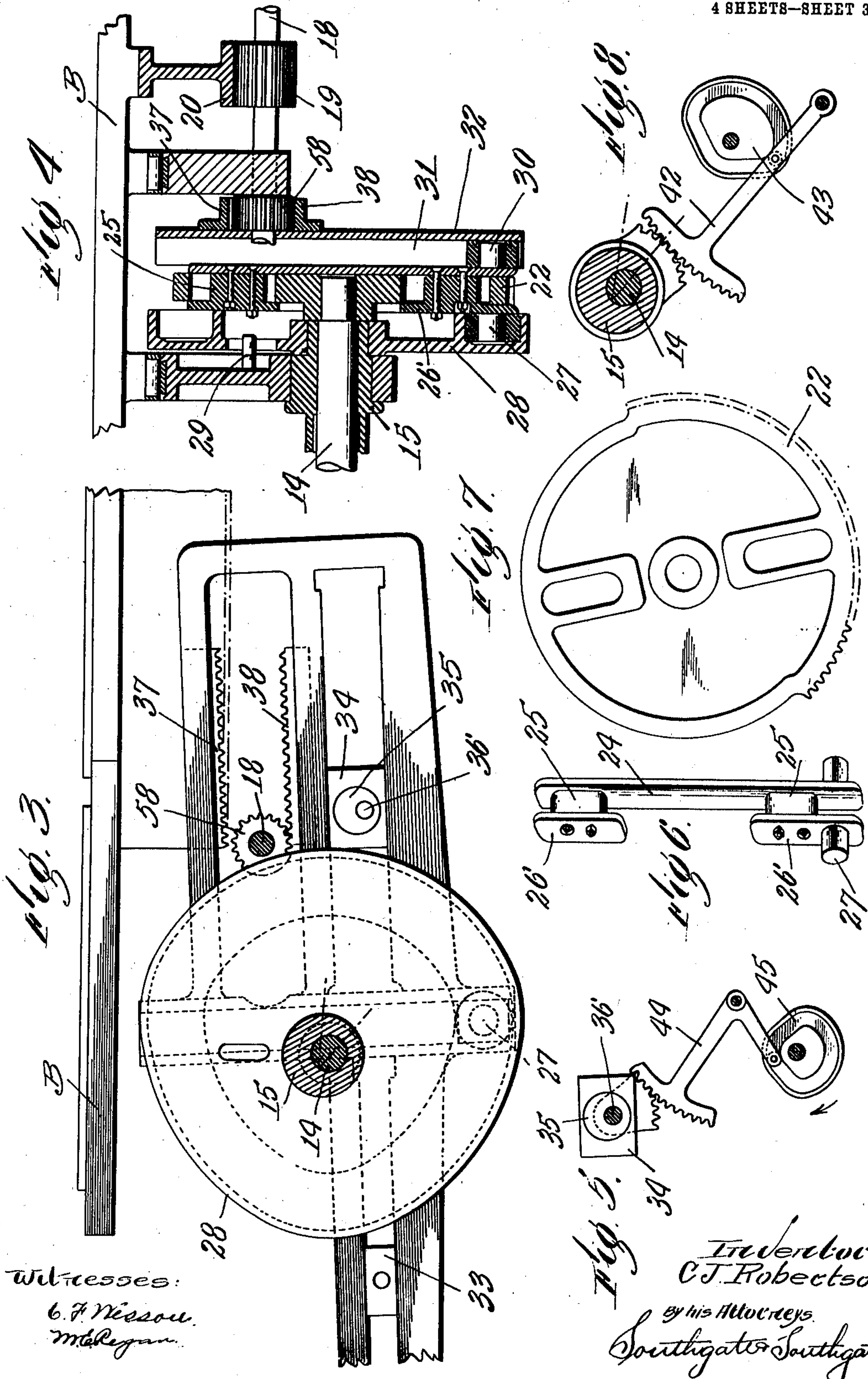
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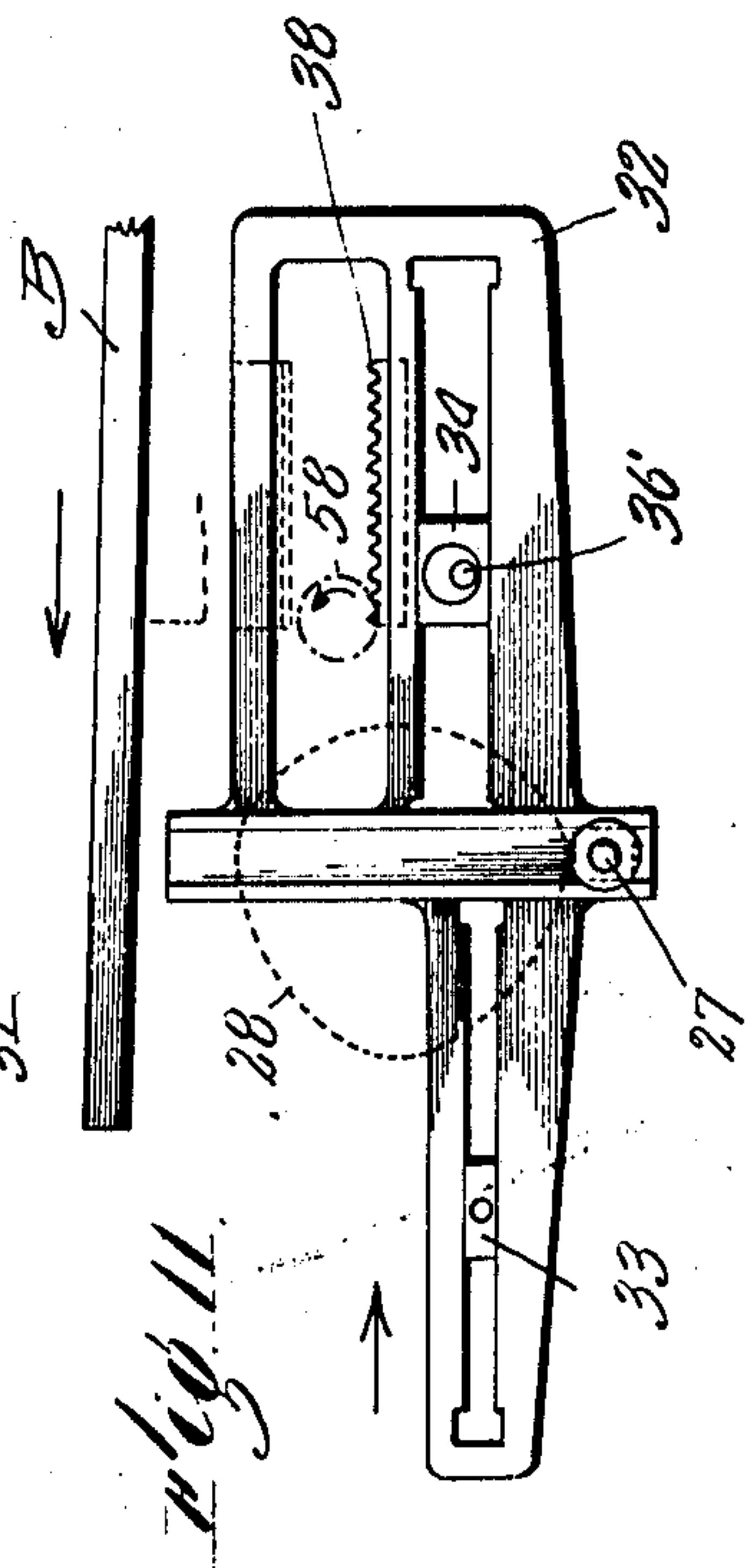
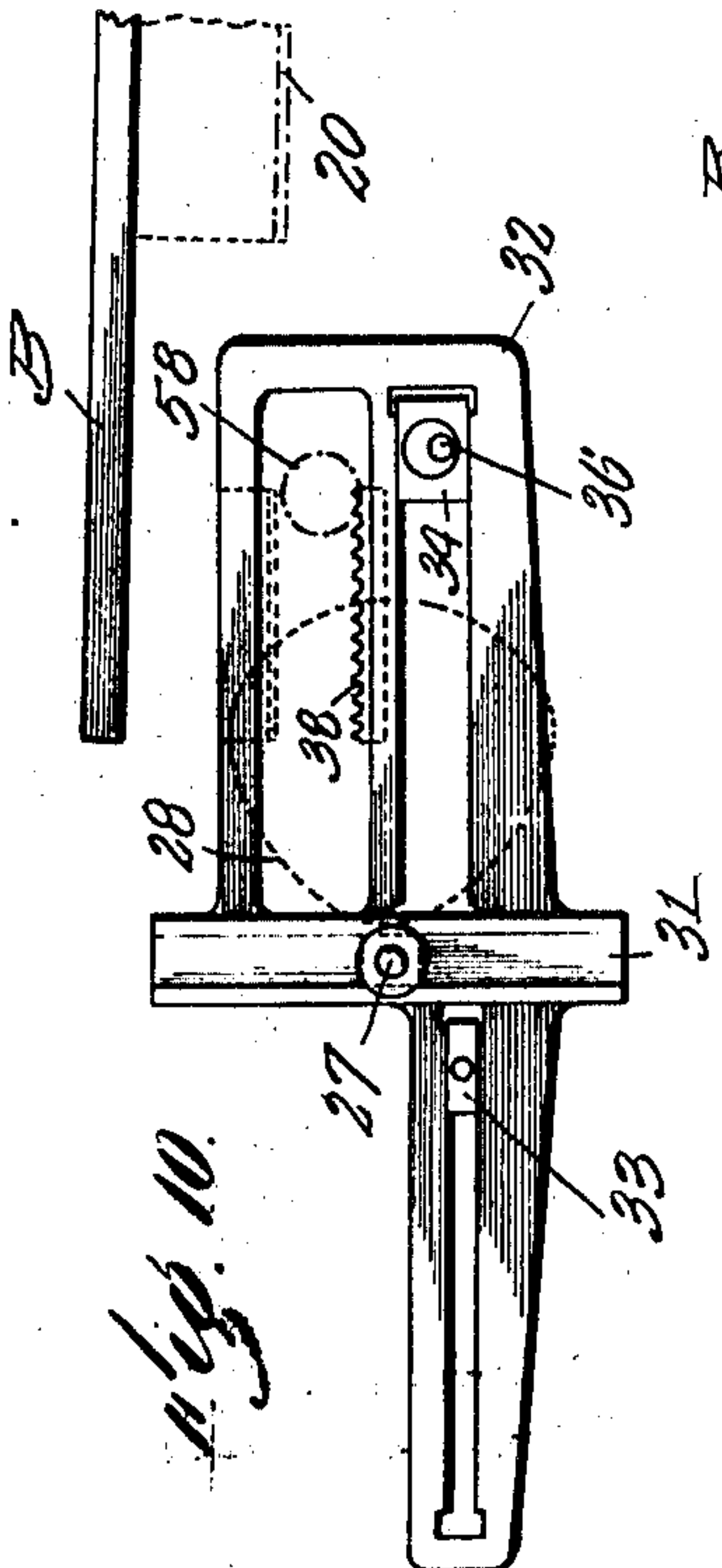
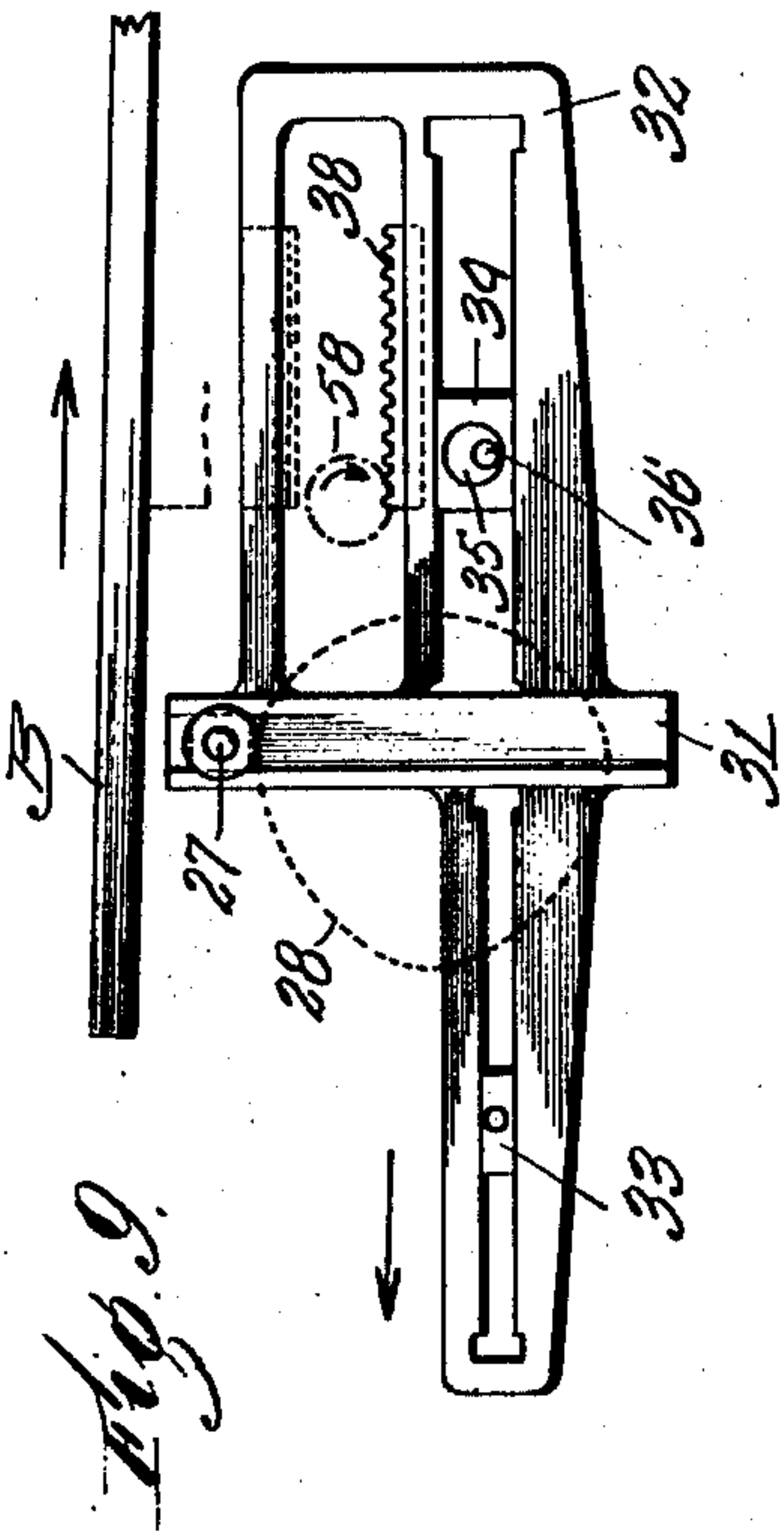
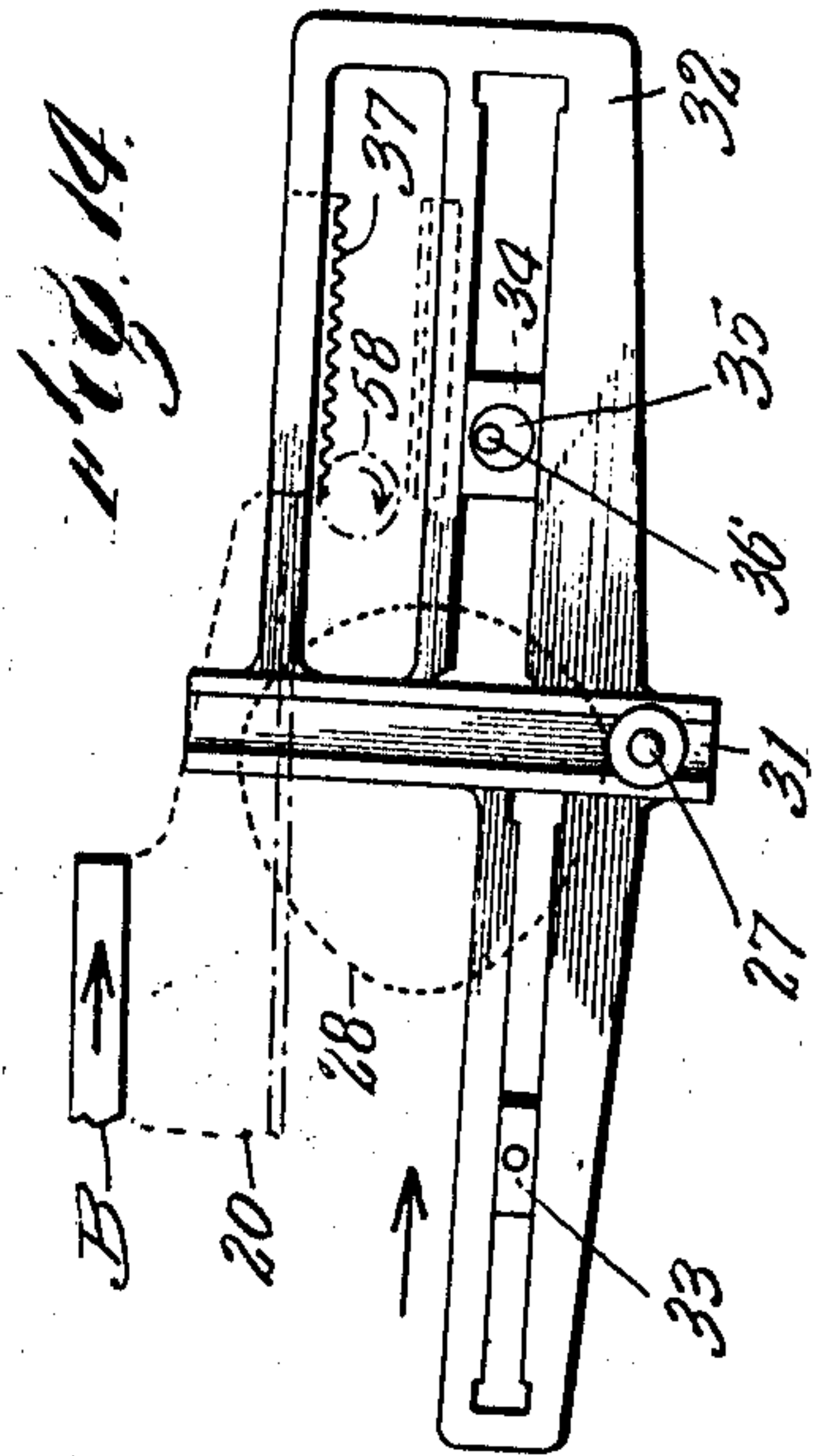
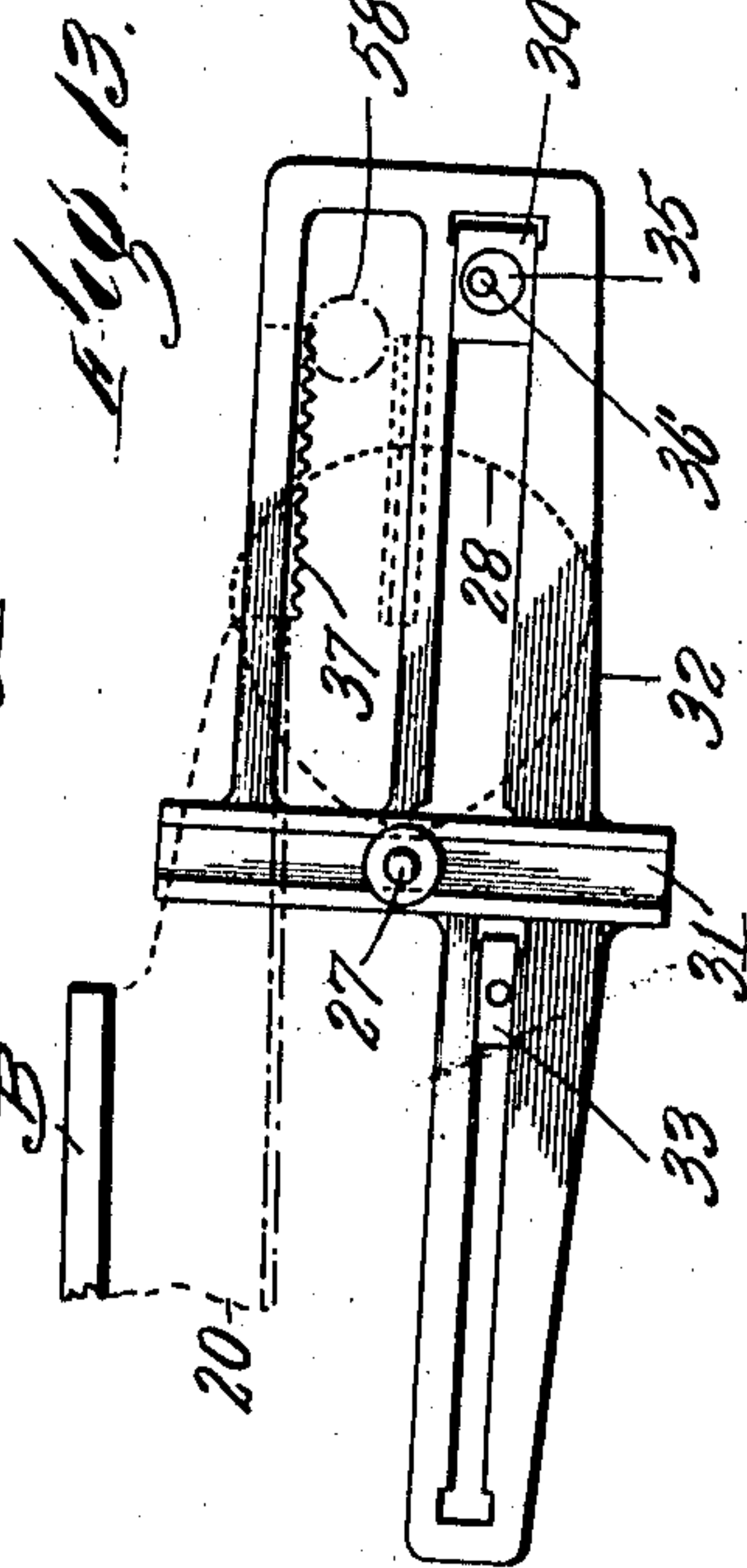
Patented Jan. 4, 1910.

4 SHEETS—SHEET 3.



APPLICATION FILED MAR. 21, 1905. RENEWED JUNE 4, 1909.

Patented Jan. 4, 1910.



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UNITED STATES PATENT OFFICE.

CHARLES J. ROBERTSON, OF TAUNTON, MASSACHUSETTS, ASSIGNOR TO THE CAMPBELL PRINTING PRESS & MANUFACTURING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

MECHANICAL MOVEMENT.

945,199.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed March 21, 1905, Serial No. 251,207. Renewed June 4, 1909. Serial No. 500,122.

To all whom it may concern:

Be it known that I, CHARLES J. ROBERTSON, a subject of the King of England, residing at Taunton, in the county of Bristol and State of Massachusetts, have invented a new and useful Mechanical Movement, of which the following is a specification.

This invention relates to that class of mechanical movement which converts rotary into reciprocating motion and which is especially adapted to move the reciprocating beds of printing presses or for use in other heavy machinery.

The especial object of this invention is to provide a mechanical movement employing a crank-actuated reversing mechanism in which the crank element has a radial movement as well as a movement of revolution.

To this end, this invention consists of the mechanical movement and of the combination of parts therein as hereinafter described and more particularly pointed out in the claims at the end of this specification.

In the accompanying three sheets of drawings, Figure 1 is a side view of sufficient parts of a printing press to illustrate the application of this invention thereto. Fig. 1^a is a partial cross sectional view illustrating in detail part of the main driving mechanism. Fig. 2 is a detail view of the connections for raising and lowering the impression cylinder. Fig. 3 is a detail view of the reversing mechanism. Fig. 4 is a transverse sectional view of the same. Fig. 5 is a detail view of the connections for raising and lowering the reversing slide. Fig. 6 is a perspective view of the frame which carries the variable throw wrist-pin. Fig. 7 is a detail view of the partial external gear having slots for the frame which carries the variable throw wrist-pin. Fig. 8 is a detail view of the connections for shifting the main shaft. Fig. 9 is a diagrammatic view showing the position of the parts at the end of a constant speed movement and at the beginning of the reversing movement at one end of the press. Fig. 10 is a diagrammatic view showing the position of the parts when the bed is at the limit of its travel in one direction. Fig. 11 is a diagrammatic view

showing the position of the parts upon the completion of a reversing movement and at the commencement of the uniform printing movement of the bed. Fig. 12 is a diagrammatic view showing the position of the parts when the bed has reached the end of its constant speed printing stroke and at the beginning of a reversal movement. Fig. 13 is a diagrammatic view showing the position of the parts when the bed has reached the limit of movement of its printing stroke, and, Fig. 14 is a diagrammatic view showing the position of the parts at the completion of the reversal and at the beginning of the constant speed return movement of the bed.

A mechanical movement of the class to which this invention relates, comprises a main driving mechanism for giving the bed its main forward and backward motions and a reversing mechanism for reversing the motion of the bed at each end of its travel. The reversing mechanisms which have heretofore been employed in constructions of this class are crank operated and, as heretofore constructed, each reversal of the bed has occupied a half-turn or less of the crank. In large sized printing presses, it is desirable to allow more time for reversals. In a companion application for patent, which I have filed of even date herewith, Serial No. 251,205, and which I have executed on even date herewith, I have shown how this can be accomplished by the use of pitman connections; that is to say, in my companion application for patent, I have shown a reversing mechanism which operates for more than a half-turn of the crank at each reversal by using the "sweet side" of a pitman reverse. The words "sweet side" are used to designate the reversing movement obtained from a pitman which is longer and easier than the reverse obtained on the other side.

The especial object of my present invention is to provide a crank reversing mechanism, which comprises a crank element arranged to operate for more than a half-turn at each reversal by having a radial movement, which movement I term "a radial throw".

In the particular construction which I

have illustrated herein, I employ the same main driving mechanism as in my application for patent filed October 6, 1904, Serial No. 227,344, and I have arranged the radial
 5 throw-crank reversing mechanism to produce the same movements which would be produced by the using of the "sweet side" of a pitman connection.

Referring to the drawings for a detailed
 10 description of the construction, A designates the usual frame-work which carries the reciprocating bed B. The impression cylinder C has its shaft journaled in eccentric bushings 10. Mounted on the impres-
 15 sion cylinder is a gear 11 which meshes with a driving gear 12 to which power may be applied in any suitable way. The driving gear 12 is fastened on a main shaft 14 which is journaled in an eccentric bushing
 20 15 fitted in the framework A. A partial internal gear 17 is secured on the end of the main shaft 14.

A driving shaft 18 is journaled in the framework of the machine and carries a
 25 driving pinion 19 which is in constant mesh with a rack 20 secured to the bed as shown in Fig. 4.

Secured on the main shaft 14 is a partial external or spur gear 32. As shown in
 30 Fig. 1, the driving shaft 18 is provided with a gear 21 which coöperates with the external gear 22 and also fastened on the driving shaft 18 is a gear 23 which coöperates with the internal gear 17. The
 35 partial internal gear 17 and the partial external gear 22 occupy substantially similar angular positions on the main shaft 14.

The mechanism, as thus far described, constitutes a main driving mechanism and
 40 is of substantially the same construction as shown in my application Serial No. 227,344 before referred to.

When the main shaft 14 is shifted in one direction by its eccentric bushing 15, the
 45 partial internal gear 17 will engage the gear 23 on the driving shaft 18 and will turn the main driving pinion 19 to move the bed during a constant speed printing stroke. When the main shaft 14 is moved
 50 in the opposite direction by its eccentric bushing 15, the partial external gear 22 will engage the gear 21 and will turn the driving pinion 19 in the opposite direction to move the bed on its constant speed return move-
 55 ment. This main driving mechanism is designed so that the constant speed movements in opposite directions will take place for equal distances and for equal times. In this application for patent, I do not wish
 60 to claim specifically this particular construction of main driving gear, as this subject matter is claimed in my application Serial No. 227,344 for patent before referred to.

The reversing mechanism I have designed 65 for the purpose of allowing more time to reversals is actuated from a radial throw-crank which may be mounted and arranged as illustrated more particularly in the second sheet of drawings. 70

As shown in Fig. 7, the partial external gear 22 is provided with slots for carrying the frame of a variable throw-wrist-pin. The frame as illustrated in Fig. 6 comprises a plate 24 having studs 25 which 75 fit the slots in the gear 22 and the frame is held in place by clamp plates 26. Extending from one of the clamp plates 26 is a pin 27 carrying a roller which fits into the groove in a cam 28. As shown in Fig. 4, 80 the cam 28 is arranged to move up and down with the main shaft 14 when the same is shifted by reason of its eccentric bushings 15 and the cam plate 28 itself is held from turning by means of a pin 29 fixed 85 in the framework. Extending in the opposite direction from the pin 27 is the variable throw wrist-pin 30 which carries a block fitted into the vertical slot 31 in the independently moving member or slide 32. 90 The slide 32 as shown in Fig. 3 is mounted on a guide block 33 which is pivoted into a fixed stud and on a guide block 34 which is mounted on an eccentric 35 carried by a shaft 36. By means of this construction, 95 when the shaft 36 is turned (for example, by means of connections hereafter described) the slide 32 will be rocked or tipped. Carried by the slide 32 are top and bottom racks 37 and 38. Coöperating with the top 100 and bottom racks 37 and 38 is a gear 58 fastened on a driving shaft 18. By means of this construction when the end of the slide 32 is tipped or raised as illustrated in Fig. 3, the bottom rack 38 will engage 105 the gear 58 to accomplish the reversal of the bed at one end of its movement and when the end of the slide is lowered or tipped down, the top rack 37 will engage the gear 58 to accomplish the reversal of 110 the bed at the other end of its movement.

Any desired connections may be employed for turning the eccentric bushings which raise and lower the impression cylinder, which shift the main shaft 14, and which 115 tip or tilt the slide 32.

As illustrated in Fig. 2, the eccentric bushings 10 of the impression cylinder C may be operated by links 67 connecting to arms 68 extending from a shaft. Extending 120 up from this rock shaft is an arm which is connected by a link 69 to a lever 40, which lever 40 is operated by a cam 41. To shift the main driving shaft 14 its eccentric bushing 15 may be provided with a partial gear 125 meshing with a sector carried by a lever 42, which lever 42 is operated by a cam 43.

The connections for tipping or tilting the

slide 32 comprise a partial gear extending from the shaft 36 and meshing with a sector carried by a bell-crank lever 44. The other arm of the bell-crank lever 44 is engaged by a cam 45.

Considering now the operation of the reversing mechanism, the reversing action commences as shown in Fig. 9 before the radial throw wrist-pin comes over the center of the main shaft and the cam which controls the radial throw wrist-pin acts to change the crank radius of the radial throw wrist-pin so that the bed will be given an easy stopping motion until it reaches the limit of its travel as shown in Fig. 10. When the bed is started on its return travel, the cam at first shortens the crank radius of the radial throw wrist-pin, the variation of the crank radius of said wrist-pin being such that the bed is given an easy starting movement until the wrist-pin has made more than a half-turn from its position at the beginning of the reversal as shown in Fig. 11. When the bed reaches the end of its constant speed printing stroke, as shown in Fig. 12, the slide member 32 is tipped down to bring the top rack 37 into mesh and the reversing action commences before the radial throw-wrist-pin passes over the center of the main driving shaft and the cam controlling the radial throw-wrist-pin changes its crank radius so that the bed will be given an easy stopping motion until it reaches the end of its travel as shown in Fig. 13. Then the bed is started back on its return movement, the cam at first gradually decreasing the crank radius of the variable throw wrist-pin and then changing the same so that the bed will be started back with an easy starting motion until the parts reach the position shown in Fig. 14 when the bed will have been brought into proper position and will be traveling at proper speed to commence its constant speed return movement.

In the particular construction I have herein illustrated I have proportioned the cam to produce substantially the same motions that would be produced by employing a pitman. It is to be understood, however, that I do not wish to be limited to the particular kind of movement produced by my variable throw crank reverse mechanism, it being obvious that considerable varieties may be used by utilizing various cams or other means for shifting the radial throw wrist-pin.

In this application for patent I do not wish to claim broadly a mechanical movement in which reversals occupy longer times than the constant speed movements, as that is claimed in my companion application for patent before referred to.

I am aware that many changes may be made in practicing my invention by those who are skilled in the art without departing

from the scope of my invention as expressed in the claims. I do not wish, therefore, to be limited to the construction I have herein shown and described, but

What I do claim and desire to secure by Letters Patent of the United States is:—

1. A mechanical movement comprising a main driving mechanism and a radial throw crank-actuated reversing mechanism.

2. A mechanical movement comprising a main driving mechanism and a radial throw crank-actuated reversing mechanism connected to operate for more than a half turn for a reverse.

3. A mechanical movement comprising a main driving mechanism and a radial throw crank-actuated reversing mechanism connected to reverse the bed at the ends of its travel in either direction and to act for more than a half turn for each reversing movement.

4. A two-revolution mechanical movement for converting rotary into reciprocating movement, comprising a main driving mechanism for imparting a uniform to-and-fro movement to a reciprocating member, a crank reversing mechanism for imparting the reversing movement, and means whereby the crank reversing mechanism shall act between the uniform movements for more than a half turn.

5. A mechanical movement comprising a main driving mechanism, a wrist-pin, means for changing the crank radius of the wrist-pin, and means for connecting the wrist-pin to effect a reversal during more than a half turn thereof.

6. In a mechanical movement the combination of the moving member, a rack carried thereby, a driving pinion engaging said rack, an external gear and an internal gear for turning the pinion in opposite directions and a radial throw crank reversing mechanism operating alternately with the main driving mechanism.

7. In a mechanical movement the combination of a main driving mechanism and a reversing mechanism comprising a radial throw wrist-pin, and a cam for changing the crank radius of the wrist-pin.

8. In a mechanical movement the combination of a main driving mechanism and a reversing mechanism comprising a radial throw wrist-pin, a cam for changing the crank radius of the wrist-pin, and means for connecting the wrist-pin to effect a reversal during more than a half turn thereof.

9. In a two-revolution mechanical movement, the combination of a main driving mechanism and radial throw crank-actuated reversing mechanism having reversal movements occupying more time than the constant speed movements.

10. In a mechanical movement, the com-

combination of a main driving mechanism comprising a main shaft, a partial internal gear, a partial external gear, a driving pinion engaging a rack on the moving member and
5 pinions engaged by the internal gear and external gear respectively, and a reversing mechanism comprising a radial throw wrist-pin turning with the main shaft, a cam varying the crank radius of the wrist-pin and
10 means for connecting the wrist-pin to im-

part a reversing movement to the bed during more than a half turn of the wrist-pin.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

C. J. ROBERTSON.

Witnesses:

ROBERT T. JOHNSTON,
FRED J. VIEWEG.