

(No Model.)

11 Sheets—Sheet 1.

A. GODFREY.

RECIPROCATING PLATEN PRINTING MACHINE.

No. 344,265.

Patented June 22, 1886.

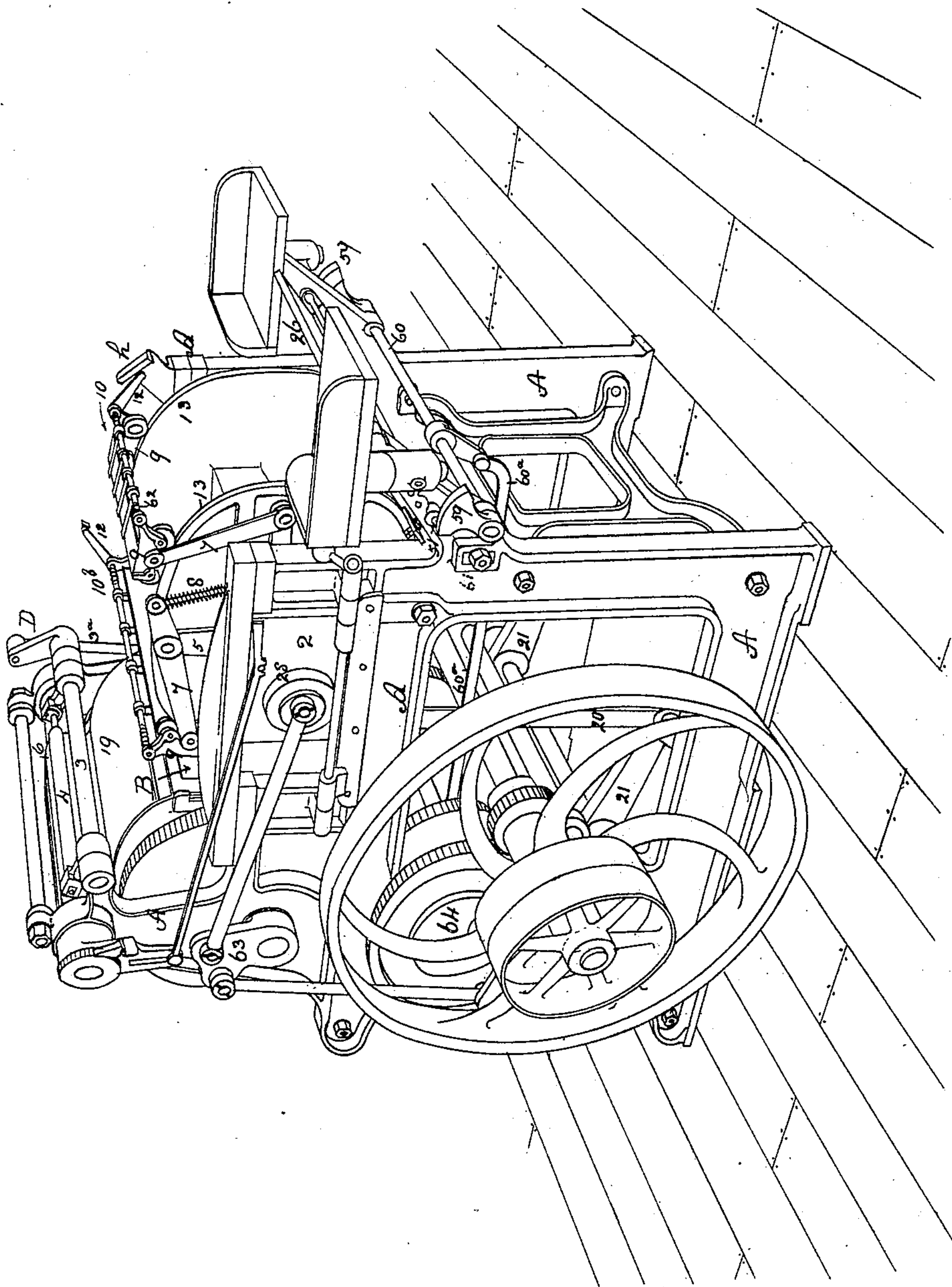


Fig. 1.

Witnesses.

Delbert H. Decker
William Austin

Inventor

Alfred Godfrey

By his attorney

Wm. L. Ewin.

(No Model.)

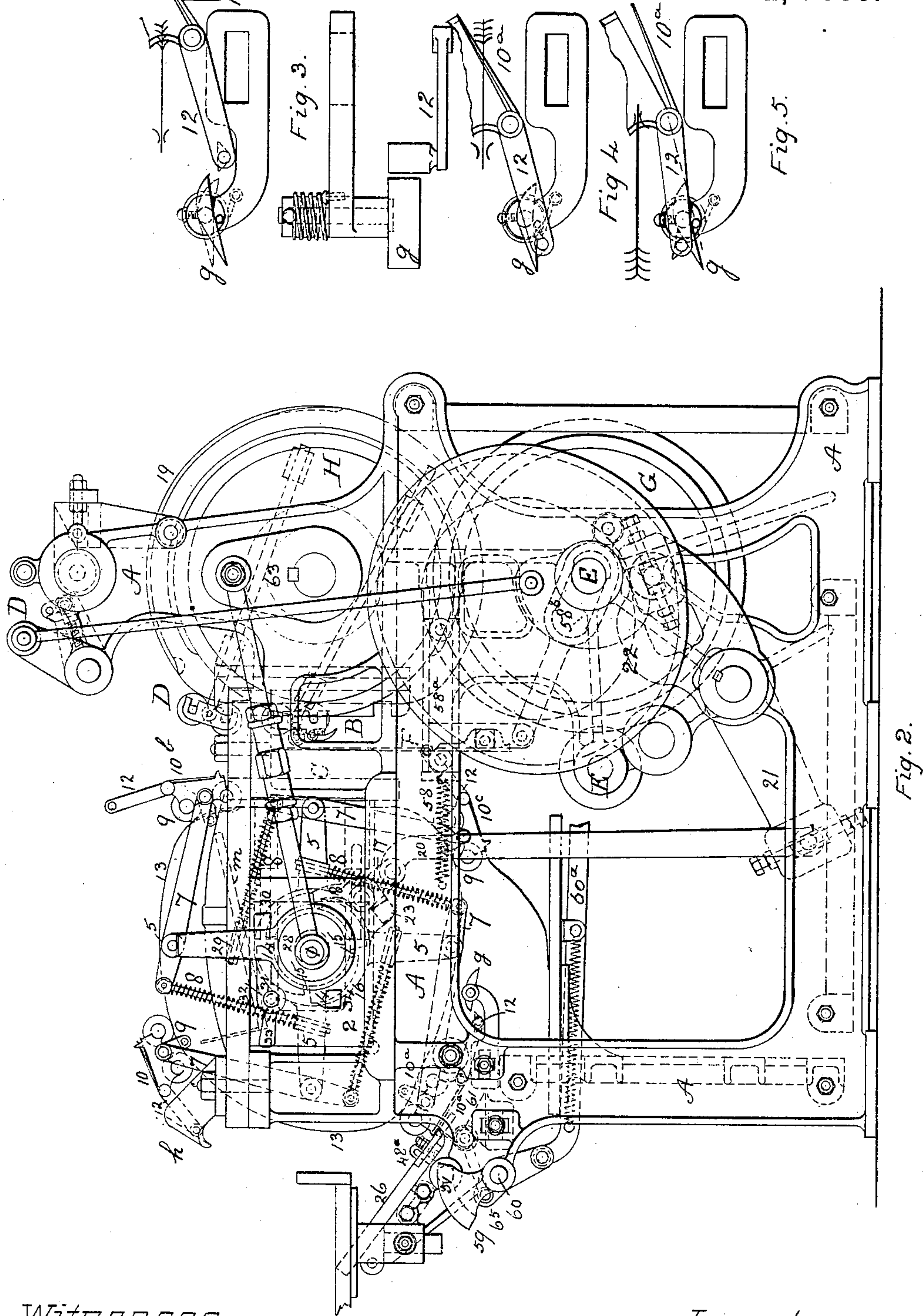
11 Sheets—Sheet 2.

A. GODFREY.

RECIPROCATING PLATEN PRINTING MACHINE.

No. 344,265.

Patented June 22, 1886.



Witnesses

Albert H. Decker
William Taylor

Inventor

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A. L. Ewin.

(No Model.)

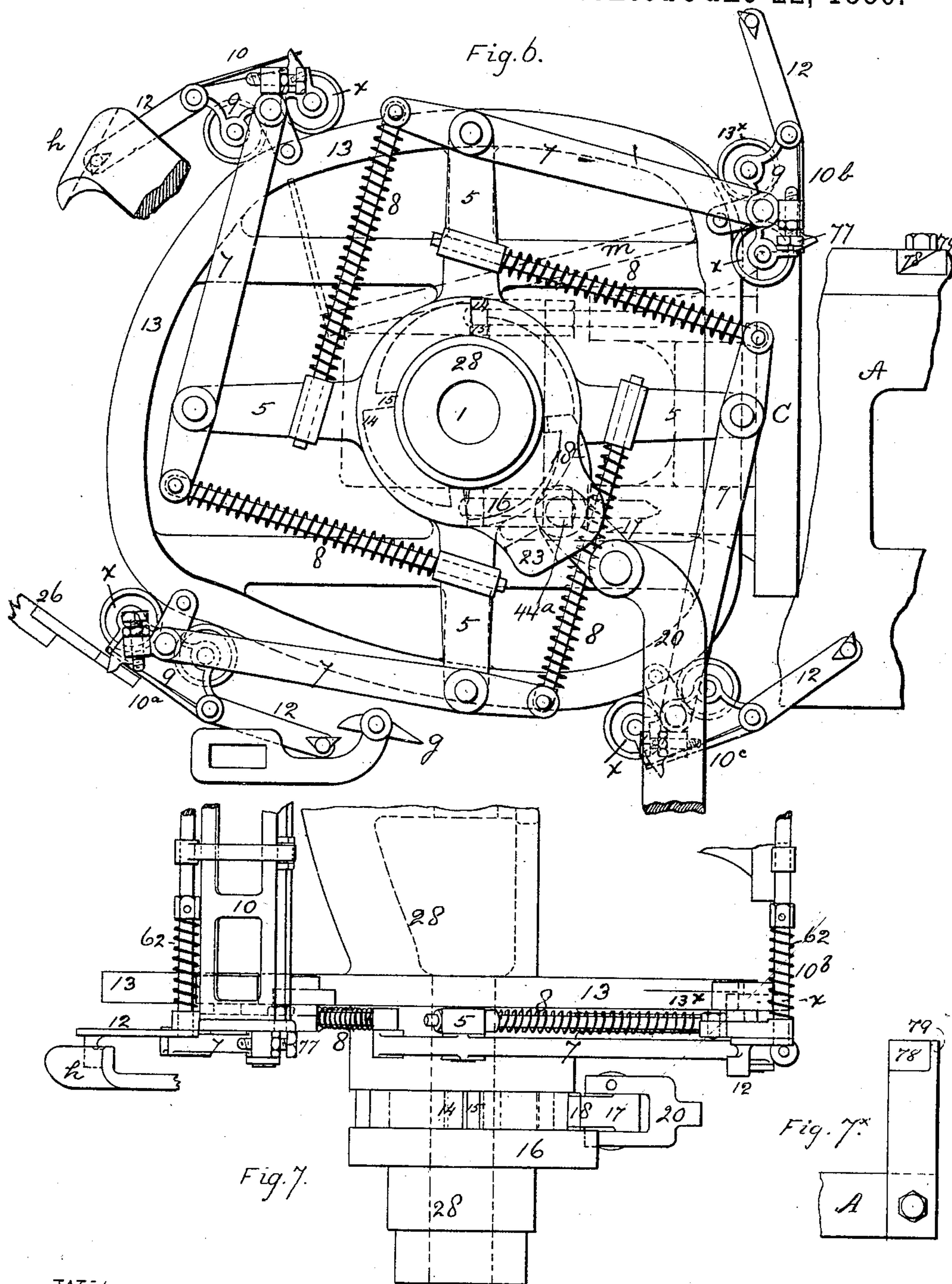
11 Sheets—Sheet 3.

A. GODFREY.

RECIPROCATING PLATEN PRINTING MACHINE.

No. 344,265.

Patented June 22, 1886.



Witnesses

Delbert H. Decker
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(No Model.)

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A. GODFREY.

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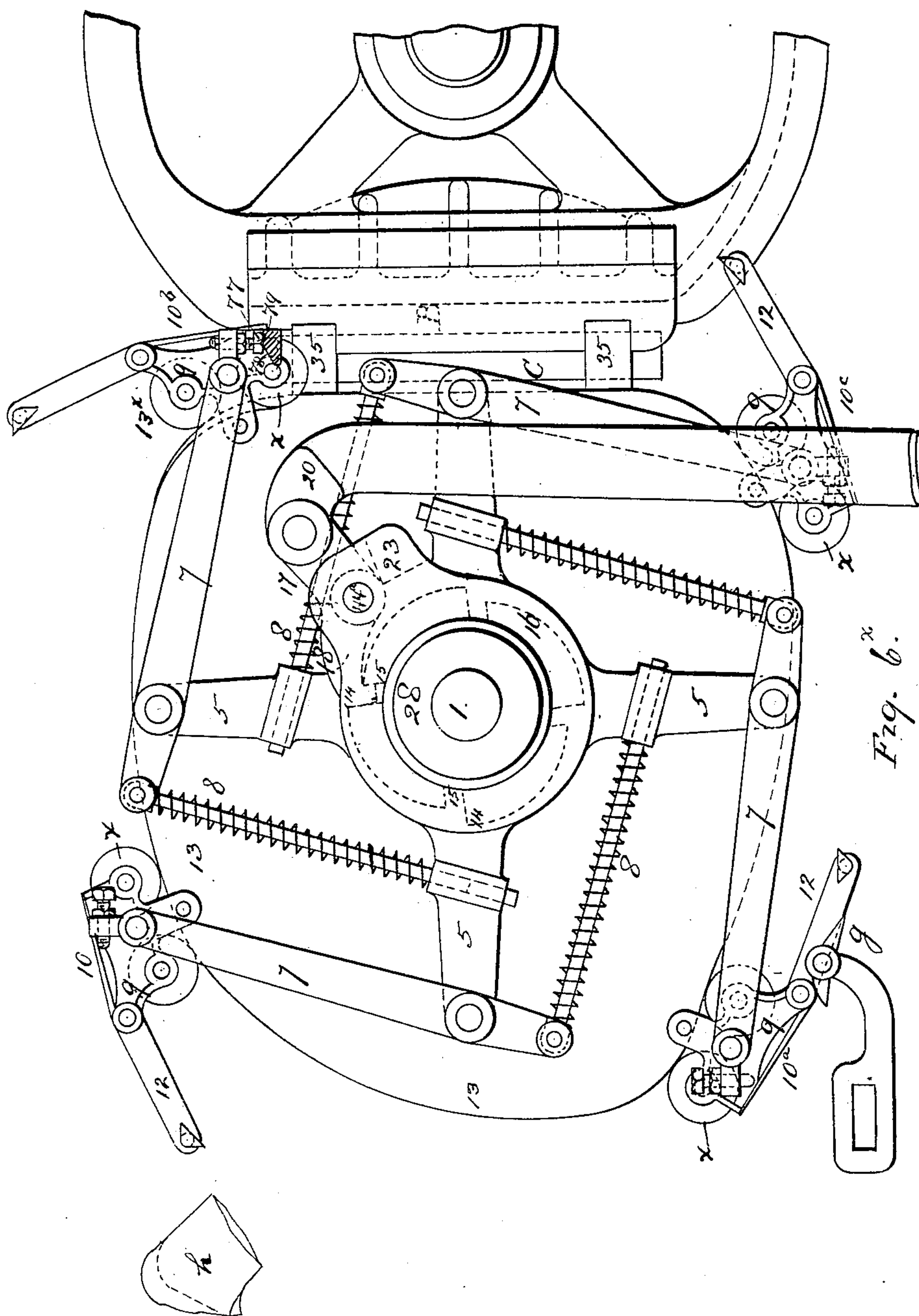


Fig. 6.

Witnesses:

Delbert H. Decker
William Gayton

Inventor

Alfred Godfrey

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R. L. Ewin

(No Model.)

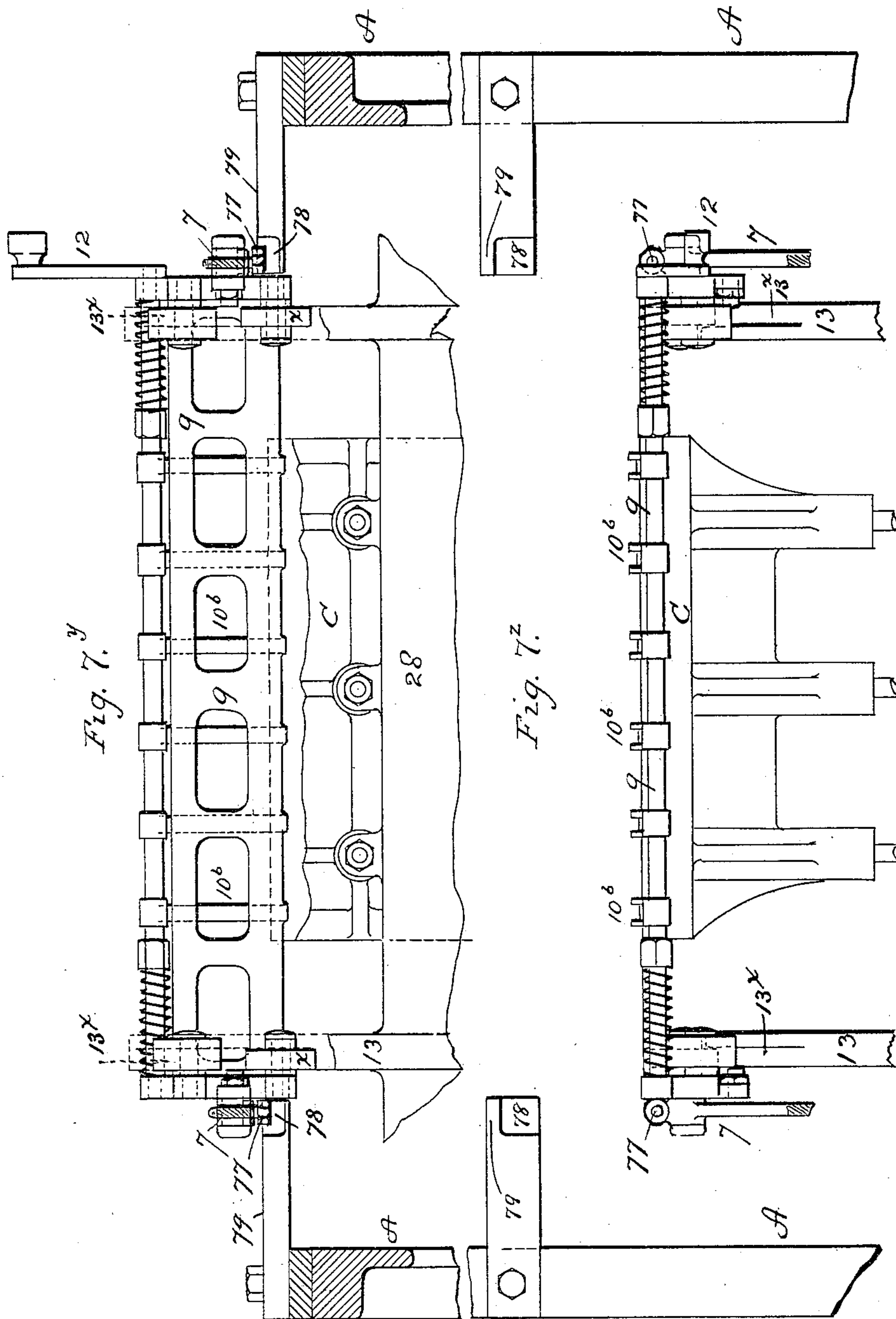
11 Sheets—Sheet 5.

A. GODFREY.

RECIPROCATING PLATEN PRINTING MACHINE.

No. 344,265.

Patented June 22, 1886.



Witnesses:

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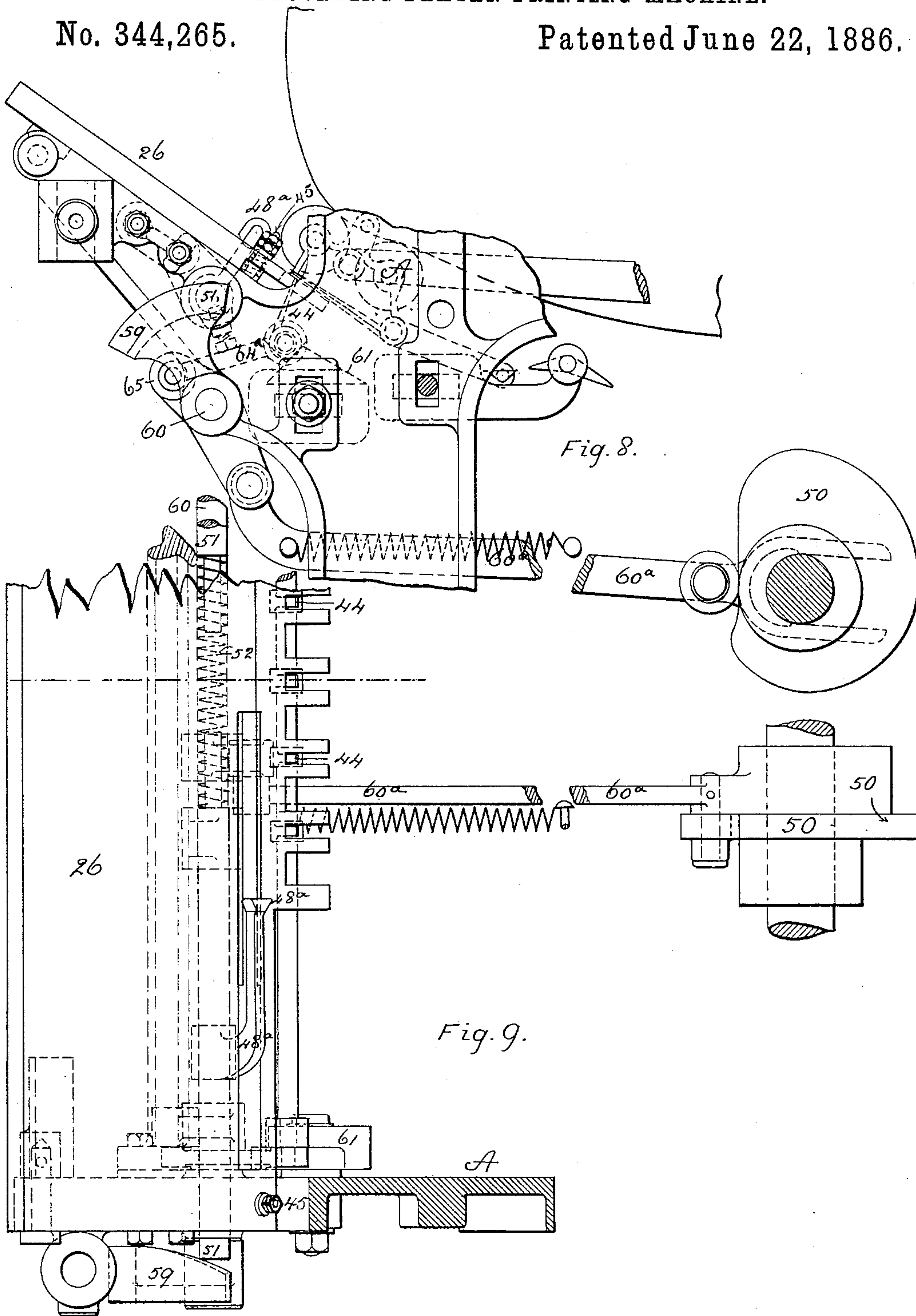


Fig. 8.

Fig. 9.

Witnesses

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William Astin

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(No Model.)

11 Sheets—Sheet 7.

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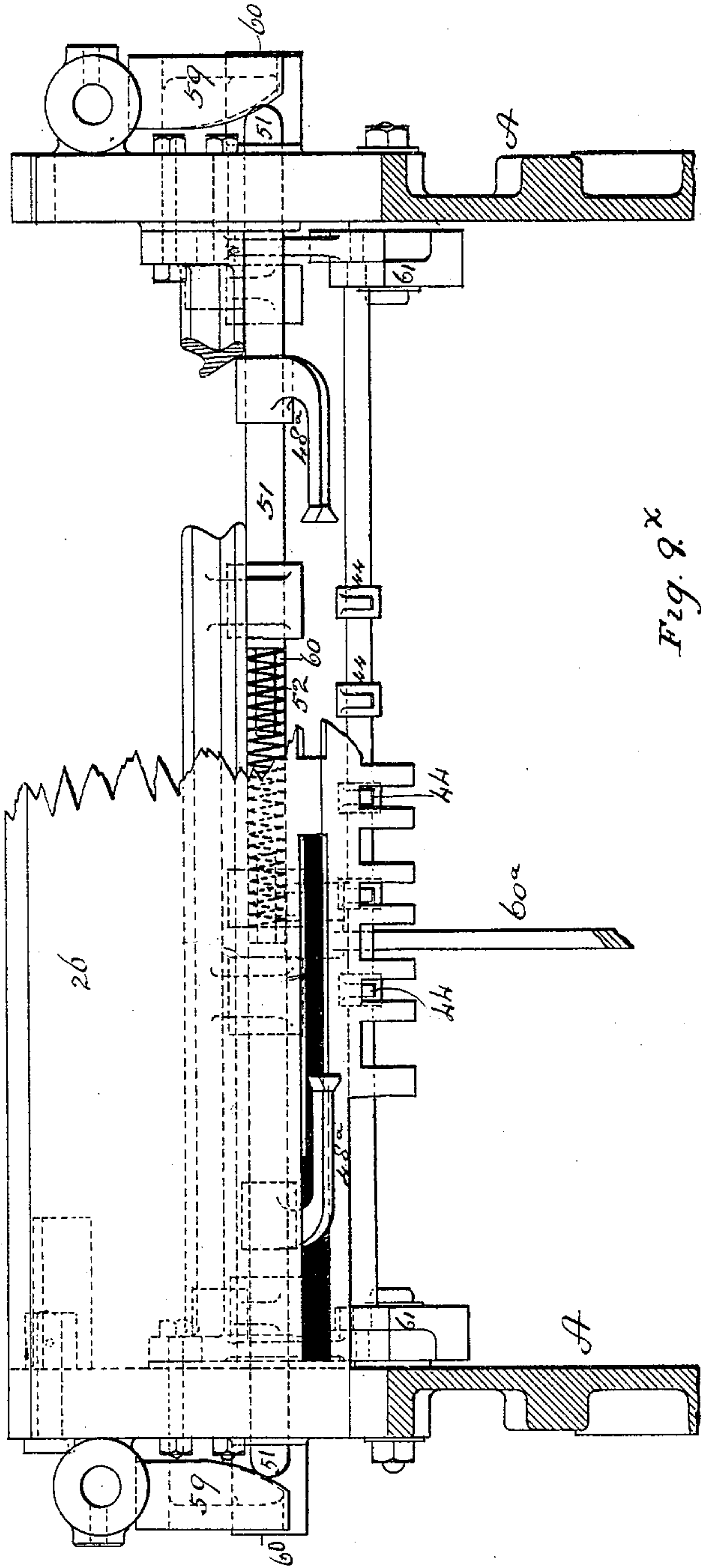
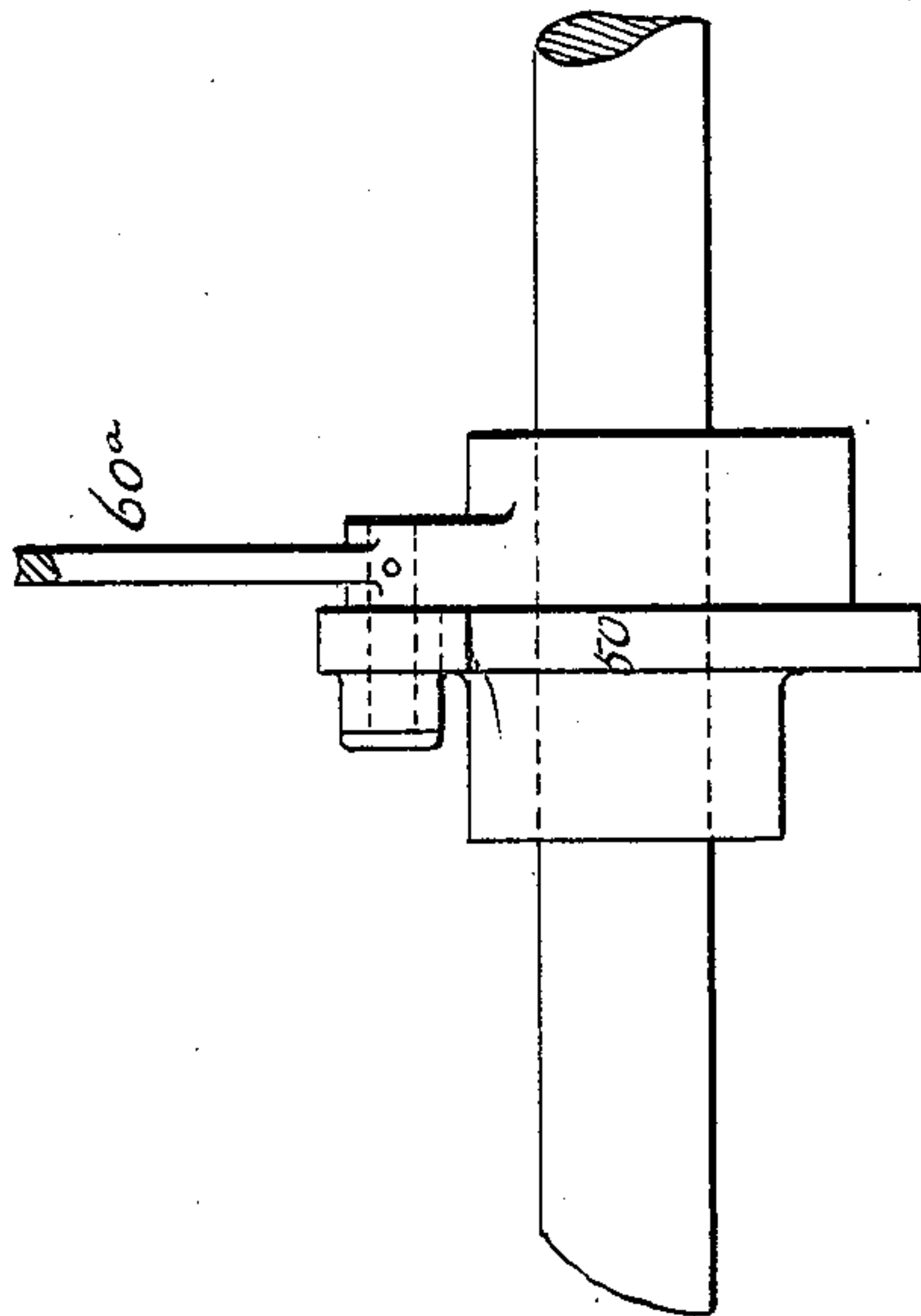


Fig. 9.



Witnesses:

Robert H. Decker
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H. L. Ewin

(No Model.)

11 Sheets—Sheet 8.

A. GODFREY.

RECIPROCATING PLATEN PRINTING MACHINE.

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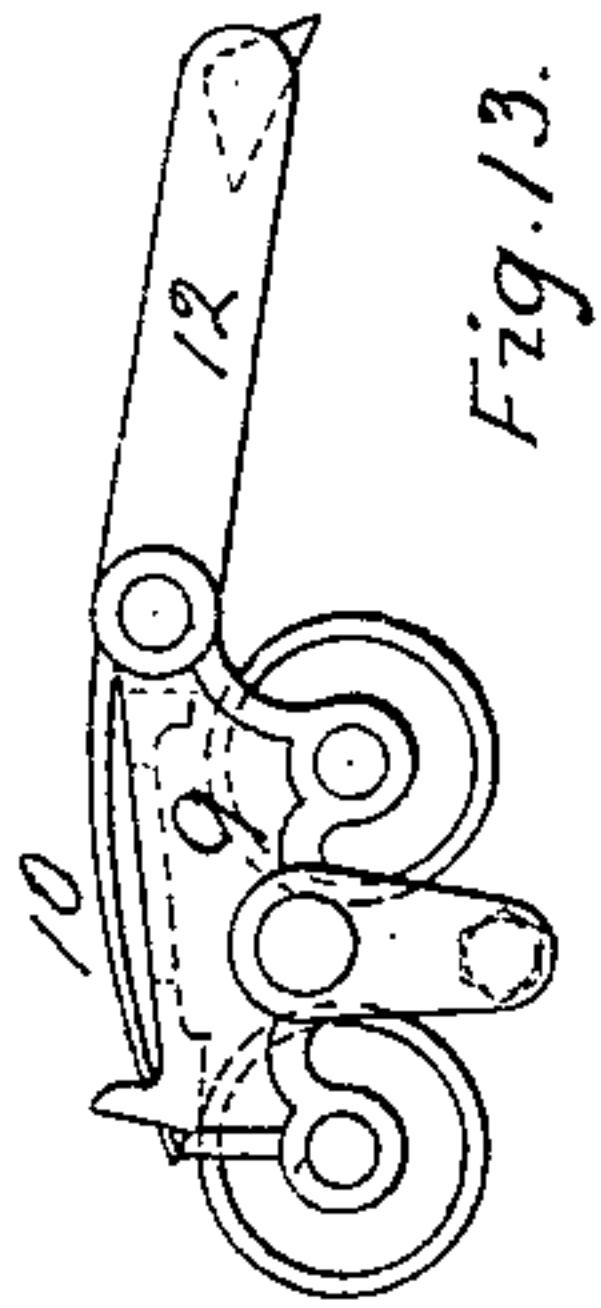


Fig. 13.

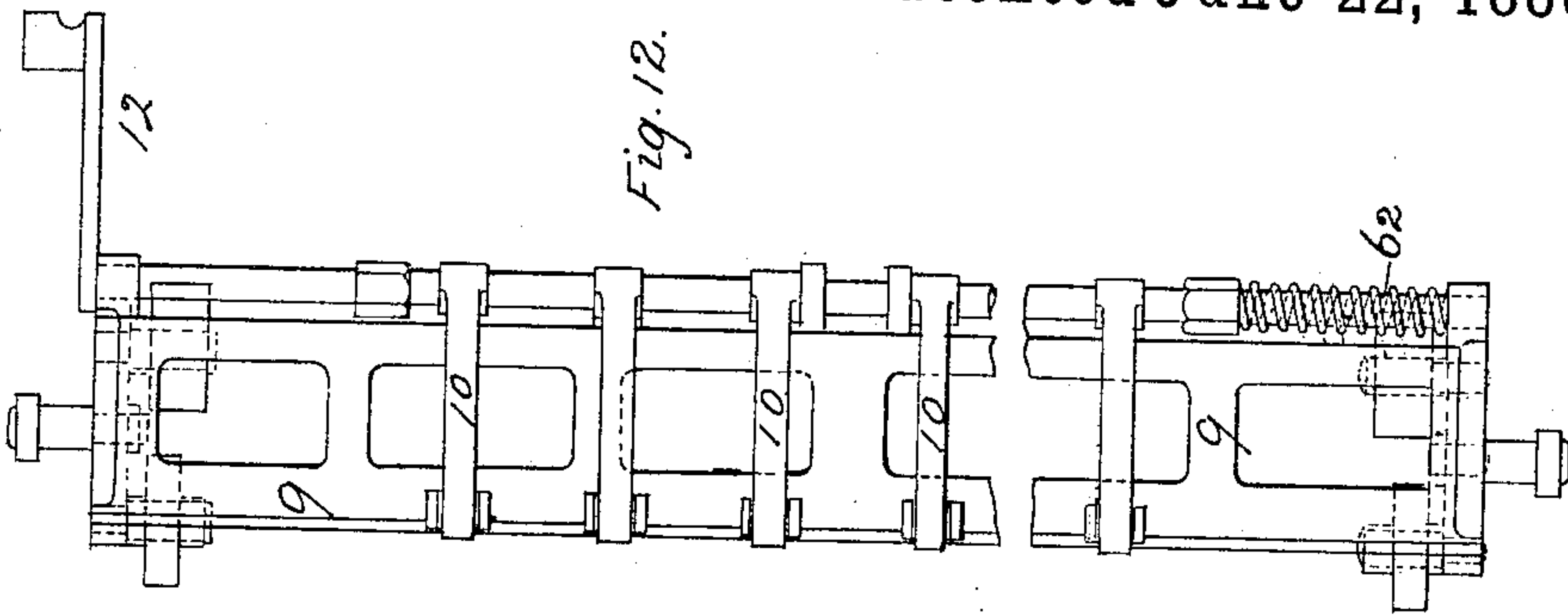


Fig. 12.

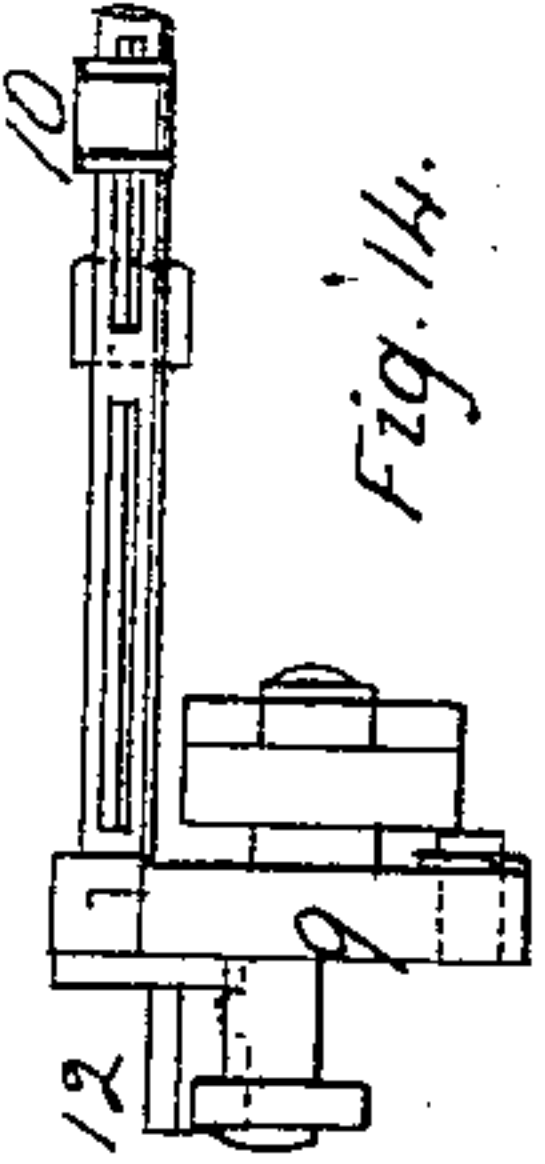


Fig. 14.

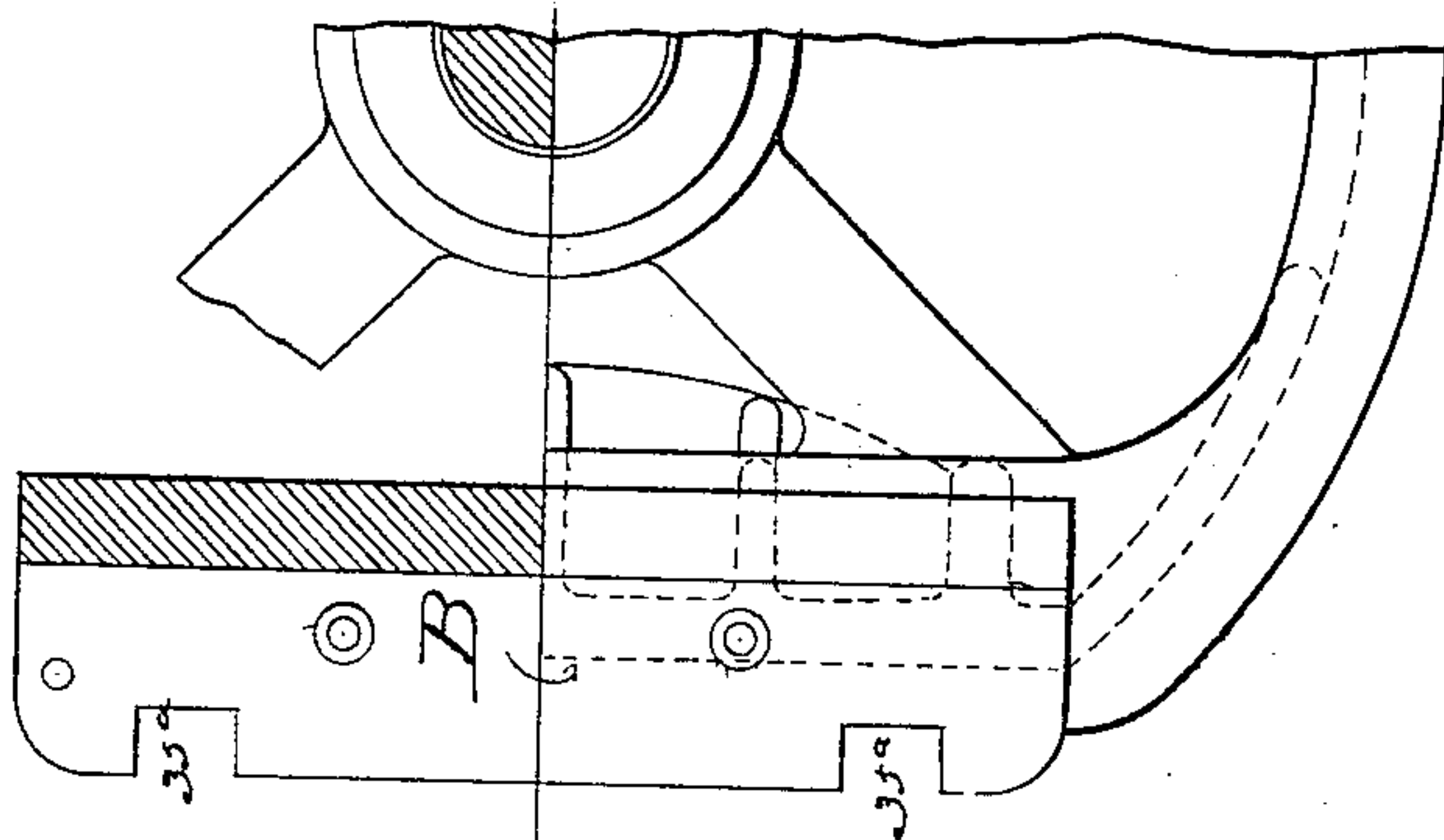


Fig. 10.

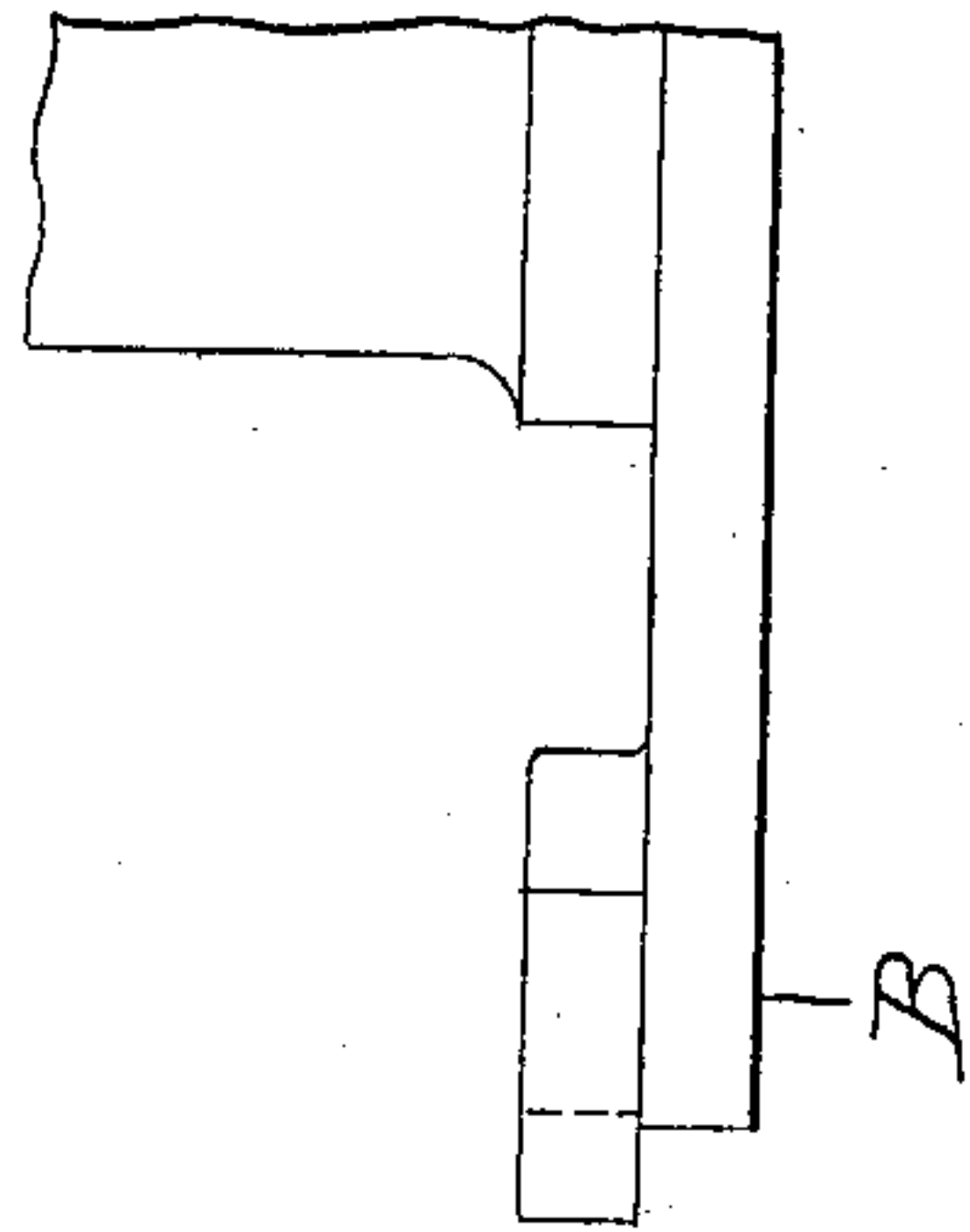
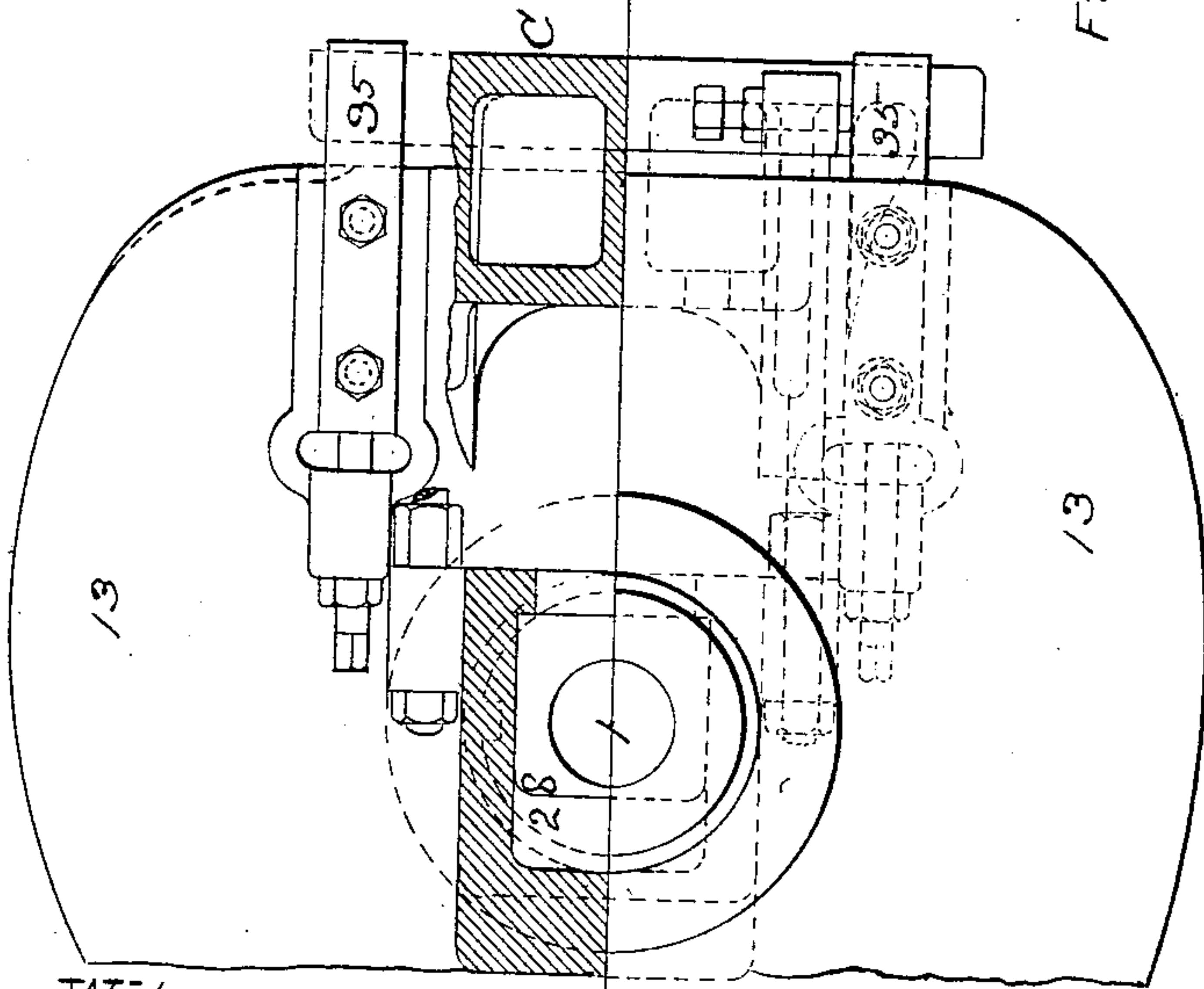
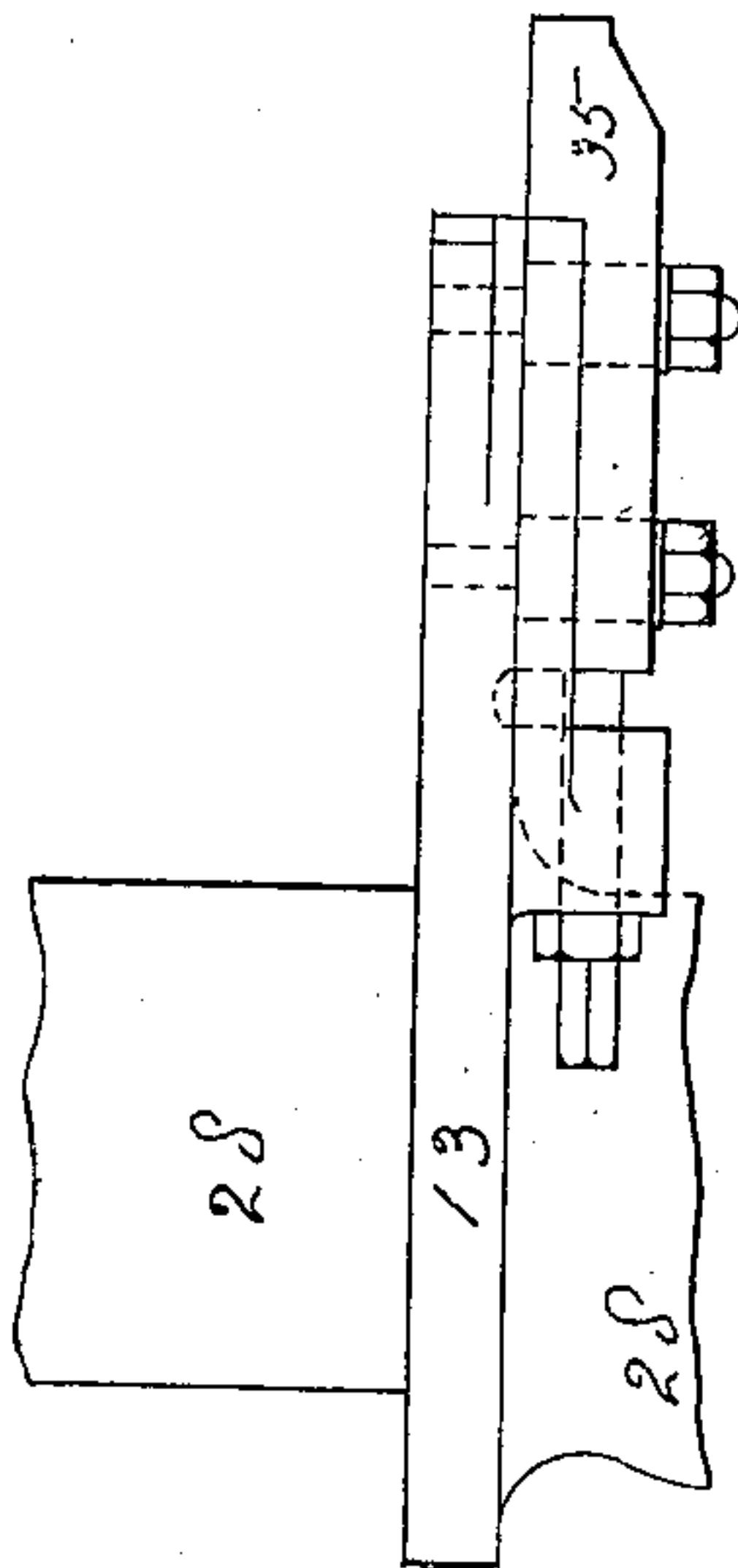


Fig. 11.



Witnesses

Delbert H. Decker
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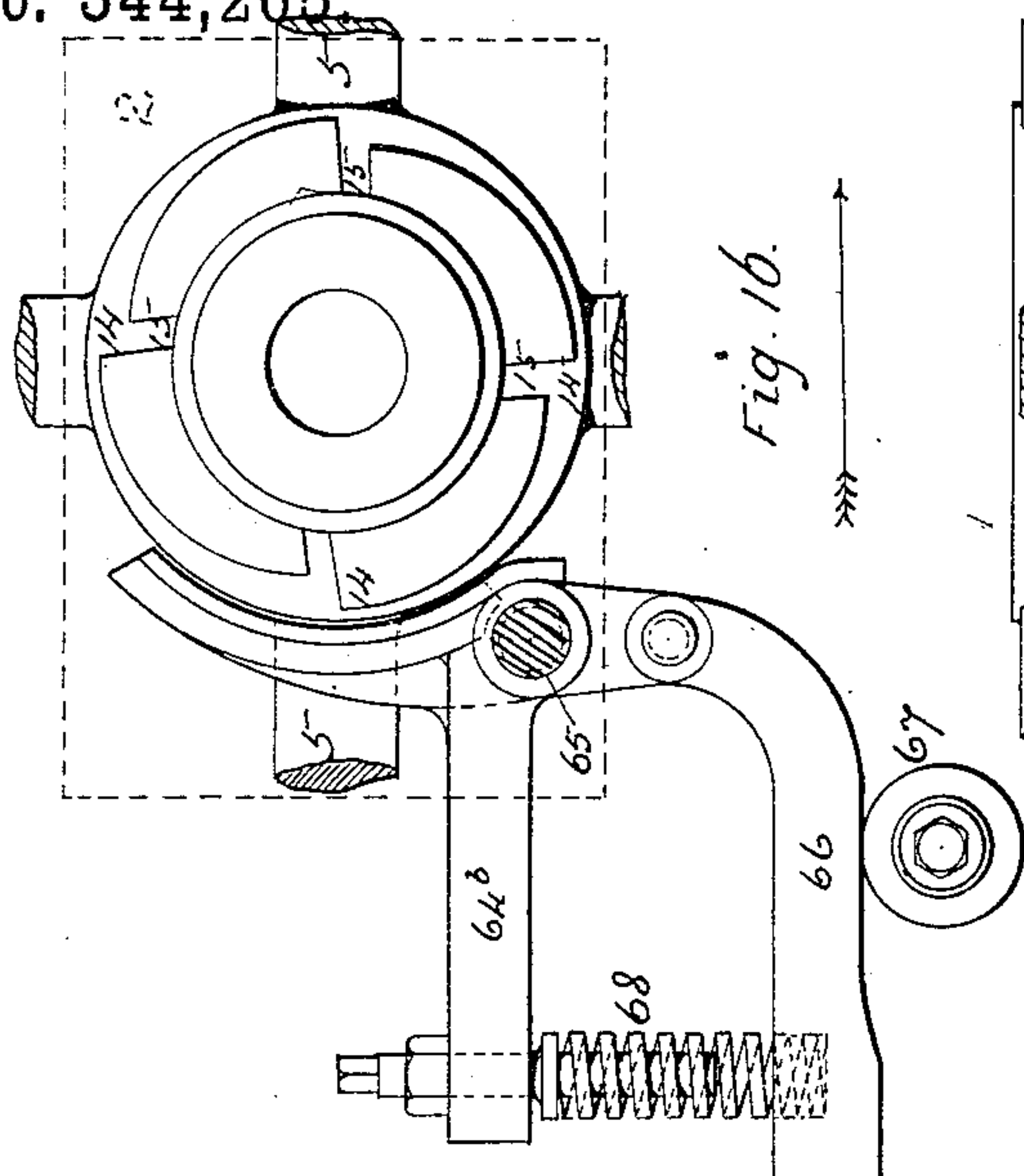


Fig. 16.

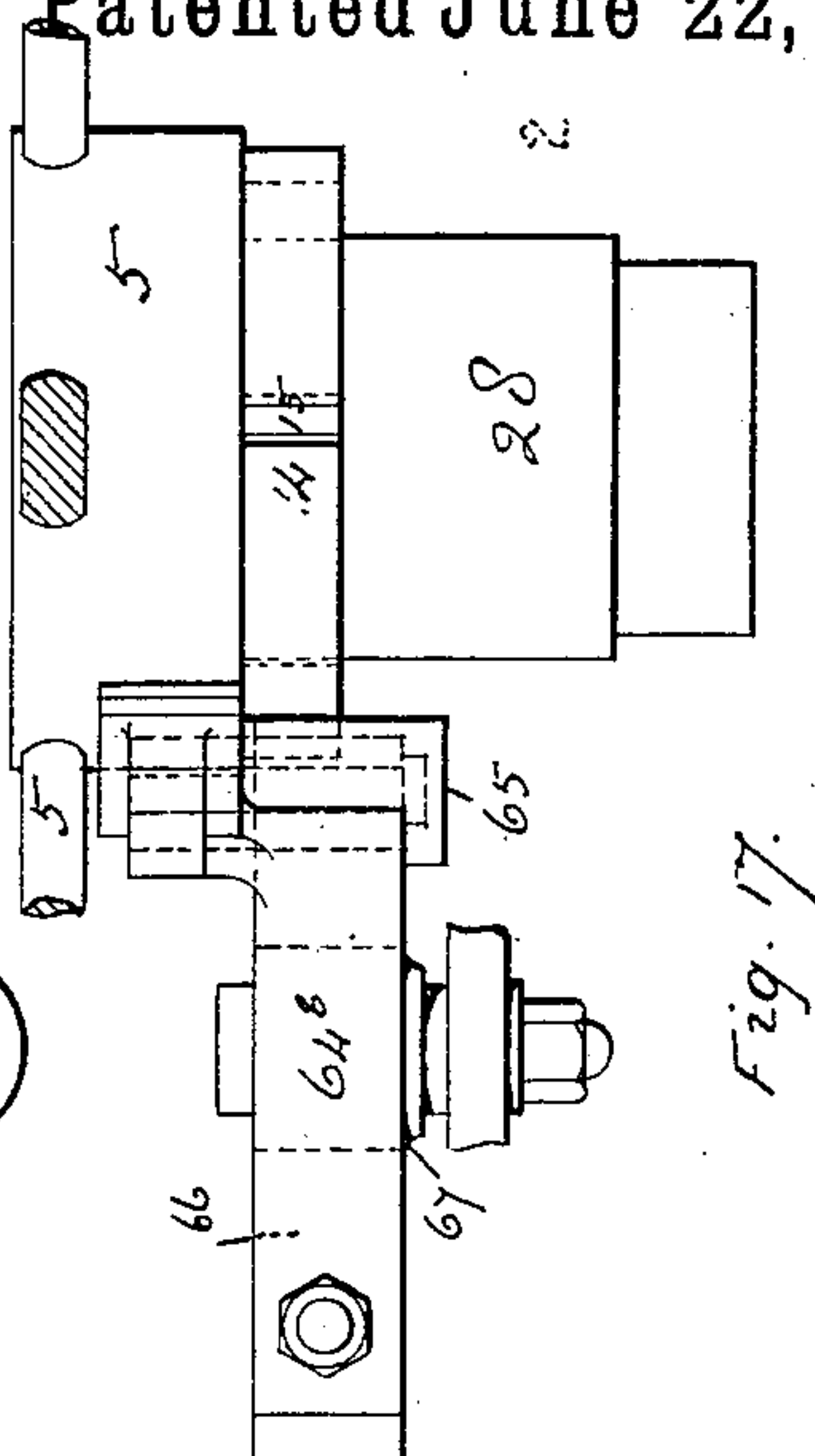


Fig. 17.

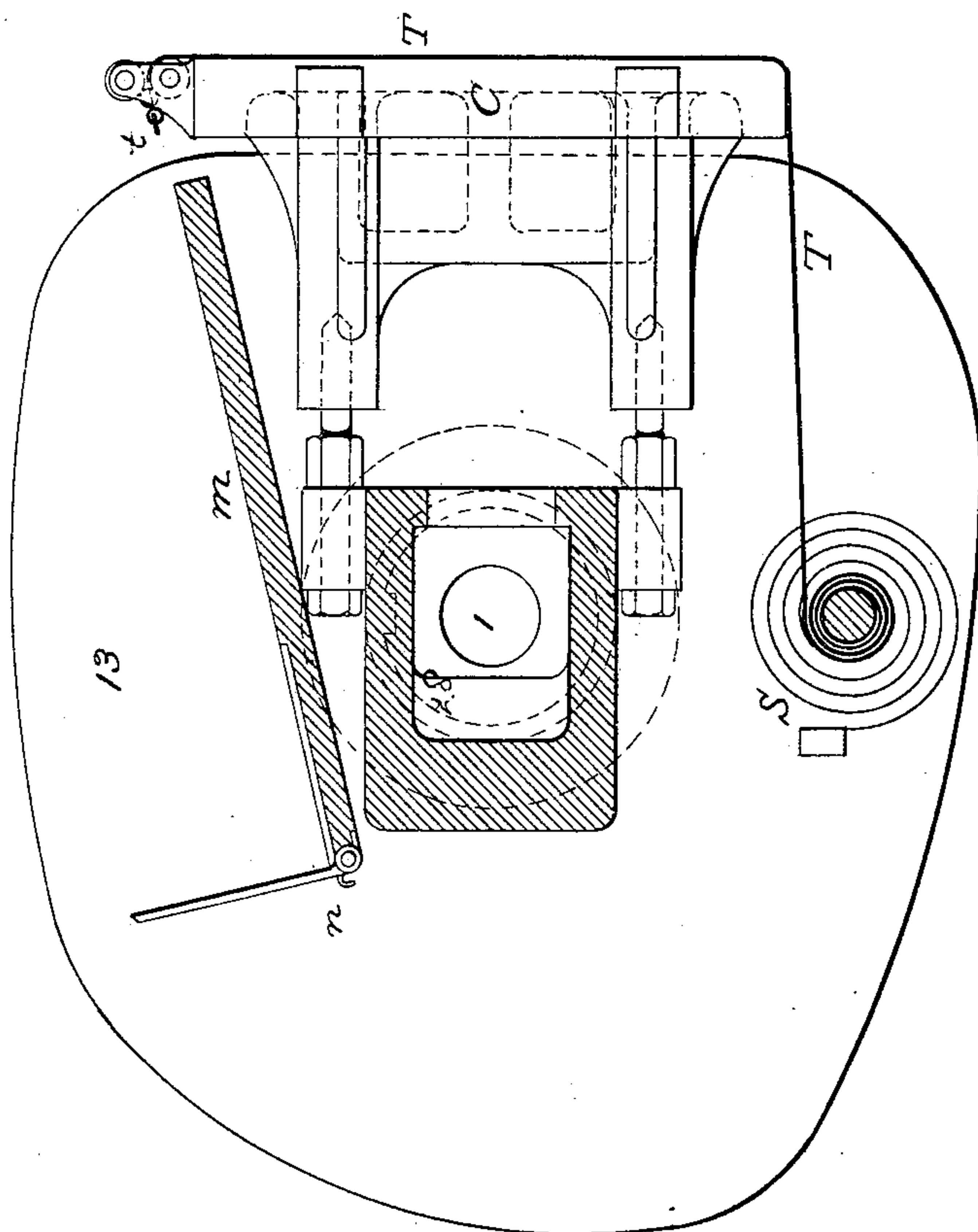


Fig. 15.

Witnesses

Inventor

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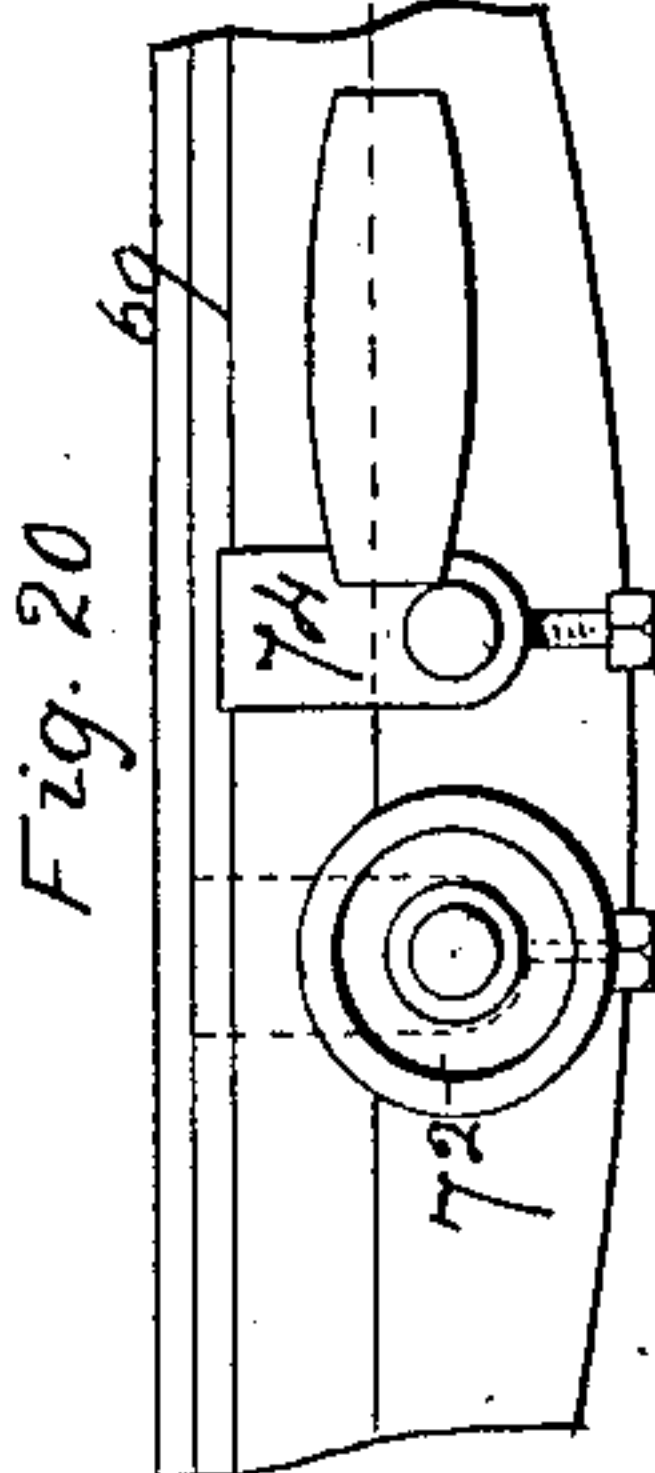
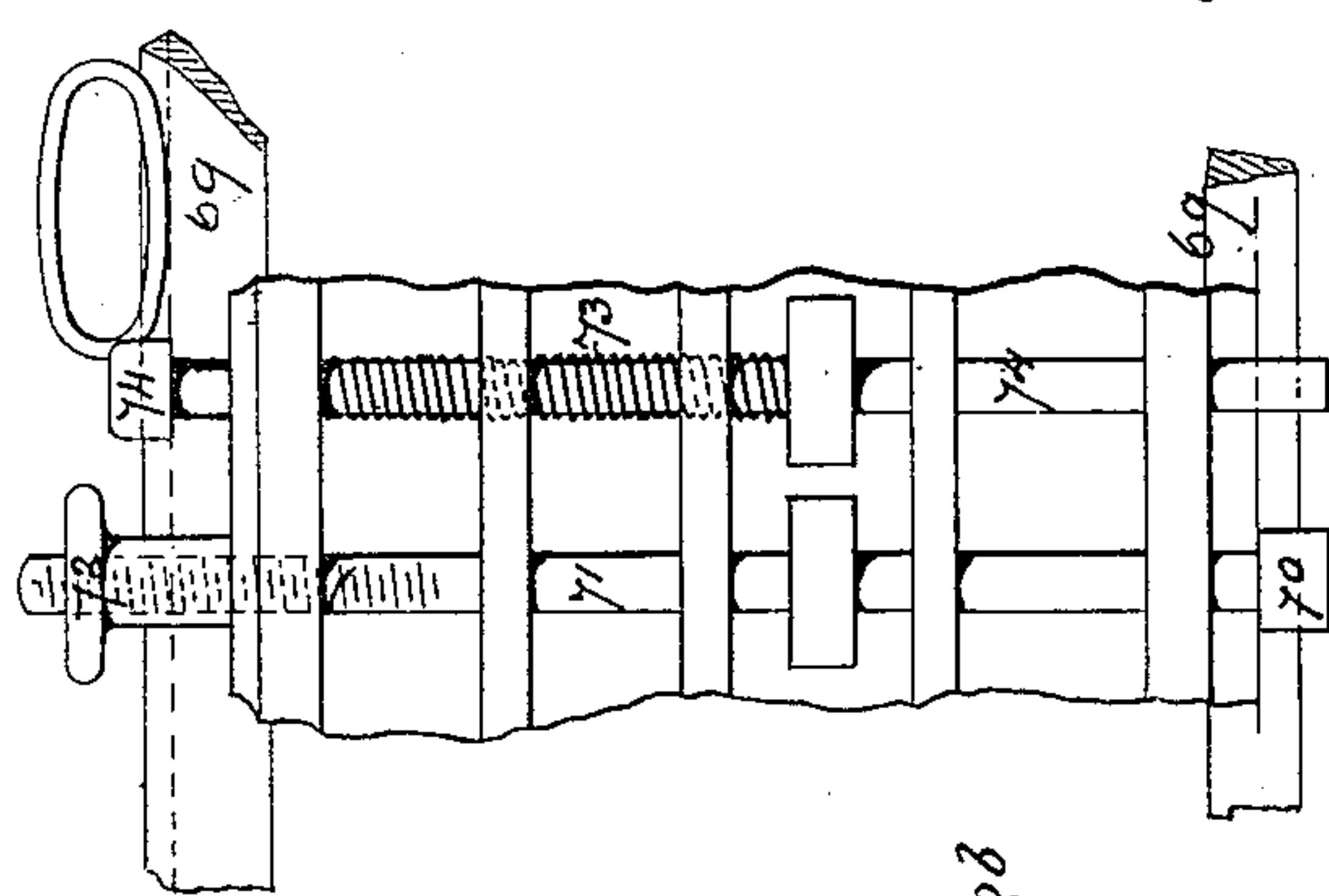
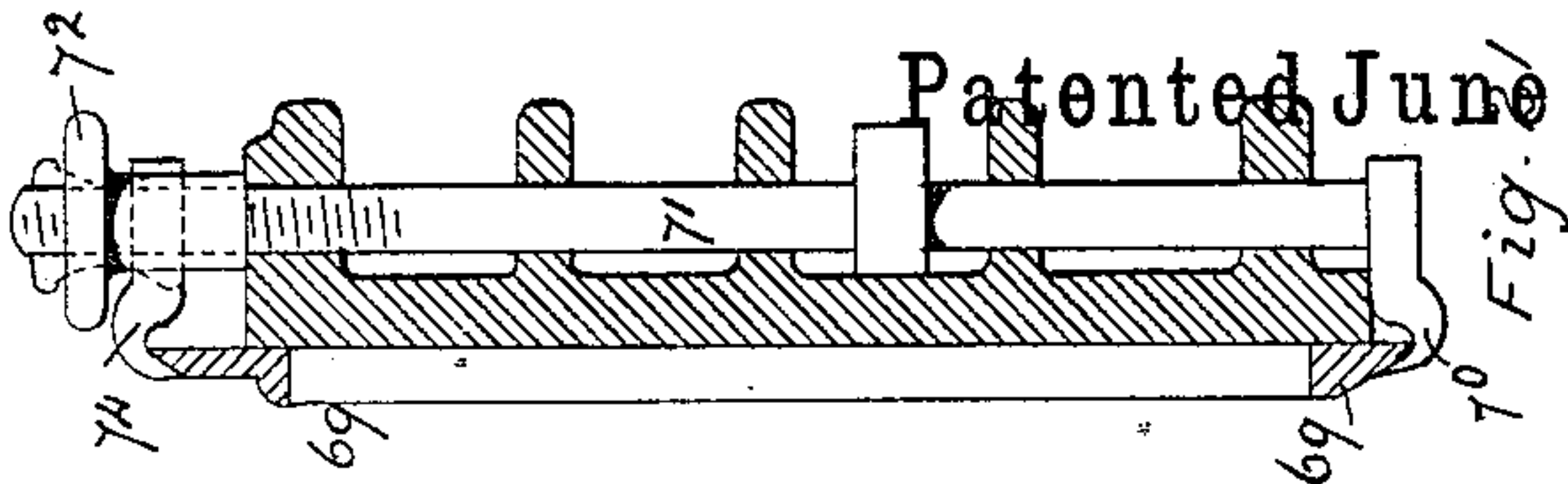


Fig. 22.

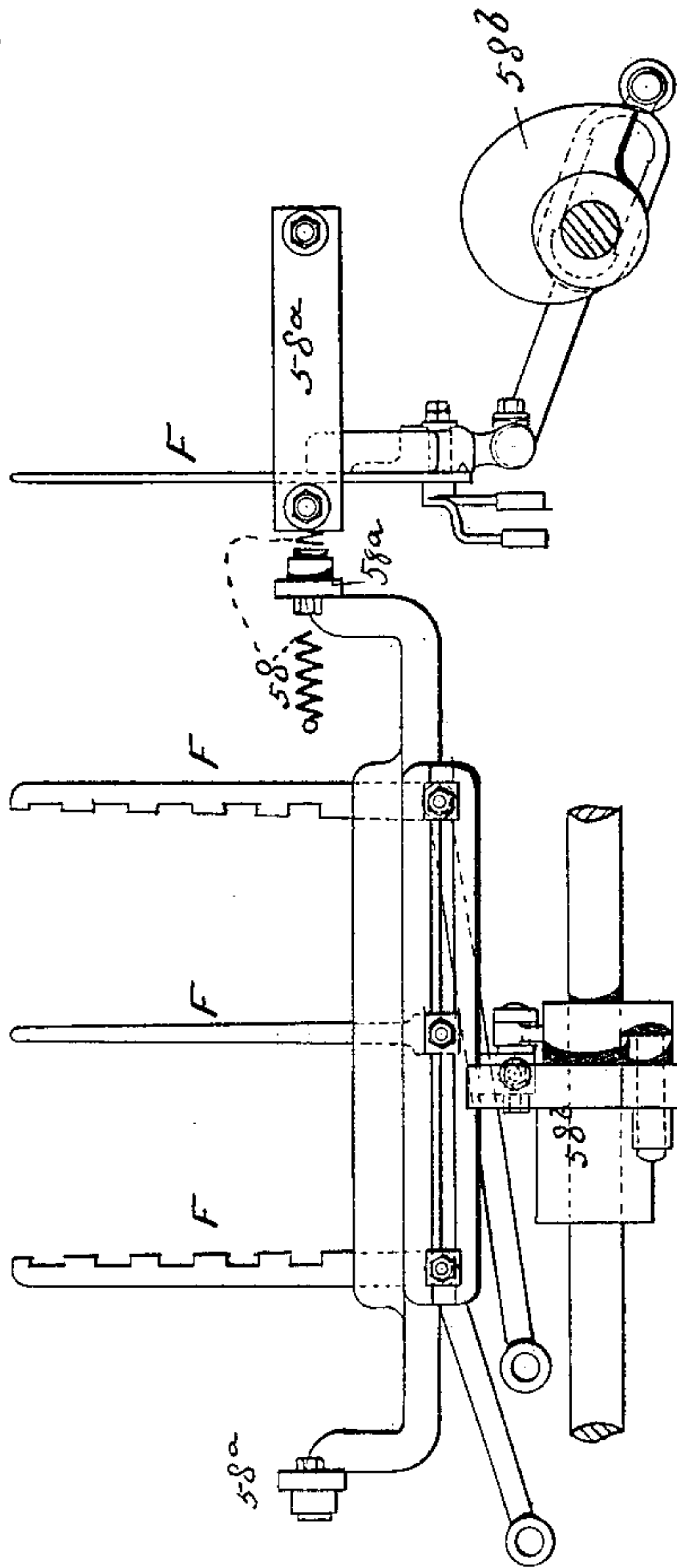


Fig. 19.

Fig. 18.

Witnesses

Inventor

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W. L. Ewin.

(No Model.)

11 Sheets—Sheet 11.

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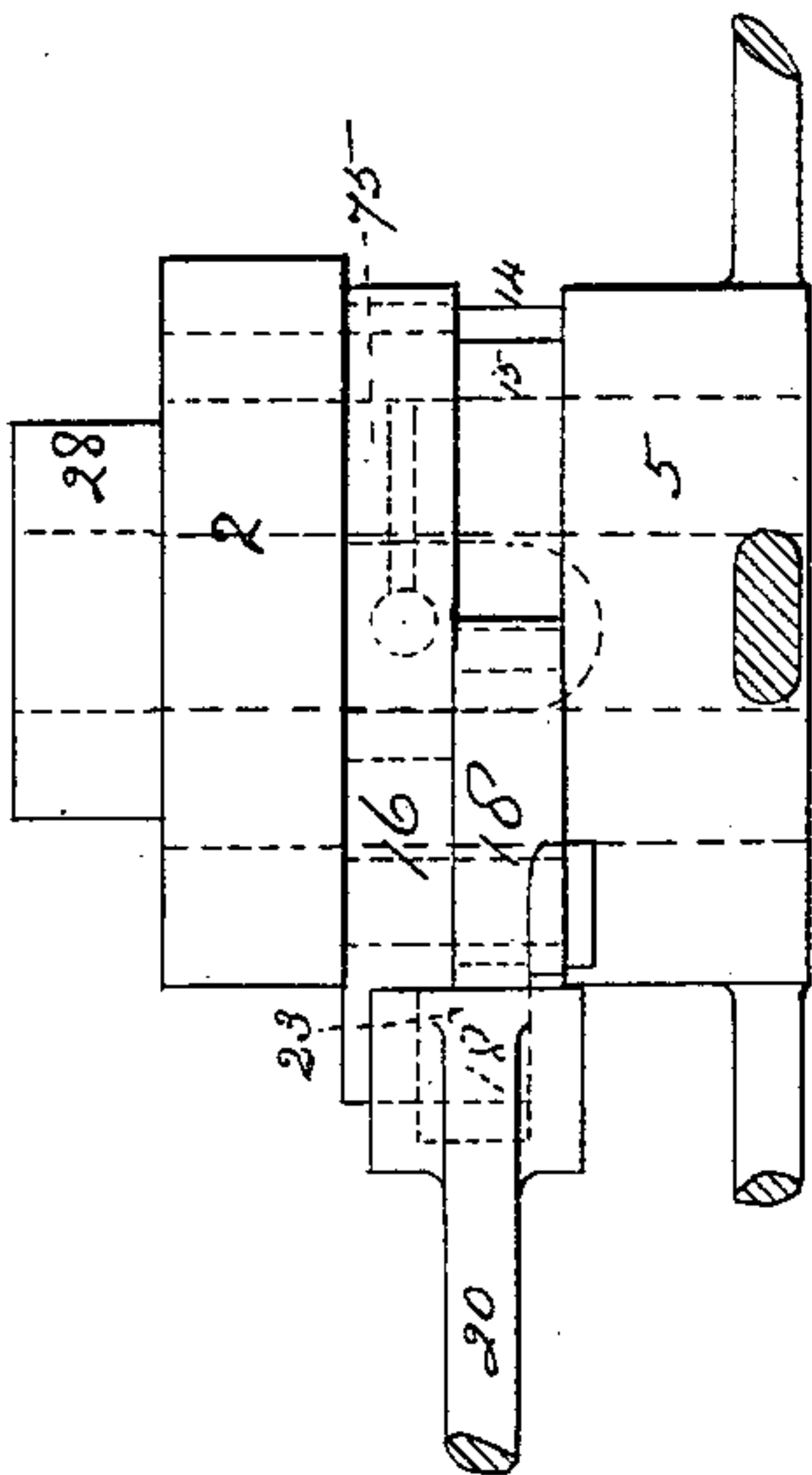


Fig. 24

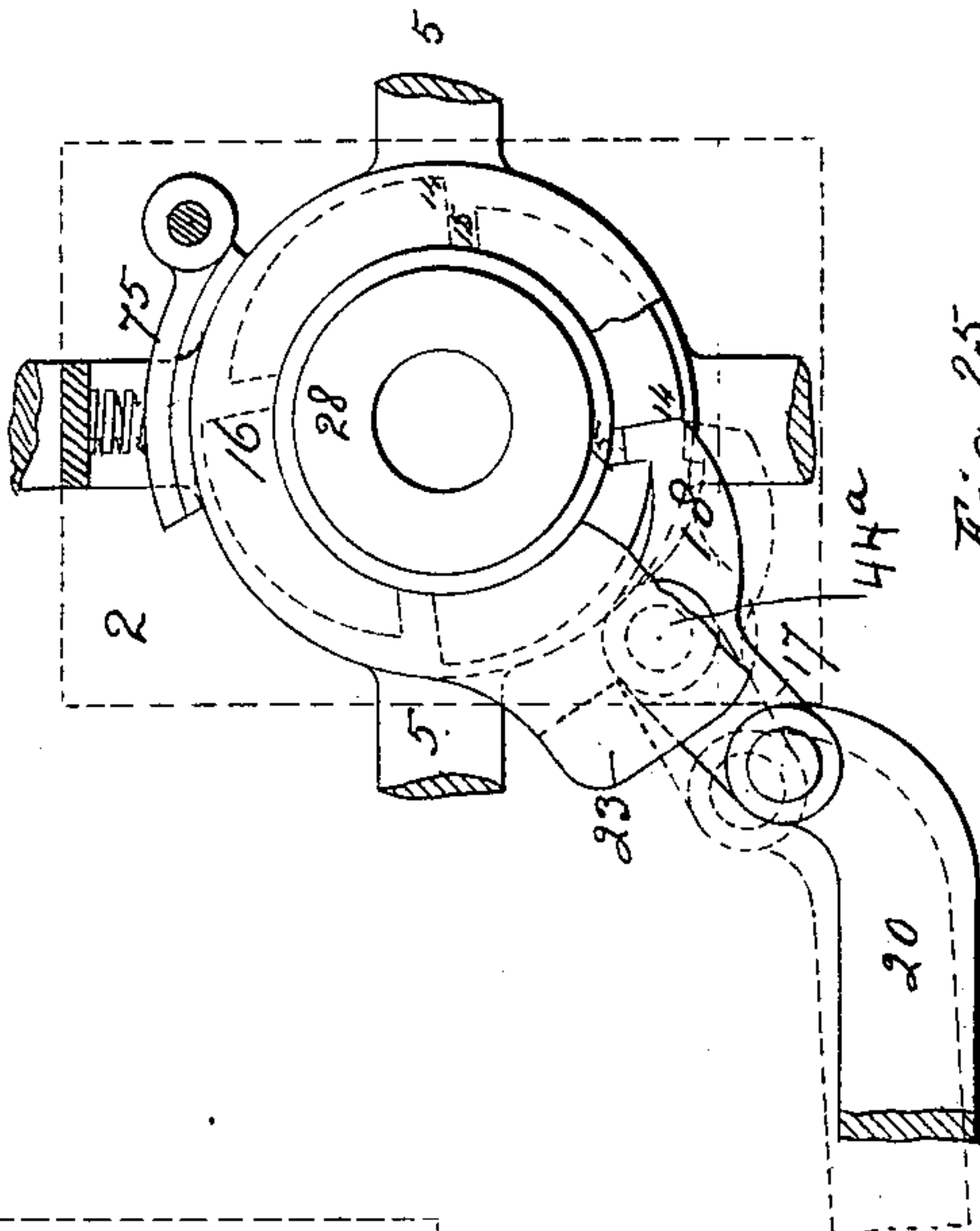


Fig. 25

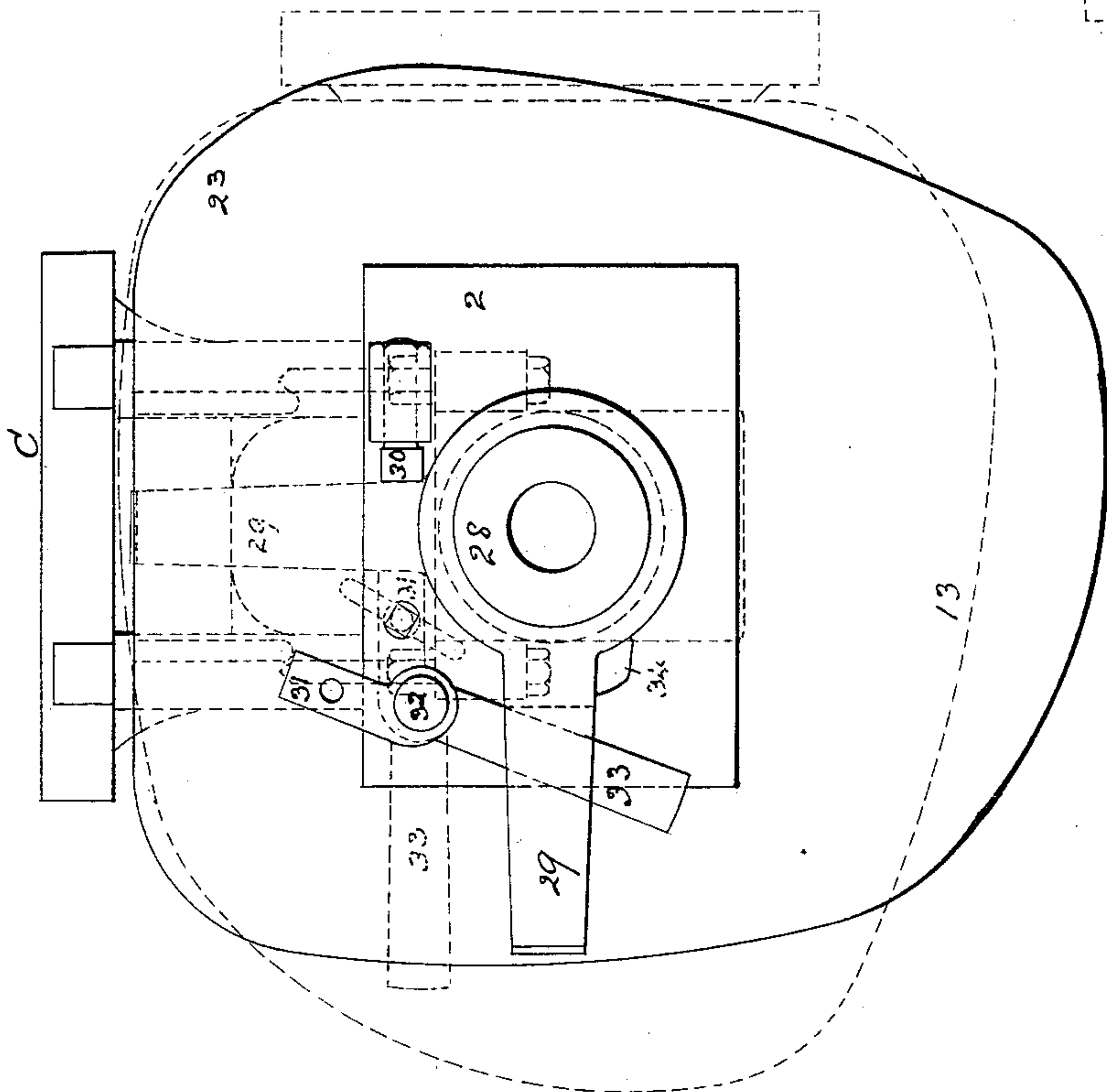


Fig. 23

Witnesses

Albert H. Decker
William Taylor

Inventor

Alfred Godfrey
By his attorney
H. L. Swin

UNITED STATES PATENT OFFICE.

ALFRED GODFREY, OF NEW REDDISH, COUNTY OF LANCASTER, ENGLAND.

RECIPROCATING-PLATEN PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 344,265, dated June 22, 1886.

Application filed August 25, 1885. Serial No. 175,308. (No model.) Patented in England March 29, 1883, No. 1,591, and August 11, 1883, No. 3,895; in France September 28, 1883, No. 157,769; in Belgium October 2, 1883, No. 62,763; in Canada April 29, 1884, No. 19,205, and in Germany October 26, 1884, No. 33,299.

To all whom it may concern:

Be it known that I, ALFRED GODFREY, a subject of the Queen of England, residing at New Reddish, in the county of Lancaster, England, have invented an Improved Reciprocating-Platen Printing-Machine, (patented in part in England on 29th of March, 1883, under No. 1,591, and on 11th of August, 1883, under No. 3,895; in France on 28th of September, 1883, under No. 157,769, and on 31st of October, 1884, by patent of addition; in Belgium on 2d of October, 1883, under No. 62,763, and on 3d of November, 1884, by patent of addition; in Canada on 29th of April, 1884, under No. 19,205, and in Germany on 26th of October, 1884, under No. 33,299,) of which the following is a specification.

My invention relates to that class of printing-machines known as "platen-machines," and is designed for the purpose of enabling such machines to print separate sheets of paper with greater facility and expedition than hitherto by a novel arrangement of feed apparatus, which will automatically take the sheets of paper separately from the feed-table, where they are automatically set in exact register separately to the printing-surface of the type, and will, by a continuation of the same movement, withdraw or take off the paper when printed, and will deliver each sheet direct from the feed-grippers onto a delivery board or table.

In order that my invention may be the better understood I have hereunto annexed eleven sheets of drawings, upon which are marked like letters of reference to all similar parts in the different figures.

Figure 1, Sheet 1, is a general perspective view of my improved platen printing-machine. Fig. 2, Sheet 2, is a side elevation of the said machine. Figs. 3, 4, and 5, Sheet 2, are detached detailed views of the gripper-tail and tappet in various positions. Figs. 6, 6^x, 7, 7^x, 7^y, and 7^z, Sheets 3, 4, and 5, are detailed views in elevation and plan of the gripper-feed apparatus detached from the machine, with registering screws and steels. Figs. 8, 9, and 9^x, Sheets 6 and 7, are detailed views in elevation and plan of the feed-board, showing the side and end lays, by which the paper is adjusted

in register for the feed-grippers. Figs. 10 and 11, Sheet 8, show part outside and part sectional elevation of the platen-bearers and the plan of the same, respectively. Figs. 12, 13, and 14, Sheet 8, show a plan, side elevation, and part front elevation of one of the feed-grippers and carriage detached. Fig. 15, Sheet 9, shows a sectional elevation of a tympan, which can be drawn onto the delivery-board for making ready. Figs. 16 and 17, Sheet 9, show a side elevation and plan, respectively, of the brake applied to the boss of the feed-gripper casting. Figs. 18 and 19, Sheet 10, show front and side elevation, respectively, of the frisket-fingers detached from the machine. Figs. 20, 21, and 22, Sheet 10, show a back view, transverse section, and plan of the chase-adjustment. Figs. 23, 24, and 25, Sheet 11, show the platen-tilting device and detail of ratchet for working the grippers.

In these figures, A is the framing of the machine. B is the type surface or form, C the platen, D the inking apparatus, F the frisket-fingers, and E the driving-shaft operating the platen-beam through a suitable cam and connections, all being usual parts of a platen printing-machine, the platen, however, in this case being preferably maintained parallel to the form throughout its travel. The novel part of my machine is as follows:

Upon the turned end 1 of the platen-beam 28, I fit the star-arm casting 5, detail Figs. 6, 6^x, and 7, Sheets 3 and 4, so that it turns freely upon the said end. The arms of this star-casting 5 at their extremities form fulcrums which carry the levers 7. The short arm of each one of these levers 7 is spring-pressed by the spiral springs 8, and their opposite or longer arms carry the runners or carriages 9, on which the gripper-jaws 10 are fitted, and kept normally closed by springs 62. The said gripper-jaws are provided with tail-levers 12, by which the opening of the jaws is effected, as hereinafter more fully described. The runners or gripper-carriages 9 are pressed home by the action of the spiral springs 8 upon the edge or periphery of the fixed race-plate 13, which thus serves to guide the said gripper-carriages truly in their required path. When the rotary travel of the gripper-carriages is

completed, and the one carrying the sheet to be printed is in front of the type, the remaining and hitherto simultaneous horizontal travel of said gripper-carriages, in connection with the reciprocating movement of the platen-beam, is modified as to this sheet-carrying carriage by the head of a screw, 77, Figs. 6, 6^x, 7^y, and 7^z, at each lateral end of the carriage, coacting as a stud with a stationary incline, 78, Figs. 6, 6^x, 7^x, 7^y, and 7^z, and stopping at the proper working height upon a "dead-level," 79, as shown in Fig. 6^x, thus compensating any inaccuracy in the ratchet-teeth. A pair of such stud-screws, 77, hereinbefore termed "registering-screws," are carried by the ends of said levers 7 at the ends of each carriage. An incline, 78, and a dead-level, 79, are formed at the inner end of each of said registering-steels, which project inward from the respective sides of the framing A. One of them is shown in Fig. 6 and the other in Figs. 6^x and 7^x, while both are shown in Figs. 7^y and 7^z.

Fig. 6 shows the grippers when they have just completed their rotary travel around the axis of the platen-beam, and are moving horizontally together with the platen toward the form. Fig. 6^x shows them at the end of the latter movement with the platen home on the form. Each of the race-plates 13 is recessed at one corner at the top, as represented at 13^x, Figs. 6, 7, 6^x, 7^y, and 7^z, to allow those wheels *x* of each gripper-carriage which are at this point its lower wheels to drop back so as to permit the sheet of paper to lie home upon the platen. Said wheels *x* are accordingly made narrower than the other wheels, so as to drop into said recesses 13^x. When the grippers carry a sheet of paper over the face of the platen, it is some distance from contact; hence the necessity for so bringing the paper into contact when each gripper-carriage has completed its rotary movement preparatory to contact with the form. The boss of the aforesaid star-casting 5 is provided with ratchet-teeth 14, a ratchet-tooth being provided to each arm, and a recess, 15, is formed in the root of each ratchet-tooth, to provide an efficient lock or grip for the pawl 18, to prevent the star-casting disengaging itself by its momentum from the point of the said pawl. The said pawl 18 (see Figs. 24 and 25, Sheet 11) is pivoted on a pin, 44^a, on the collar or ring 16, running loose on the ends of the platen-beam, the other end, 17, of the said pawl being connected by the rod 20 and the rocking beam 21 (see Fig. 2, Sheet 2) to the cam 22, by which a reciprocating movement is given to the said pawl. The loose collar 16, detail Figs. 6 and 7, Sheet 3, and Figs. 23 and 24, Sheet 11, is provided with a stop, 23, so placed that it allows, as indicated in dotted lines, Fig. 25, a slight play of the said lever-pawl 17 18 around its pivot with each pull or thrust of the connecting-rod 20—that is, before the thrust of the rod is communicated to the ratchet-teeth 14 the said pawl turns on

its pivots, so as to bed into the recess 15, formed in the root of each tooth, and, again, on the return-stroke the first pull of the connecting-rod serves to lift the engaging point of the pawl by turning the said pawl on its pivot against the stop 23, holding the point clear of the ratchet during the return-stroke. During the engagement or disengagement of the pawl 18 with the ratchet 15 the loose collar 16 is held by a brake, (shown in Figs. 24 and 25, Sheet 11,) and which consists of a brake-block, 75, spring-pressed against the turned portion of the collar. The engagement of this lever-pawl 18 into the ratchet 14 serves to communicate the reciprocating movement of the connecting-rod 20 to the star-casting 5 in the form of an intermittent rotary motion, the said star-casting remaining stationary, while the pawl is drawn back for the next forward feed-stroke, the momentum being stopped by the action of a brake hereinafter more fully specified. In addition to the said intermittent rotary movement of the gripper-carriages 9, thus produced by the pawl 18, the whole of the race-plates and gripper-carriages partake of the said reciprocating movement of the platen-beam which is derived through the cranks 63 and cam 64 and connections from the first motion shaft. (See Fig. 1, Sheet 1.) This movement is utilized to advance the gripper-jaws toward the paper as it lies upon the feed-board, hereinafter more fully described.

In order that the paper may be placed in perfect register before it is seized by the automatic feed-grippers 10^a, for example, I use automatic adjusting side and end lays upon the feed-board, which are shown in detail in Figs. 8 and 9, Sheet 6, and Fig. 9^x, Sheet 7, and which operate as follows: The table or feed-board 26 is hinged in a slanting position, being fixed at the best angle of inclination by the springs and nuts 45, and at some little distance below it is a pair of reciprocating transverse bars, 51. Each bar 51 has fixed to it one of the side lays, 48^a, and receives the reciprocating transverse movement by the operation of one of the face-cams 59, (see Figs. 1, 2, 8, 9, and 9^x,) on the ends of the shaft 60. The said face-cams 59 are operated by the connecting-rod 60^a, the latter receiving its movement from the cam 50. The transverse movement of the said shafts 51 is against the reaction of the spiral spring 52, which thus causes the return travel of the side lays. The paper so adjusted by the side lays will rest also with its front edge against the front lays, 44, which for this purpose are brought into position above the surface of the feed-board by mounting upon the frame the fixed inclines 61, the movement being derived from the same rocking shaft 60 that operates the face-cam 59, by means of the connecting-rod 64^a and lever 65. The combined action of the slanting feed-board 26 and the lays 48^a and 44 thus places the sheet of paper on the feed-board in perfect register for being seized by the feed-grippers. When the paper has been thus fed by the attendant upon

the feed-board 26 and accurately adjusted by the side and front lays, 48^a and 44, as hereinbefore described, the gripper-jaws seize successively upon the sheets of paper to be printed by the following series of movements:

In Fig. 2, Sheet 2, the platen is shown at its extreme backward position away from and about to go on to the form. During this travel the feed-pawl 18 is engaged into the ratchet-wheel at 15, and the star gripper-casting 5 with the gripper-carriages thereon is revolved about the axis of the platen-beam. The lowest left-hand feed-gripper, 10^a, has seized the paper, and by the revolution of the star-casting carries it through a quarter-revolution, ready to be brought onto the platen by the next quarter-revolution.

Referring now to Figs. 2, 3, 4, 5, 6, 6^x, 8, 9, and 9^x, Sheets 2, 3, and 5, I show the manner in which the tail-lever 12 of the gripper-carriage passes underneath the tappet *g*, the arrows in Figs. 3, 4, and 5, Sheet 2, showing the direction of movement, the point of view being reversed in said Figs. 3, 4, and 5, Sheet 2, as compared with Fig. 2. This may be also seen in its real position in Figs. 6, 6^x, and 8, Sheets 3, 4, and 6. By this same movement the left-hand top gripper carriage, 10, comes down in its rotary travel to the left-hand bottom corner, ready for seizing the next sheet of paper on the next horizontal return-stroke. By the same movement each gripper-carriage in turn, as shown at 10^b, lifts the sheet of paper which has been already printed from the face of the platen *C*, and it is now carried on and suspended over the delivery-board *m*. On the return-stroke the tail-lever of the gripper strikes the fixed tappet *h* and allows the paper to be delivered onto the delivery-board *m* at the top of the machine. By the same movement each gripper-carriage in turn, as shown at 10^c, holding a sheet of paper, passes over the face of the platen, holding the paper there in correct position to be printed at the conclusion of the movement of the platen onto the type. During the return travel of the platen from the type to arrive once more into position, (shown at Fig. 2,) the star-casting 5 is held securely by the friction-brake, described later in relation to the detail Figs. 16 and 17, and the gripper-carriages remain at rest on the race-plates 13. Then the tail-lever 12 of the gripper-jaw 10^a mounts during this movement upon the double-inclined tappet *g*, fixed to the framing, as shown in Fig. 5. The tail-lever 12, mounted upon this tappet, causes the gripper-jaw 10^a to be opened, so as to receive the lower edge of the paper resting against the lower lays, 44, which immediately fall by the relative action of the cam 50 and inclines 61. The paper is thus received within the gripper-jaw 10^a, which is now closed by reason of the tail-lever 12 having dropped over the inclined tappet *g*. The end lays, 44, having dropped by reason of their said movement on the inclines 61, the paper is left without obstruction, and firmly

held in the mouth of the gripper-jaws, of which there are several in the width of the sheet, (see Figs. 7^x 7^z, Sheet 5,) and the action is thus constantly repeated as the successive carriages arrive at the required position, the paper being carried by the succession of intermittent movements.

The brake I employ (shown in detail in Figs. 16 and 17, Sheet 9) is as follows: Pivoted at 65 on the sliding block 2, which carries the platen-beam, is the brake-lever 64^b. This is provided with a hinged arm, 66, resting on a fixed roller, 67, in the frame of the machine *A*. The lever 64^b is held in slight contact with the brake-drum on the star-casting 5 by the compression of the spring 68. On the travel of the block 2 in the direction of the arrow the incline of the arm 66 is drawn over the fixed roller 67, and the spring is still further compressed, and the brake thereby caused to grip at the requisite moment to check the momentum without shock. Before the impression is given to the paper, frisket-fingers *F*, (shown in detail, Figs. 18 and 19, Sheet 10,) which are mounted on the sliding block 58^a (working on friction rollers or grooves in the frame sides) are withdrawn by the cam 58^b so as to allow the paper and grippers to pass, and so soon as the paper lies at rest upon the platen and the cam has ceased to have any effect during the portion of its travel where it is cut away the frisket-fingers are brought back into contact with the paper by the spring 58 until arrested by a stop on the frame side, when the paper is freed to be removed from the platen by the grippers from which it is suspended.

Owing to the automatic feed of my grippers being always to a dead-line upon the platen, it is necessary, whatever the size of the form, that it shall be always set with one edge to that feed-line, and thus probably in many cases to quite the top of the type-back. This irregularity of position of the type out of the center of pressure will tend to cause an unequal pressure upon the surface of the platen, and so tend to throw it from its true vertical printing position. In order to obviate this tendency I place upon the race-plates projecting bearers 35. (Shown in detached detail at Figs. 10 and 11, Sheet 8.) These are placed at the four corners of the platen, so that when the said platen is forcing the paper against the type the said projecting bearers 35 will simultaneously with such action slide into recesses 35^a and come into contact with the type-bed supporting the form, and thereby uniformly support the platen and counteract the tendency there otherwise would be of unevenness of pressure or battering of the type at the time the impression is being given.

To enable the setting of any required margin, (see detail, Figs. 20, 21, and 22, Sheet 10,) I suspend the chase 69 from a hook, 70, fixed to a screw-threaded rod, 71, passing through a projection from the type-back. This screwed rod (and therefore the chase) can be raised by

means of an internally-threaded collar, 72, against the compression of a spring, 73, on a hooked rod, 74. The reaction of the spring and the screw will permit of adjustment of the chase to any height or width of margin.

To allow the surface of the platen to be placed in a convenient position to enable the printer to "make ready"—

First. Where hard packing or paper tympan is used for producing fine work, I make the ends of the platen-beam fit into circular holes in the blocks 2, supporting the said platen. I fit to one of the ends 28 of the platen-beam a lever or handle, 29, Fig. 2, Sheet 2, and detail Fig. 23, Sheet 11, which abuts when the platen is in a vertical position for printing against a shoulder, 30, of the said block. When it is in this position, it is locked by one arm, 31, of a lever supported on a fulcrum-pin, 32, fixed to the platen sliding block 2. The opposite arm of the lever forms a handle, 33, by which this locking-arm can be put in and out of locking position. When the lock is removed, the platen-handle 29 is pulled back through a quarter of a turn, when it comes into contact with another stop, 34, of the block, this quarter-turn removing the platen from a vertical to a horizontal position, in which it is most conveniently placed for making ready.

Second. Where ordinary commercial work is to be treated and tilting of the platen is not necessary, I employ a tympan (see Fig. 15, Sheet 9) of a convenient textile or fibrous material, T, stretched over the platen, and kept so stretched by the reaction of a spiral spring, S. In order then to make ready, the effective portion of said tympan may be drawn onto the delivery-board *m* and there made ready, its upper end, *t*, by which it is pulled, being hooked into position at *n*. When made ready, the tympan is released, the spiral spring S once more drawing the tympan back tight over the face of the platen.

Having now particularly described and ascertained the nature of my invention and in what manner the same is to be performed, I declare that what I claim is—

1. An improved platen printing-machine having a reciprocating platen, a series of grippers arranged to act in succession, and constructed with jaws which close and open to grip and release the paper, a feeding-board on which separate sheets of paper are automatically registered, a receiving-board on which the printed sheets are deposited, and mechanism, substantially as described, which rotates said grippers intermittently, but in a continuous direction around said platen, and actuates their jaws at said feeding-board, and then at said receiving-board, whereby each gripper is caused to take hold of a registered sheet of paper on said feeding-board, and to carry the same over the platen-surface for impression, and thence without release to said receiving-board, where it deposits the same, substantially as hereinbefore described.

2. An automatically-feeding platen-machine comprising a star-casting, 5, free to rotate on the axis 1 of the platen-beam 2, and carrying on its arms grippers, which are intermittently rotated around the said axis by a pawl, 18, operated by a rod and lever, 20 21, and cam 22, to take the sheets from the feed-board, whereon they are automatically adjusted in position for such seizure, and thence to the platen, which is maintained parallel to the type during the impression by bearers, and thence to deliver them direct to the receiving-board, substantially as described:

3. In such a platen-machine provided with automatic feed-grippers, a feed-board with side lays, 48^a, reciprocated transversely by face-cams 59, receiving movement from levers 60 60^a and cam 50, and with end lays, 44, moved by the same levers, 60 60^a, and cam 50, in combination with a fixed incline, 61, and connecting-gear to accurately adjust the paper upon the said feed-board ready to be seized by the feed-grippers, substantially as described.

4. In such a platen-machine provided with automatic feed-grippers, a platen which is normally locked upon its axis, but is free to move through a quarter-turn when unlocked, and provided with a turning handle, 29, in combination with a relatively-fixed abutment, 30, a locking-lever, 31, having a handle, 33, and the pivot 32 of said locking-lever, to enable the platen to be unlocked and brought up horizontally by hand for making ready, substantially as described.

5. In such a platen-machine provided with automatic feed-grippers, the combination, with the platen, of bearers 35, fitting in recesses 35^a in the type-back, to give equality of pressure for the impression under all circumstances, substantially as described.

6. In such a platen-machine provided with automatic feed-grippers, the combination of the chase with screwed hook-rod and collar, and reacting-spring and hook-rod to permit of adjustment of margin, substantially as specified.

7. In such a platen-machine provided with automatic feed-grippers, the combination of a stud, 77, incline 78, and dead-level 79 at each end of each gripper-carriage to guide the travel of the grippers to an exact position and compensate any irregularity, substantially as specified.

8. In such a platen-machine provided with automatic feeding-grippers, the combination, with the moving gripper-carriages, of a friction-brake to control and stop the momentum at the requisite moment without shock or jar, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED GODFREY.

Witnesses:

JOHN C. FELL,
SAM. P. WILDING.