

No. 614,541.

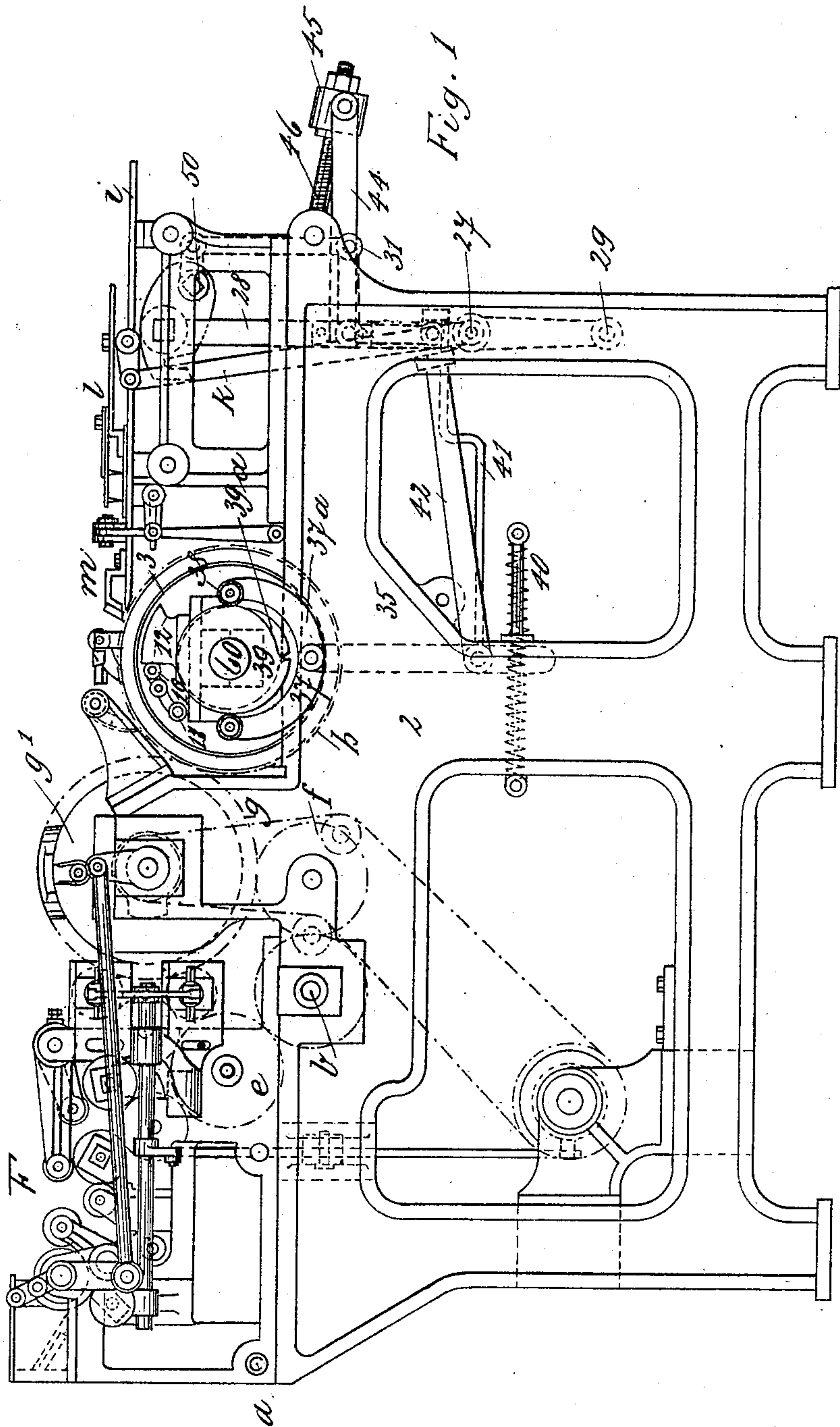
Patented Nov. 22, 1898.

E. FISCHER.
PRINTING MACHINE.

(Application filed Feb. 2, 1897.)

(No Model.)

5 Sheets—Sheet 1.



Witnesses
O. Beumer
E. Hinkhager

Inventor
Ernst Fischer
by Adamas
atty

No. 614,541.

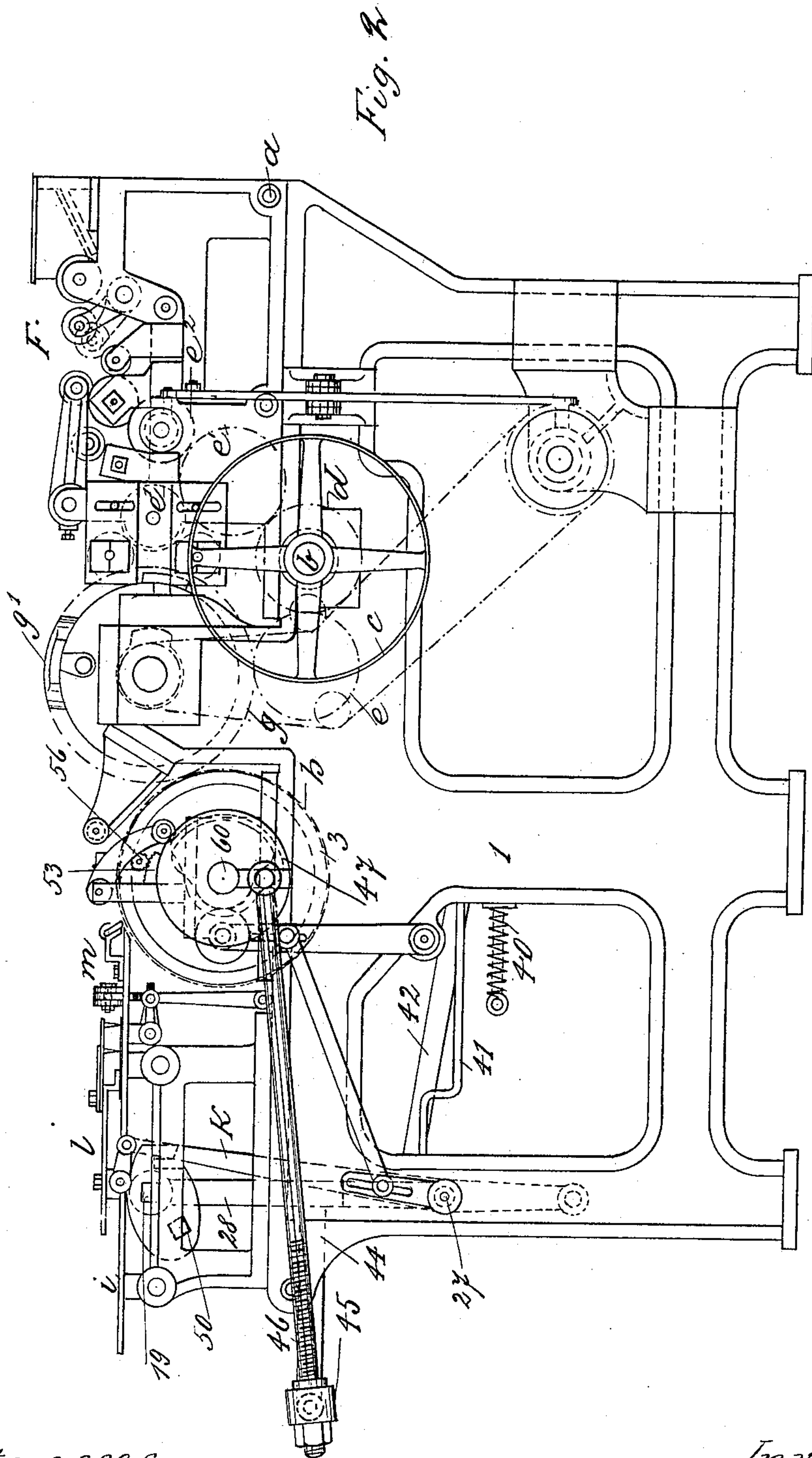
Patented Nov. 22, 1898.

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PRINTING MACHINE.

(Application filed Feb. 2, 1897.)

(No Model.)

5 Sheets—Sheet 2.



Witnesses
O. Beymer
Lang Munkhagan

Inventor
Ernst Fischer
by H. Lammes
Atty

No. 614,541.

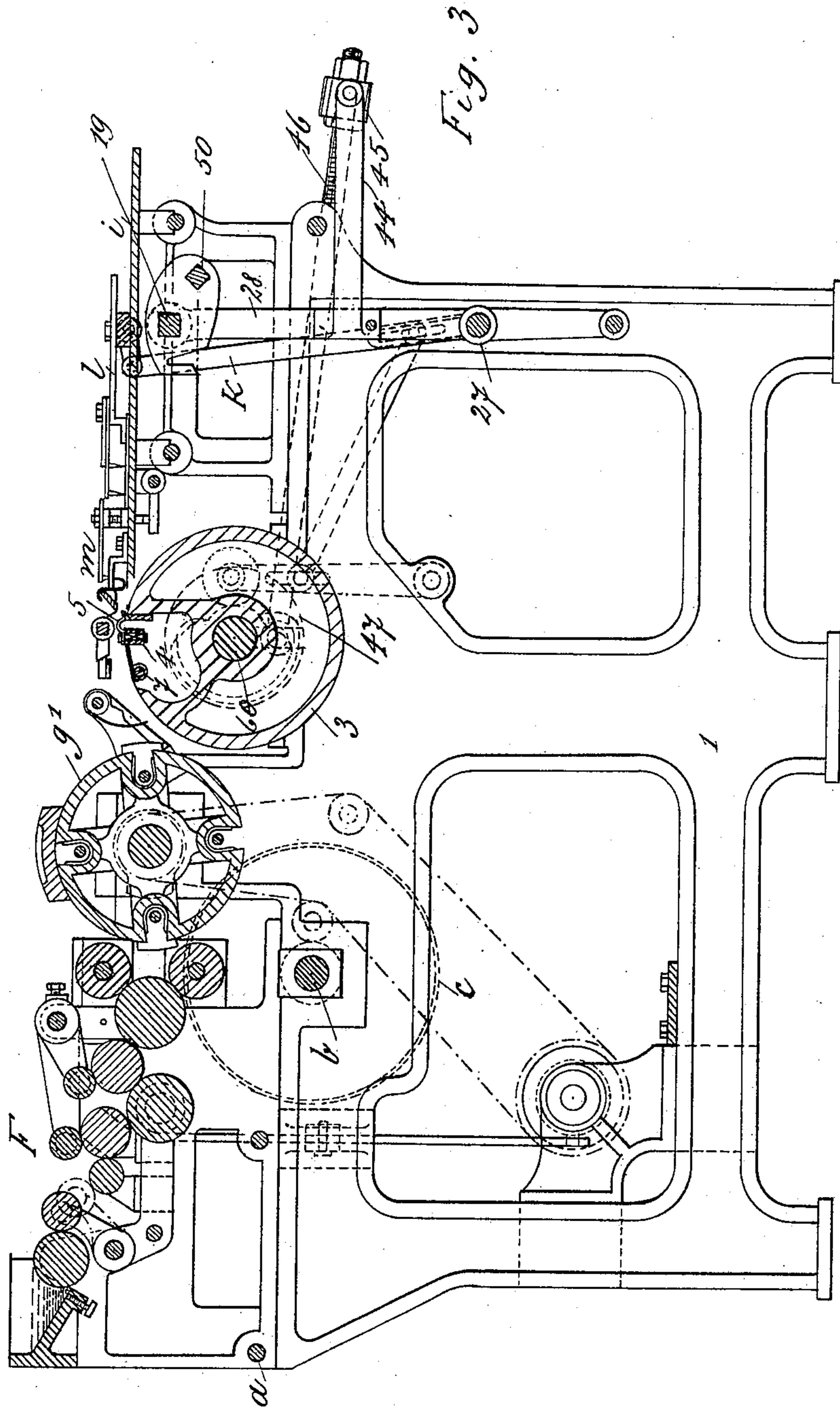
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(Application filed Feb. 2, 1897.)

(No Model.)

5 Sheets—Sheet 3.



Witnesses
C. Benner
E. Winterhager

Inventor
Ernst Fischer
by Adammus
King

No. 614,541.

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(Application filed Feb. 2, 1897.)

(No Model.)

5 Sheets—Sheet 4.

Fig. 4.

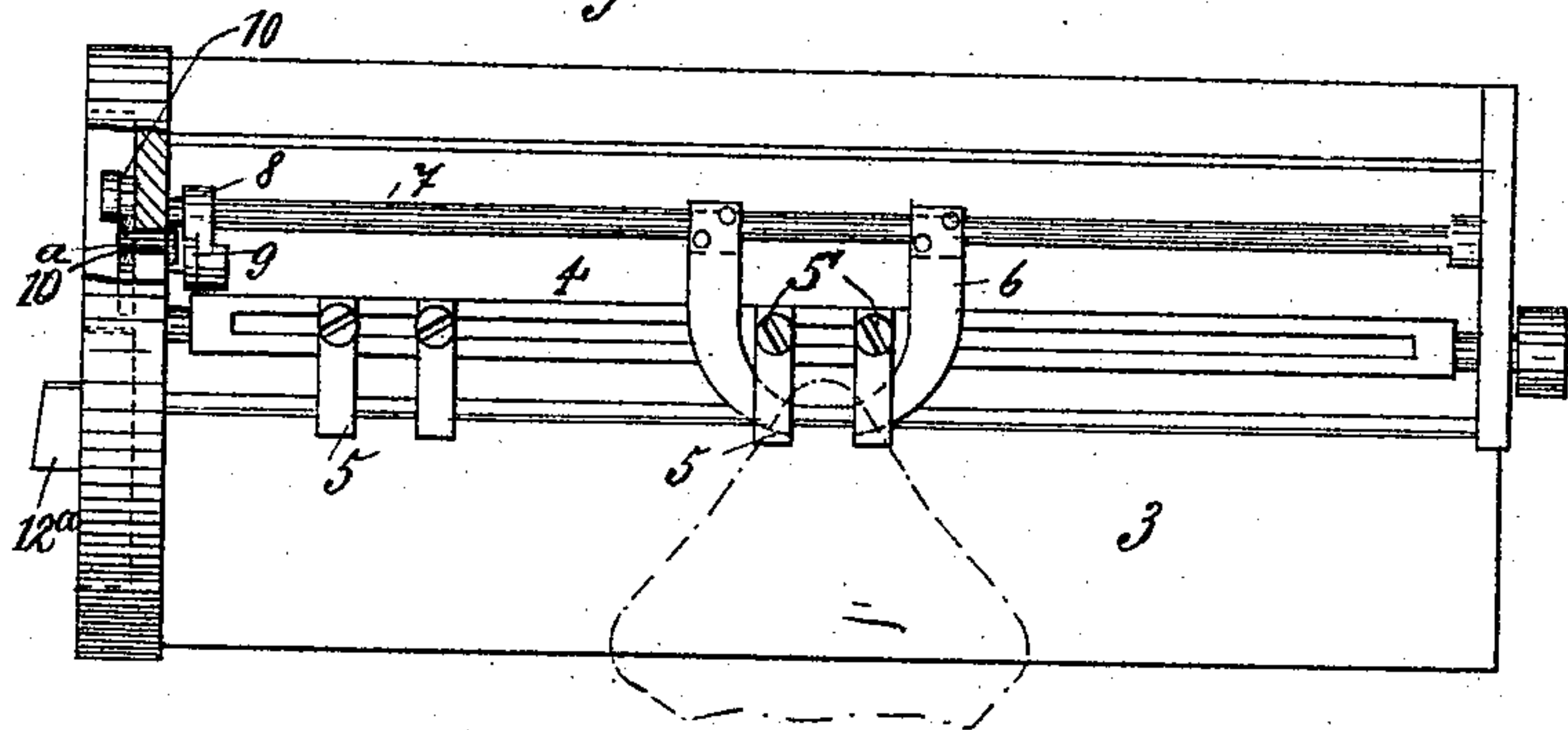


Fig. 5.

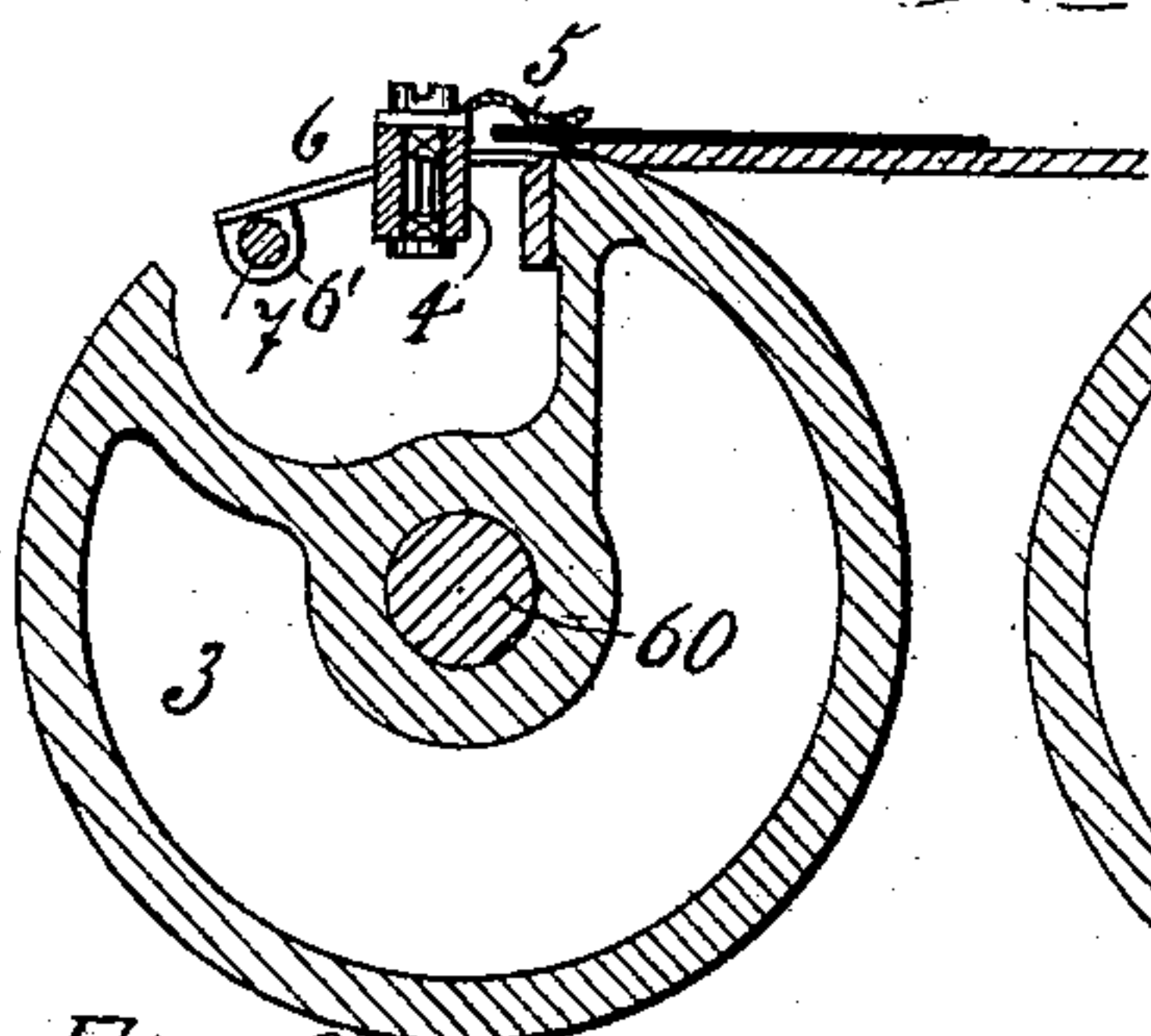
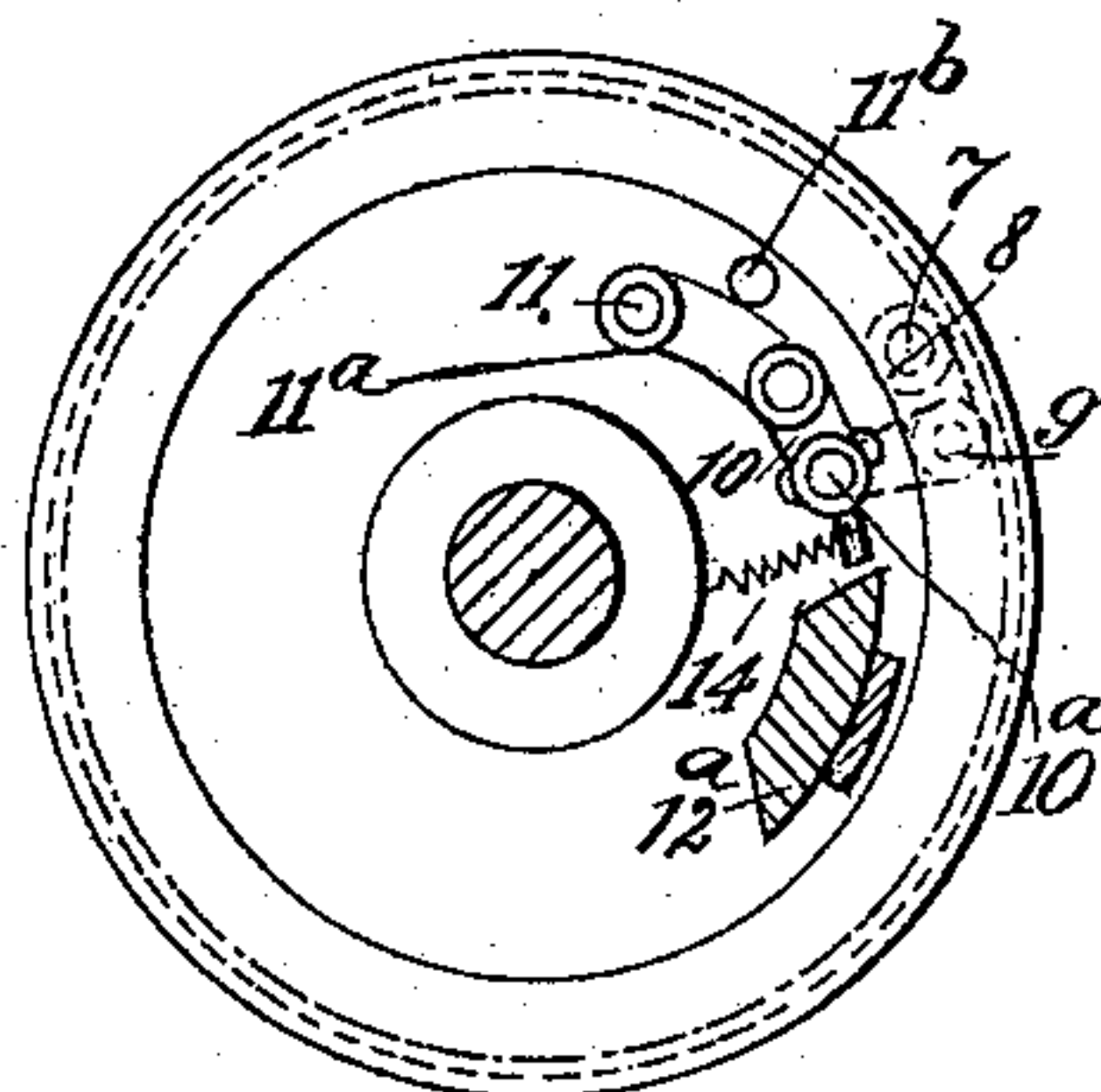


Fig. 6.

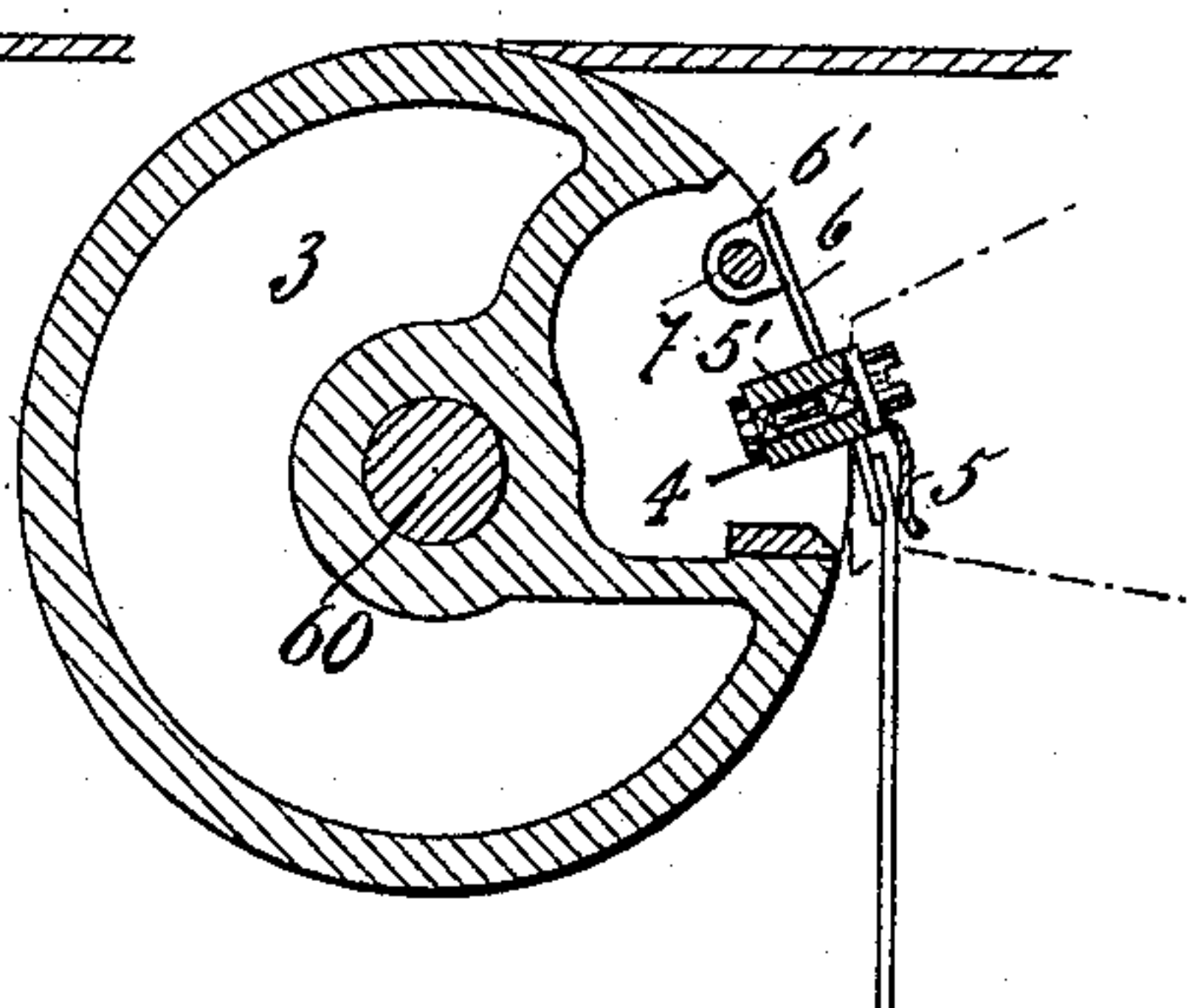


Fig. 7.

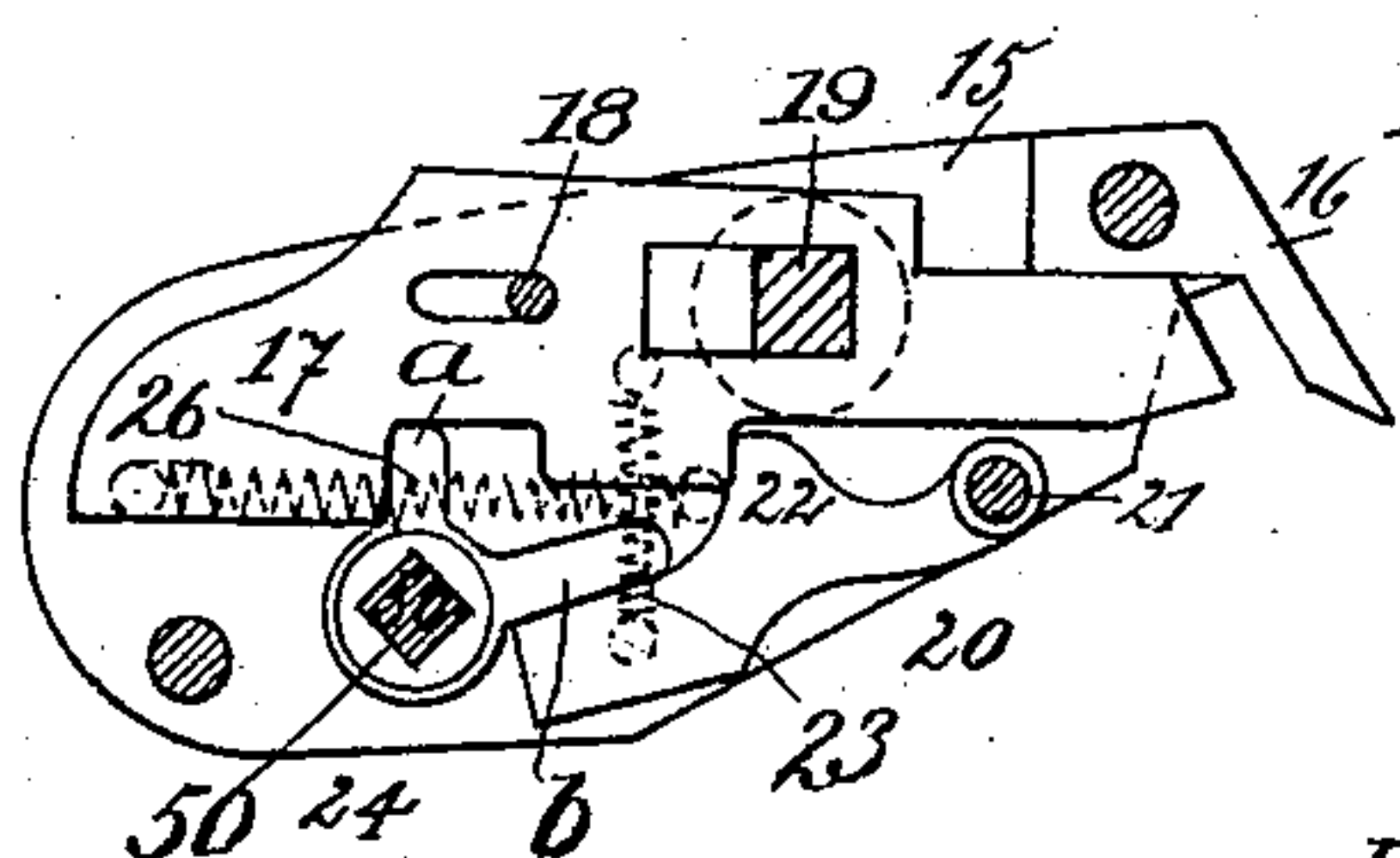


Fig. 13.

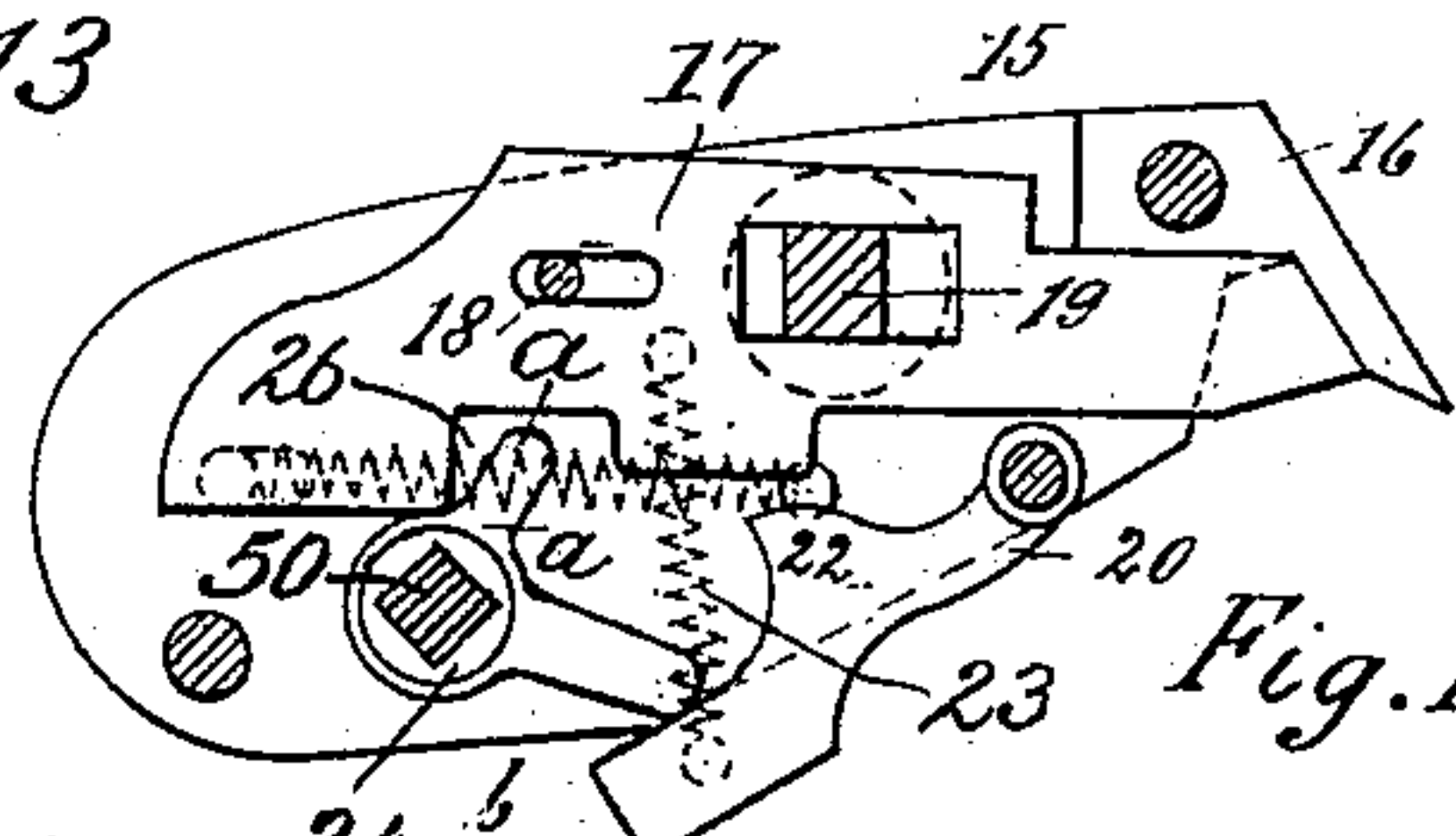


Fig. 14.

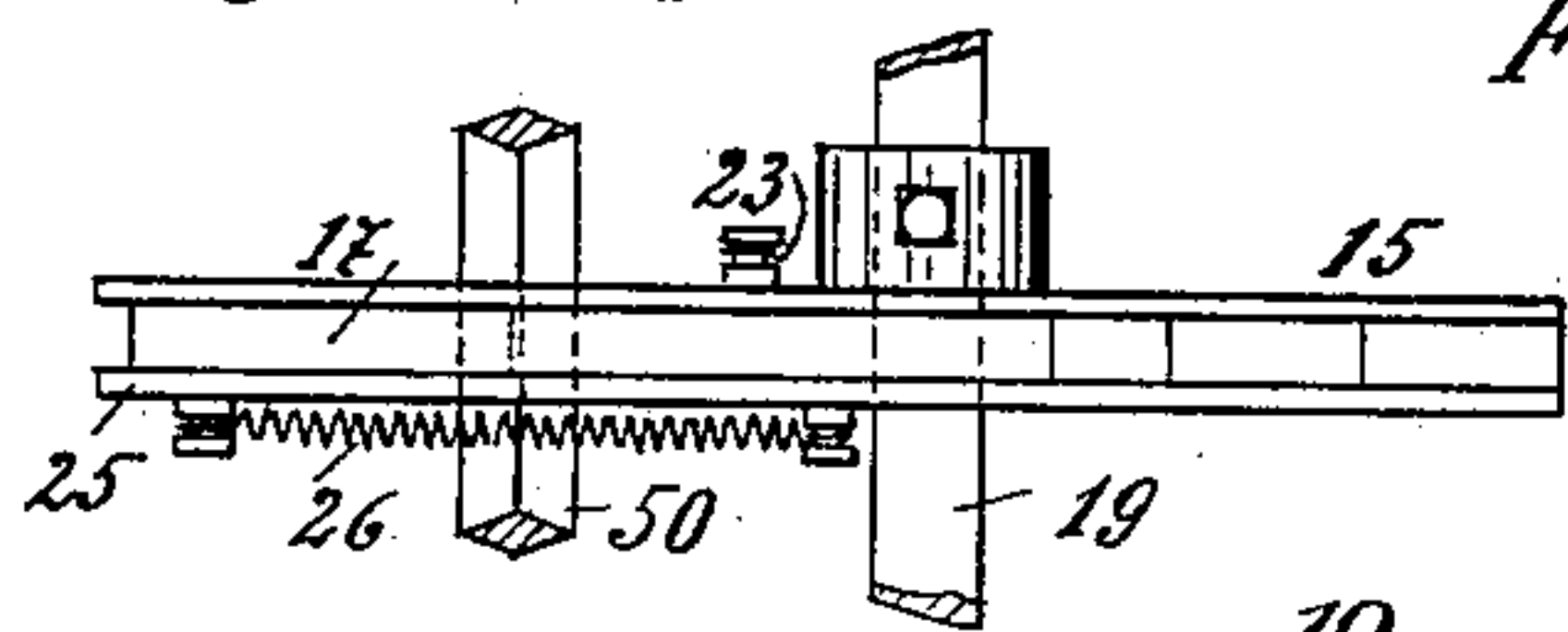


Fig. 15.

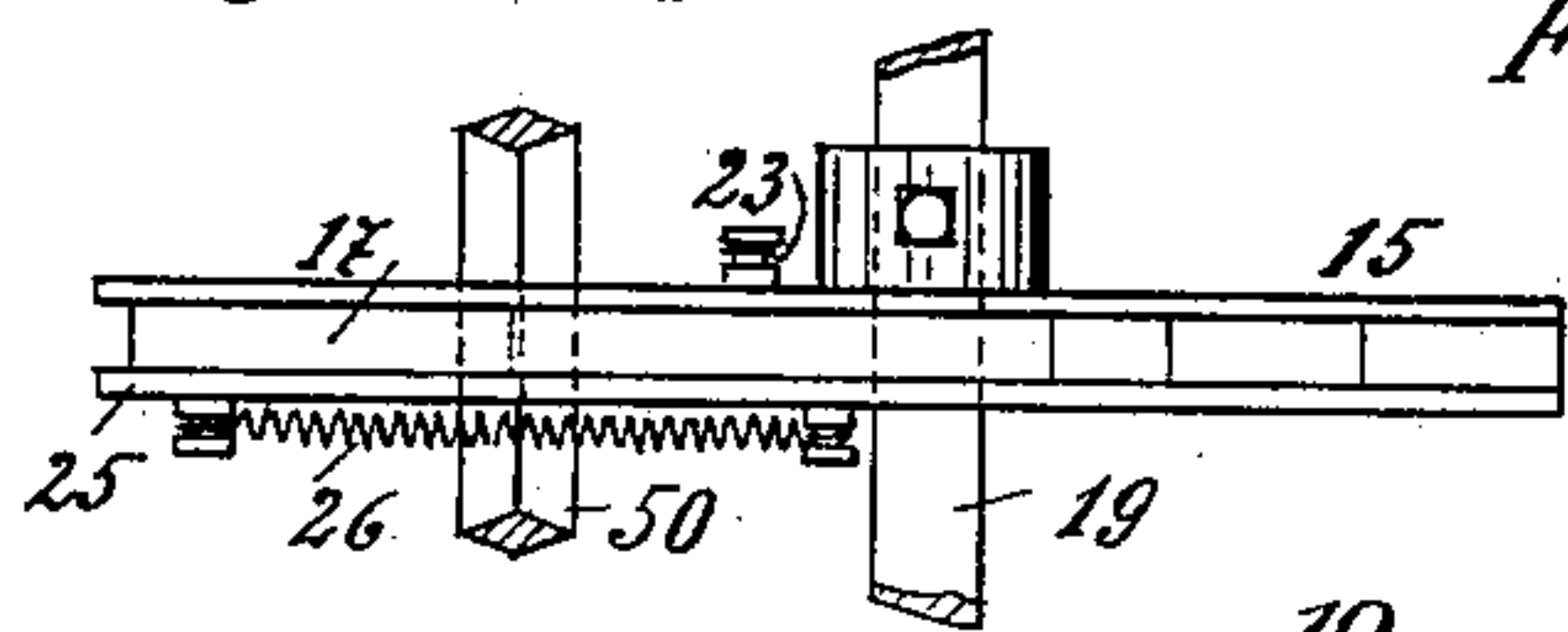
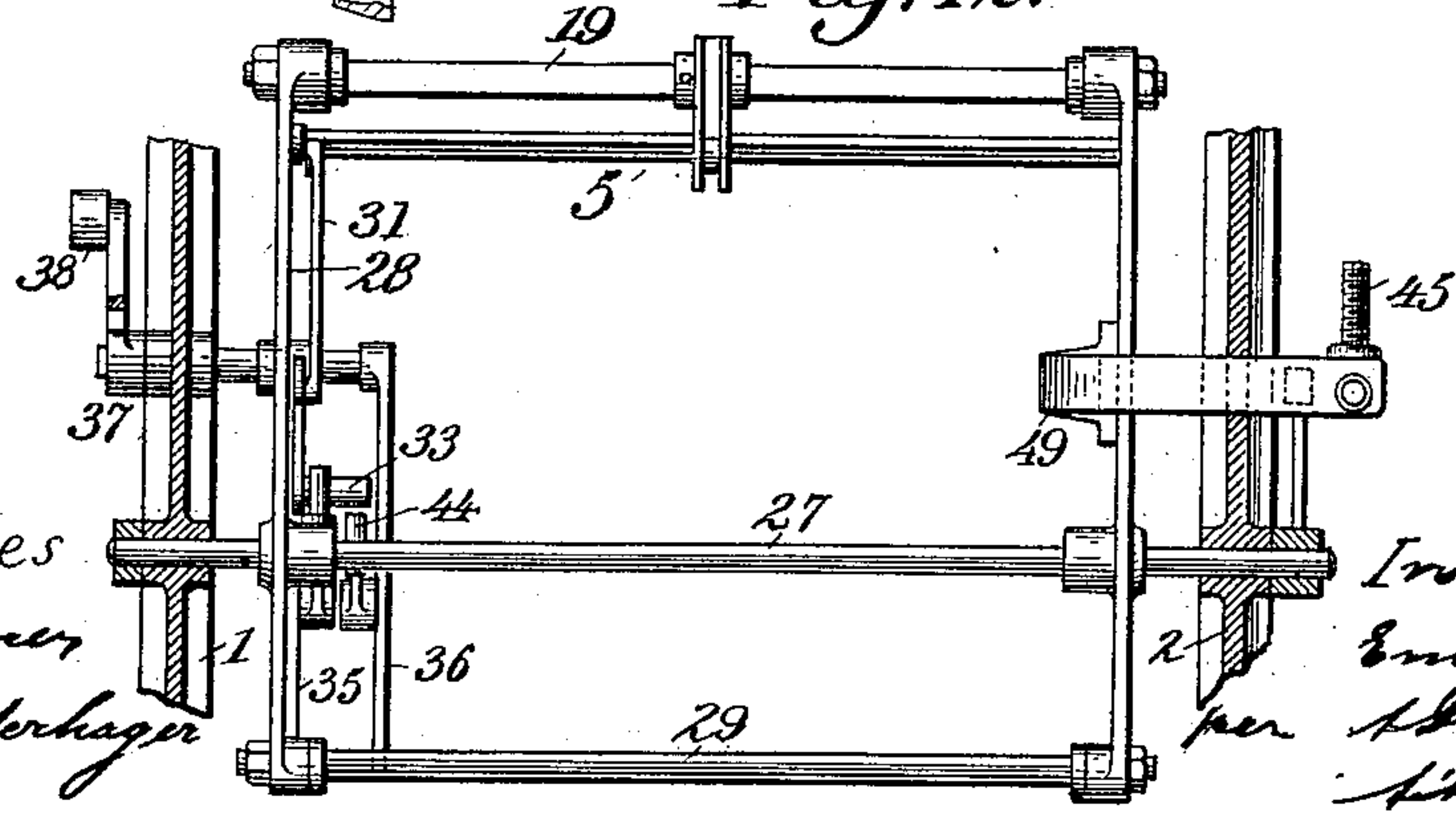


Fig. 12.



Witnesses
Otto Bomer
Eugen Winterhager

Inventor
Ernst Fischer
per Adm. Fischer
Attorney

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(No Model.)

(Application filed Feb. 2, 1897.)

5 Sheets—Sheet 5.

Fig. 11

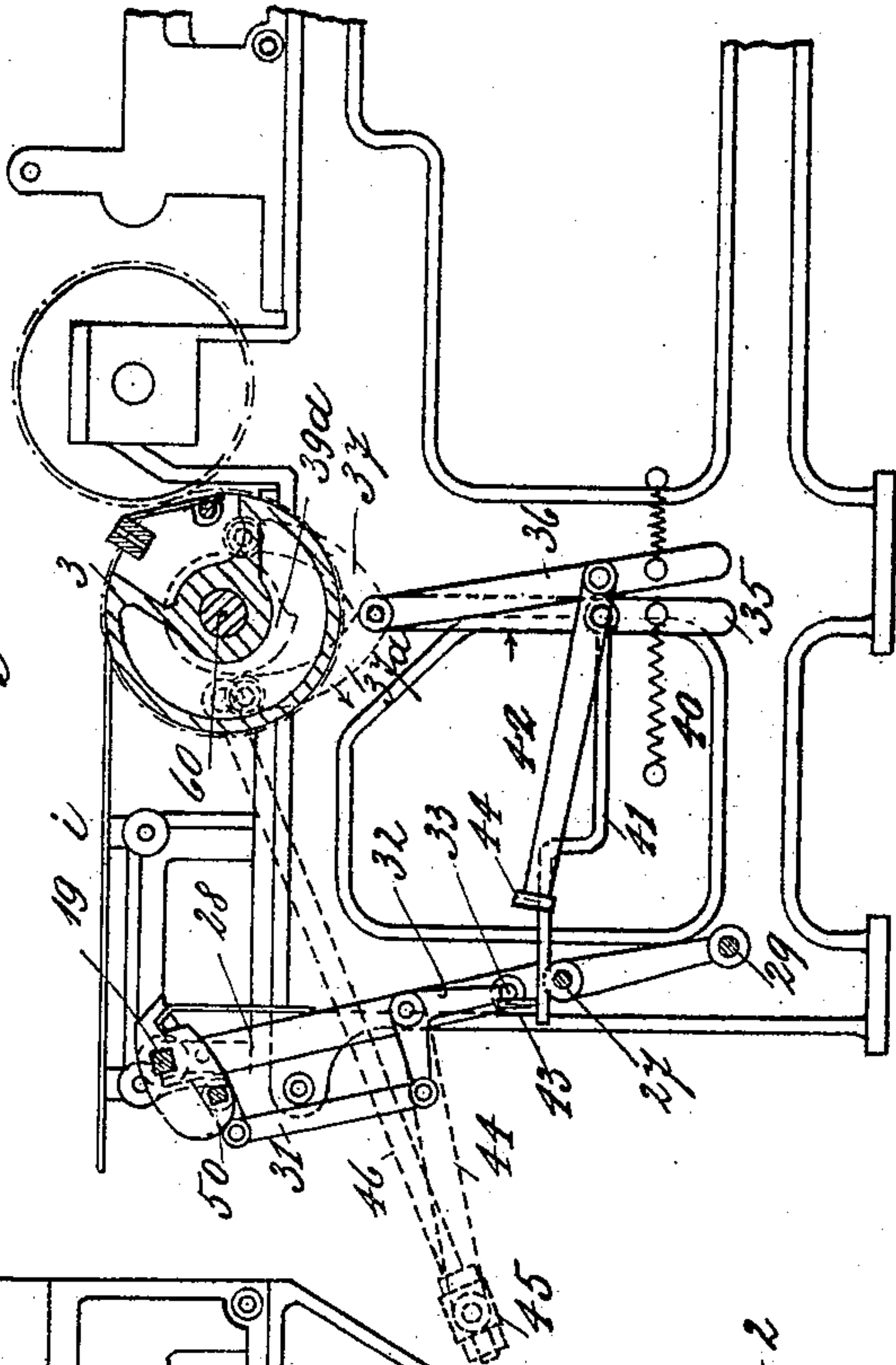
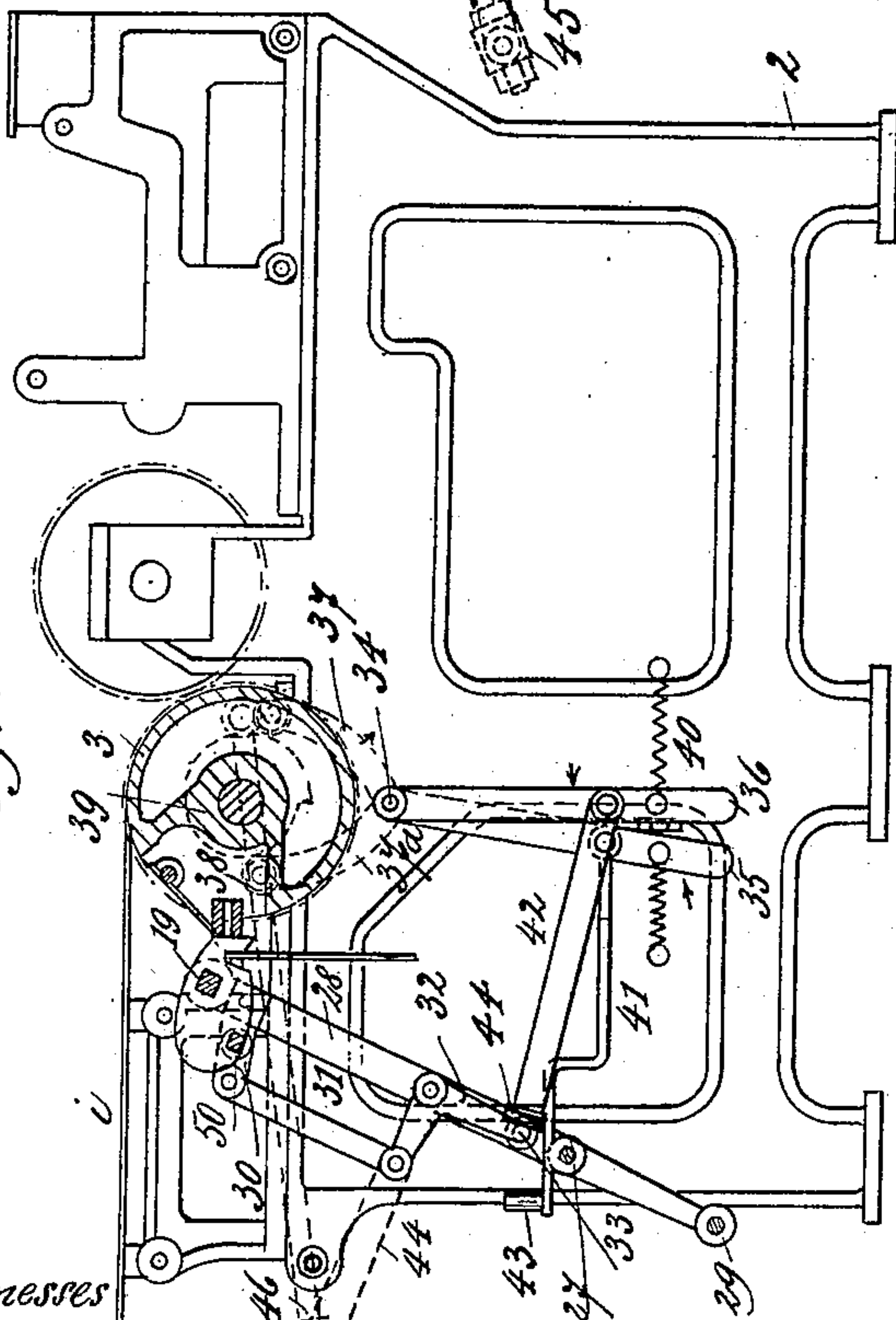


Fig. 10



Witnesses
O. Benner
& Hinderkager

Fig. 9

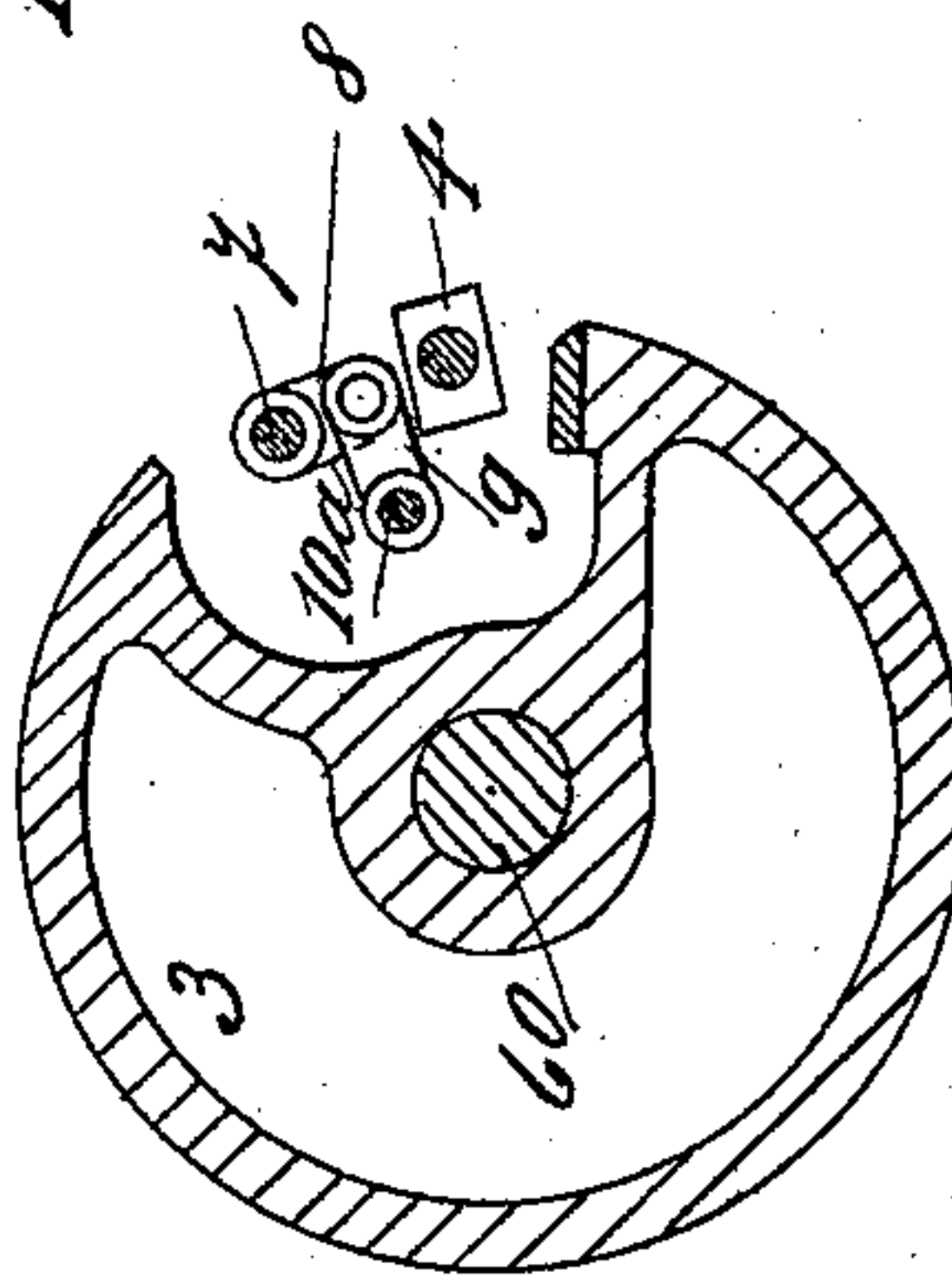
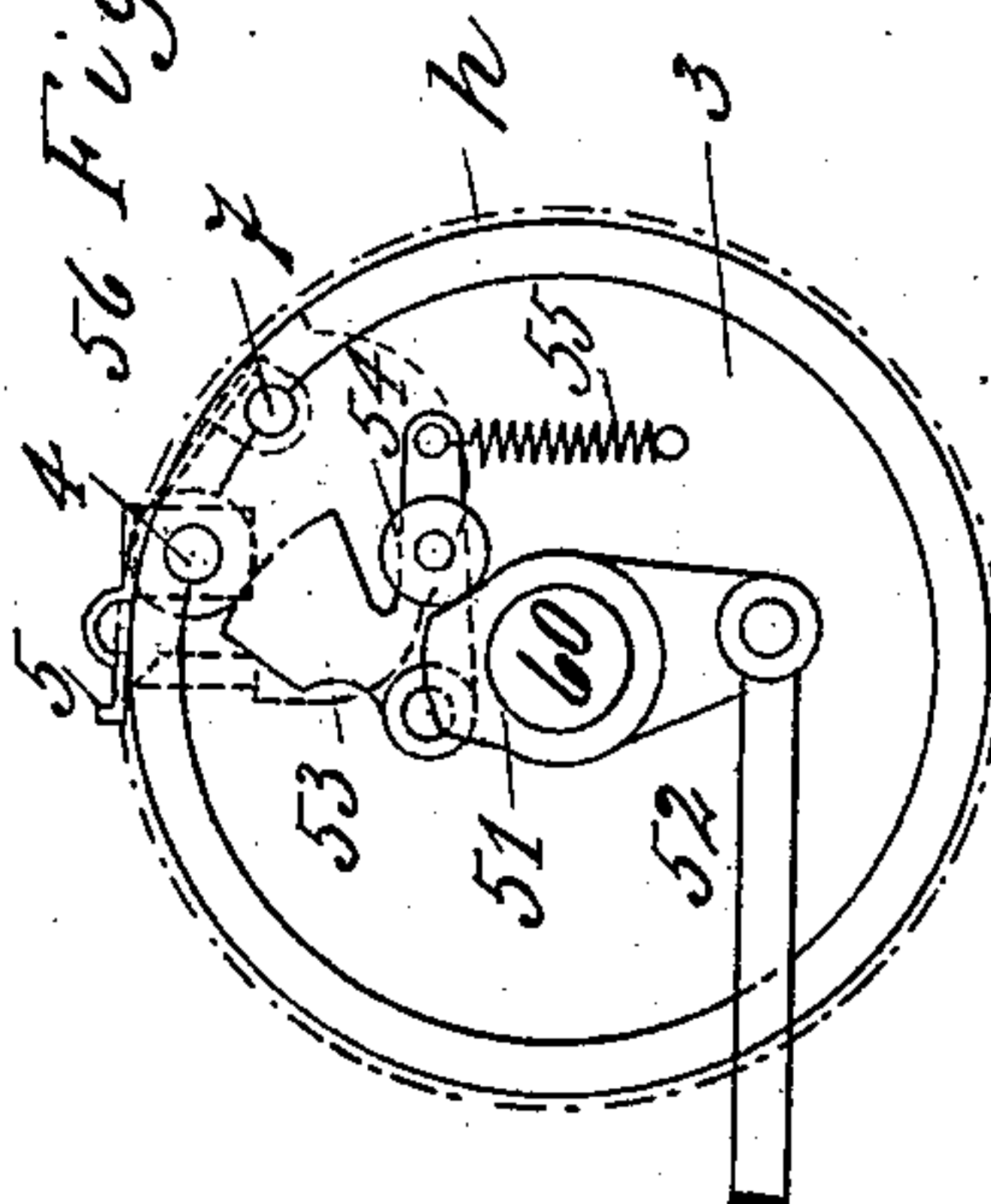


Fig. 8



Inventor
Ernst Fischer

By *Adams*

UNITED STATES PATENT OFFICE.

ERNST FISCHER, OF BARMEN, GERMANY.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 614,541, dated November 22, 1898.

Application filed February 2, 1897. Serial No. 621,716. (No model.)

To all whom it may concern:

Be it known that I, ERNST FISCHER, a subject of the Emperor of Germany, residing at Barmen, Rhenish Prussia, Germany, have invented a new and useful Improvement in Printing-Machines, (for which I have obtained a patent in Great Britain, No. 29,398, bearing date December 19, 1896,) of which the following is a specification.

This invention relates to the class of printing-presses represented by the invention for which Letters Patent of the United States No. 594,408, November 30, 1897, were granted to J. Liebhardt and E. Fischer, and the gist of which consists in mechanism operating to feed the sheet to the rotating impression-cylinder and carrying it out of the machine after it has been printed.

My present object is to provide in the nature of an improvement in the aforesaid patent another species of mechanism for removing the sheet from the printing-cylinder after the printing operation and deliver it to the workman, creasing-machine, or the like, and this improvement shall afford, so far as I am aware, the best means for the named purpose. I therefore desire to claim this new species in detailed combinations at the end of this specification.

In the accompanying drawings, Figure 1 is a side elevation of the complete printing-machine seen from the left side. Fig. 2 is a similar view seen from the right side. Fig. 3 is a vertical section through the entire machine. Figs. 4 to 9 show in an enlarged scale the impression-cylinder with improved fittings to grip the sheet. Figs. 10 and 11 illustrate the working of the cooperating removing and gripper mechanism. Fig. 12 is a side elevation of Fig. 11. Figs. 13, 14, and 15 show the removing and delivery mechanism, respectively.

In said figures the several parts are respectively indicated by reference numbers and letters as follows:

The reference-numerals 1 and 2 denote the main frames of the machine, made of cast-iron, which are held together by stiffening-bolts *a*. In said frames is suitably journaled the main shaft *b*, to which is fixed the driving-pulley *c*, imparting rotation to shaft *b*. To shaft *b* is keyed a toothed wheel *d*, mesh-

ing with a wheel *e*, which, by means of intermediate gear *e' e''*, drives the inking or coloring arrangement *F*, which being not novel needs no particular description. With wheel *d* meshes a wheel *f*, which gears into a wheel *g*, forming part of a cylinder *g'*, which being journaled in the frame 1 2 is arranged to impart ink or color to the printing-cylinder 3, with which it is connected by a toothed wheel *h*. The impression-cylinder receives a sheet which is fed to it in being shifted forward on a table *i* by means of a mechanism *k l m*, which, however, as it has nothing to do with my invention, is no further described.

In the cylinder 3 is located the gripper rock-shaft 4, Figs. 4, 6, and 7, consisting of a vertically-slotted bar the ends of which are made round and located in corresponding mortises of the side walls of the cylinder 3. To this bar are fixed, by means of screws 5', the grippers 5, the screw-bolts engaging the slot of the shaft 4, so that the grippers 5 may be adjusted thereon, or any number of them may be inserted on the shaft.

The grippers 5 are made in form of a blade-spring. They catch the sheet between themselves and a set of auxiliary grippers 6, which, being also of spring-like action, support the sheet from below, as will be best seen from Fig. 7.

In the machine illustrated in the drawings the feeding mechanism is shown as feeding envelop-blanks. This is always done in such a manner that the flap of the envelop is seized left and right from the point. The grippers 6 are fixed to sleeves 6', which are adjustably fastened on a rock-shaft 7, journaled in the walls of the cylinder 3 behind the slotted bar 4. The bar 4 and shaft 7 are coöperated in such a way that both sets of grippers 5 6 are actuating like the jaws of a tong—that is, they are opened and closed in order to catch a sheet and hold it fast during the printing operation, which is done during three-fourths of a revolution of the cylinder 3, and release it then after it has been somewhat lifted from the cylinder 3, so that the mouth of a mechanism which I shall describe hereinafter may pass between the cylinder and sheet and grip the latter. In order to attain this effect, the grippers or their shafts, respectively, are moved

as follows: On the shaft 60 of the impression-cylinder 3, Fig. 8, is loosely stuck a cam-disk 51, which is not rotated with said shaft, but held in a certain position by means of a bar 52. To the cylinder 3 is fulcrumed a toothed segment 53, which is fitted with a roller 54. A coil-spring 55 causes the roller to closely engage the cam, so that at each revolution of the cylinder the roller 54 passing the cam causes a turning of the segment 53. The upper edge of this lever is toothed, so that it is capable to mesh with a pinion 56, keyed to the slotted gripper-bar 4, which thus, as it will be easily understood, is likewise moved, and the grippers 5 are correspondingly turned or opened and closed, respectively.

The manner in which both sets of grippers 5 6 are elevated from the cylinder 3, as shown in Fig. 7, is as follows: To the rock-shaft 7 is keyed an arm 8, Figs. 4, 5, and 9, to which is pivoted a link 9. To the outside of the cylinder 3 is pivotally secured an arm 10, the free end of which is connected to the free end of the link 9 by a bolt 10^a, passing through a slot 10^b in the side wall of the cylinder 3. The arm 10 carries a curved arm 11, being fixedly secured to arm 10 and fitted with an antifriction-roller 11^a. In the ordinary position of the auxiliary grippers 6, in which they are not raised together with the gripper 5, the arm 11 lies against a pin 11^b, Fig. 5, so that the grippers 6 may serve as support and receive a pressure from the grippers 5, in order to hold the sheet between them, which action is supported by a coil-spring 14.

Fixedly secured to the frame 1 or the bracket of the shaft 60, respectively, is an angle-piece 12, having a projection 12^a, which is engaged at each revolution of the cylinder 3 by the roller 11^a, so that the arm 10, being turned around its pivot, causes, by means of the link 9, the lever 8 to go upward and consequently also the grippers 6, which are thus also moved upward, together with the grippers 5, and the sheet between them getting the position as shown in Fig. 7. The gear connection 56 53 does not prevent the movement of the gripper-shaft 4.

The means for taking the sheet from the cylinder 3 and delivering it are the following, Figs. 13 to 15: On a plate 15 is fixedly mounted an angle-piece 16. A sliding piece 17 is guided on said plate by means of studs 18 and a squared shaft 19. A lever 20 is fulcrumed to the plate 15 by a stud 21. A projection 22 of said lever engages the sliding piece 17. A spring 23, secured to the plate 15, is fixed to lever 20. An angle-lever 24 is fulcrumed by its nave to the plate 15. One arm of it engages the sliding piece 17. The other arm acts upon lever 20. A plate 25, corresponding in size with plate 15, covers the described mechanism and serves also partly as support and guide for the movable parts. To it is fixed a spiral spring 26, which has connection to the sliding piece 17. The outer edge of the latter and the inner extend-

ing face of the angle-piece 16 form a mouth which receives the sheet from the printing-cylinder. The sliding piece operates for this purpose in the following manner: As shown in Fig. 13, the sliding piece 17 is in its withdrawn position and the mouth is open. Upon turning the angle-lever 24 the arm *b* engages lever 20 and disconnects it from the sliding piece 17, so that the latter, by means of the spring 26, will be protruded to close the mouth, Fig. 14. For opening the same the lever 24 is turned in the contrary direction. The arm *a*, engaging the sliding piece 17, draws it back, the lever 20 taking by means of spring 23 its normal position, and the projection 22 engages the sliding piece, which is thus brought out of connection with the angle-piece 16.

If a small sheet or envelop-blank is to be printed, one of the described apparatus is sufficient. If, however, a broad sheet shall be printed, a set of such mechanism is required. Their arrangement in the printing-press and the devices for actuating such apparatus are shown by Figs. 10 to 12.

In the frame of the machine is journaled a rock-shaft 27, to which are keyed two double-armed levers 28, which, standing opposite each other, are stiffened by a rod 29 at their bottom end. At the top they are connected by the square shaft 19, which carries the gripping apparatus above described in such a way that the same may be shifted lengthwise at will and correspondingly adjusted by a set-screw. In both of the levers 28 is carried a square shaft 50, which, serving to operate the gripping apparatus, Figs. 13 to 15, runs through the same and through the lever 24, respectively, in order to move the same. For this purpose the shaft 50 carries at one end a short arm 30, which engages, by means of a bar 31, an angle-lever 32, being fulcrumed to one of the levers 28 and having at its other arm a stud 33. In the frame of the machine is journaled a spindle 34, to which are fixed on the inner side two arms 35 36 on the outer side of the frame upright arms 37 37^a, which are fitted with antifriction-rollers 38. To the shaft 60 of the impression-cylinder 3 are fixed two cams 39 39^a, each of them engaging temporarily the rollers 38 and causing thus the arms 35 36 to be protruded, while springs 40 are arranged to draw the arms 35 36 back in their normal position. Each arm has fitted thereto a bar 41 42, respectively, which are provided with pins 43 44, respectively, that are arranged on both sides of the stud 33. Now if arm 36 is protruded arm 42 pushes the stud 33 forward, the lever 32, and consequently the shaft 50, is turned upward, and the mouth of the gripper apparatus is closed; but when arm 35 is withdrawn its articulated arm 41 engages with its pin 43 the stud 33 and brings it back in its former position, which causes the opened condition of the mouth of the gripper apparatus.

The closing and opening of the mouth take place on grasping a printed sheet from the

cylinder 3 and on delivering it. For this purpose the gripper apparatus is moved toward the impression apparatus and withdrawn from it with the printed sheet. One of the
 5 levers 28 is provided with an angle-piece 44, having pivoted thereto an adjustable forked rod 45, which is coupled by a rod 46 to a crank-disk 47, mounted on the axis 60 of the impression-cylinder. Each revolution of the
 10 same causes, therefore, an oscillation of levers 28, as will easily be understood from Figs. 10 and 11.

The operation of my machine in taking and delivering a sheet is as follows: When the
 15 machine is set in motion and the impression-cylinder provided with ink or color by means of the inking or coloring apparatus F and the cylinder *g'*, the latter driving the impression-cylinder, a sheet is fed to the table *i* and shifted thereon by means of the mechanism *km*
 20 to the impression-cylinder. Segment-lever 53, fulcrumed to one side of the cylinder-engaging cam 51, is turned. Pinion 56, engaging lever 53, is also turned, and grippers 5,
 25 fixed to shaft 4, are elevated to receive a sheet. Lever 53, being released from cam 51, turns backward by means of spring 55. Pinion 56 is also turned backward and grippers 5 are closed, catching the sheet in combination
 30 with the cooperating grippers 6. The cylinder 3 is then turned about three-fourths of a revolution, during which time the sheet is printed or colored and hangs vertically down, as shown in Fig. 7. Then roller 11^a,
 35 Fig. 5, engages projection 12, arm 11 turns lever 10, lever 10 is pressed upward and causes lever 8 to follow this movement, and lever 8, fixed to shaft 7, which carries grippers 6, causes the latter to elevate, together with
 40 grippers 5, so as to take the position shown in Fig. 7. Now crank-disk 47 has caused tumbling levers 28, by means of connecting means 46 45 44, to approach impression-cylinder 3. Mouth 16 of the gripping apparatus, Figs.
 45 13, 14, and 15, enters the space between cylinder 3 and the lifted sheet. Cam 39, Figs. 10 and 11, revolving with cylinder 3, engages,

by means of a roller 38, lever 37. Lever 37 turns lever 36. Lever 36 protrudes bar 42. Its stud 44 pushes angle-lever 32 upward. 50 Rod 31, engaging said lever, causes movement of lever 30. Lever 30, engaging bar 50, Figs. 13 to 15, turns it to the right. Lever 24, fixed to bar 50, is turned. Arm *b*, engaging lever 20, presses it down. Sliding piece 55 17 is drawn forward by means of spring 26, its point closes mouth 16, and the sheet is caught. Grippers 5, operated by quadrant-lever 53, which, slipping over cam 51, turns pinion 56 and rock-shaft 4, are elevated or opened and 60 the sheet freed from grippers 5 6. Cam-disk 47 causes, by means of 46 45 44, the tumbling levers 28 to withdraw in the position, as shown in Fig. 11. Cam 39^a, engaging roller 38 of lever 37^a, turns lever 35 in the direction of 65 the arrow. Bar 42, coupled to lever 36, is withdrawn. Pin 43, engaging stud 33 of angle-lever 32, causes down turning of the latter and of lever 30. Bar 50, Figs. 13 to 15, is turned to the left. Sliding piece 17 is with- 70 drawn and caught in this position. The sheet is free to fall down or to be taken by a workman.

I am aware that printing-machines with mechanisms for taking the printed sheet away 75 of different kinds are known, and I therefore do not claim such a machine broadly; but

What I claim, and desire to secure by Letters Patent, is—

In a printing-machine an apparatus for receiving the sheet from the impression-cylinder and delivering it consisting of a sliding piece 17 forming with an angle-piece 16 a mouth said sliding piece being held in normal position by a lever 20, protruded by a 85 spring 26 and withdrawn by an angle-lever 24 said lever engaging also lever 20 as illustrated and for the purpose set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

ERNST FISCHER.

Witnesses:

OTTO KÖNIG,
 H. F. HESS.