

(No Model.)

4 Sheets—Sheet 1.

E. STEIGER.

MACHINE FOR MULTIPLYING COPIES OF MANUSCRIPT.

No. 604,849.

Patented May 31, 1898.

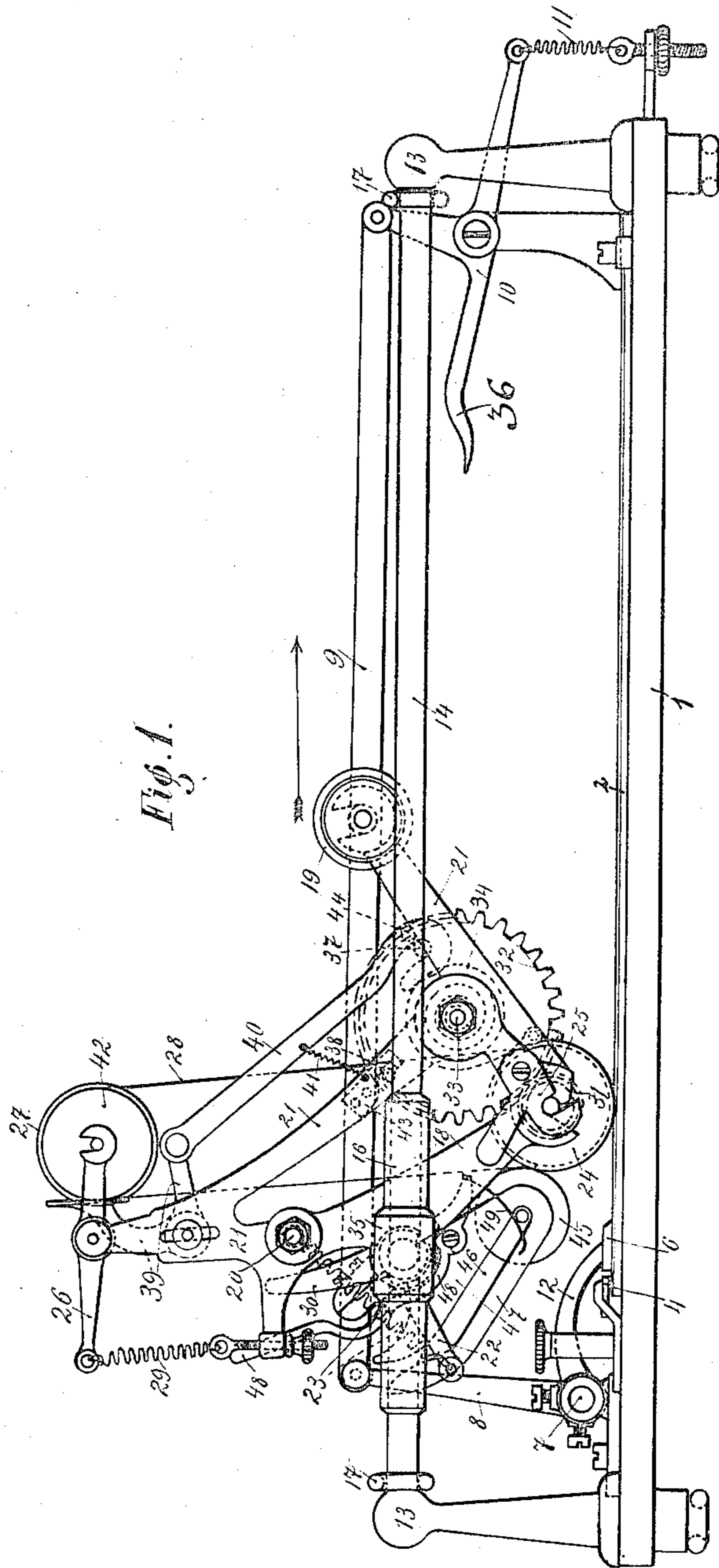


Fig. 1.

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(No Model.)

4 Sheets—Sheet 2.

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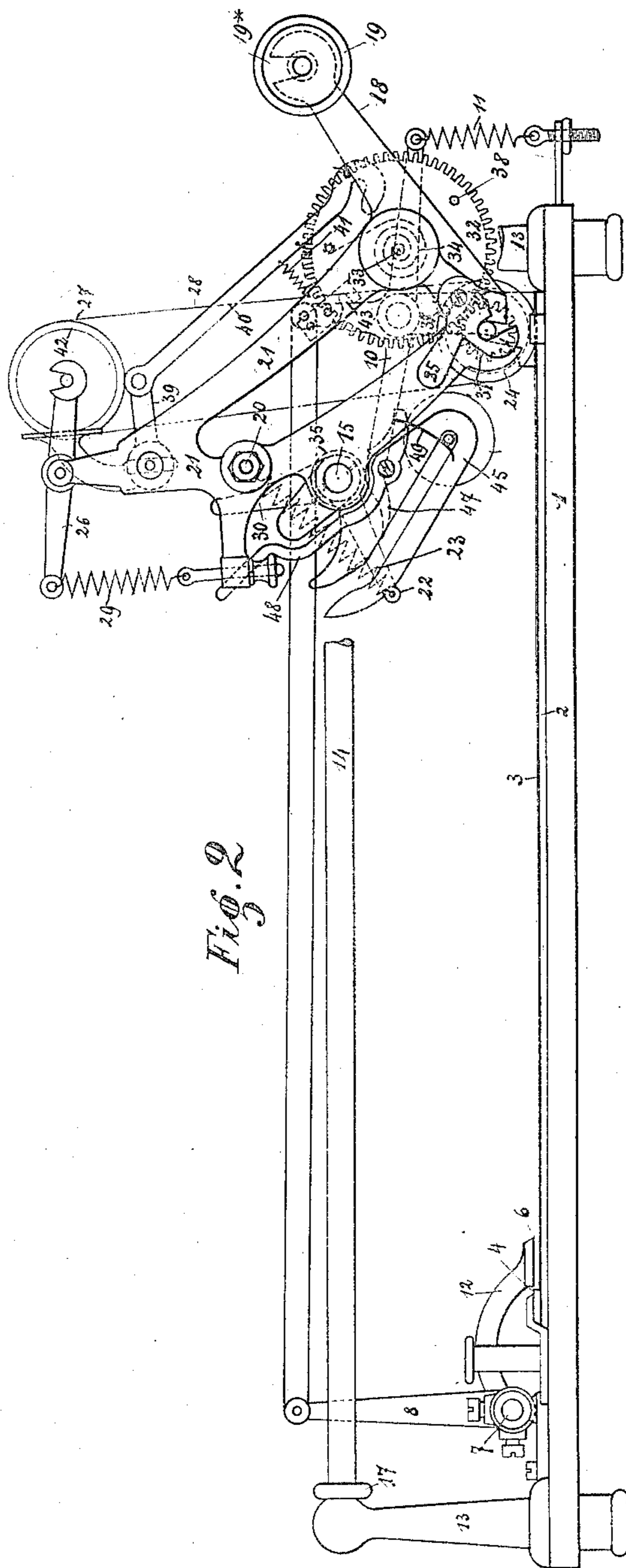


Fig. 2

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4 Sheets—Sheet 3.

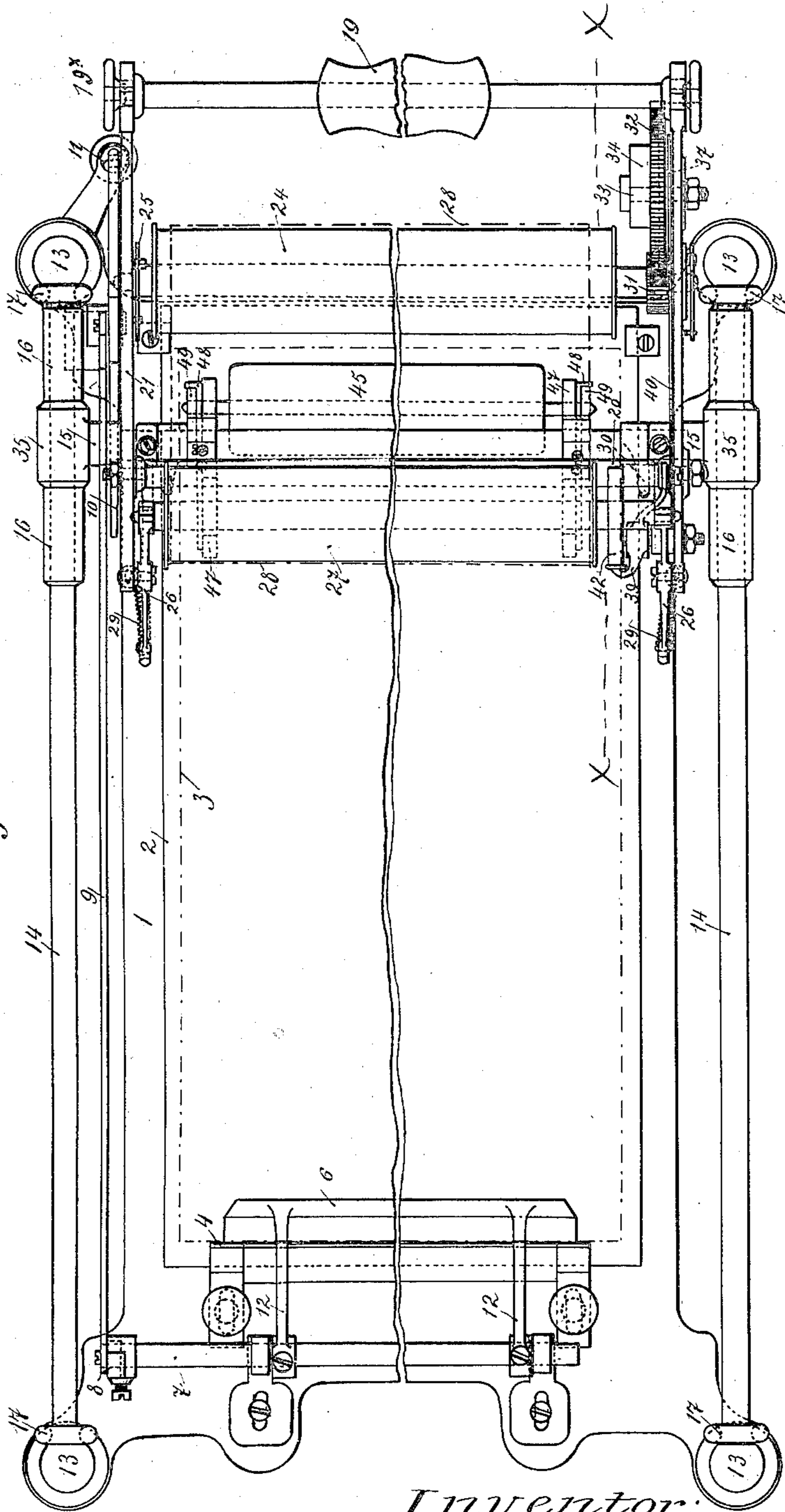
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Fig. 3.



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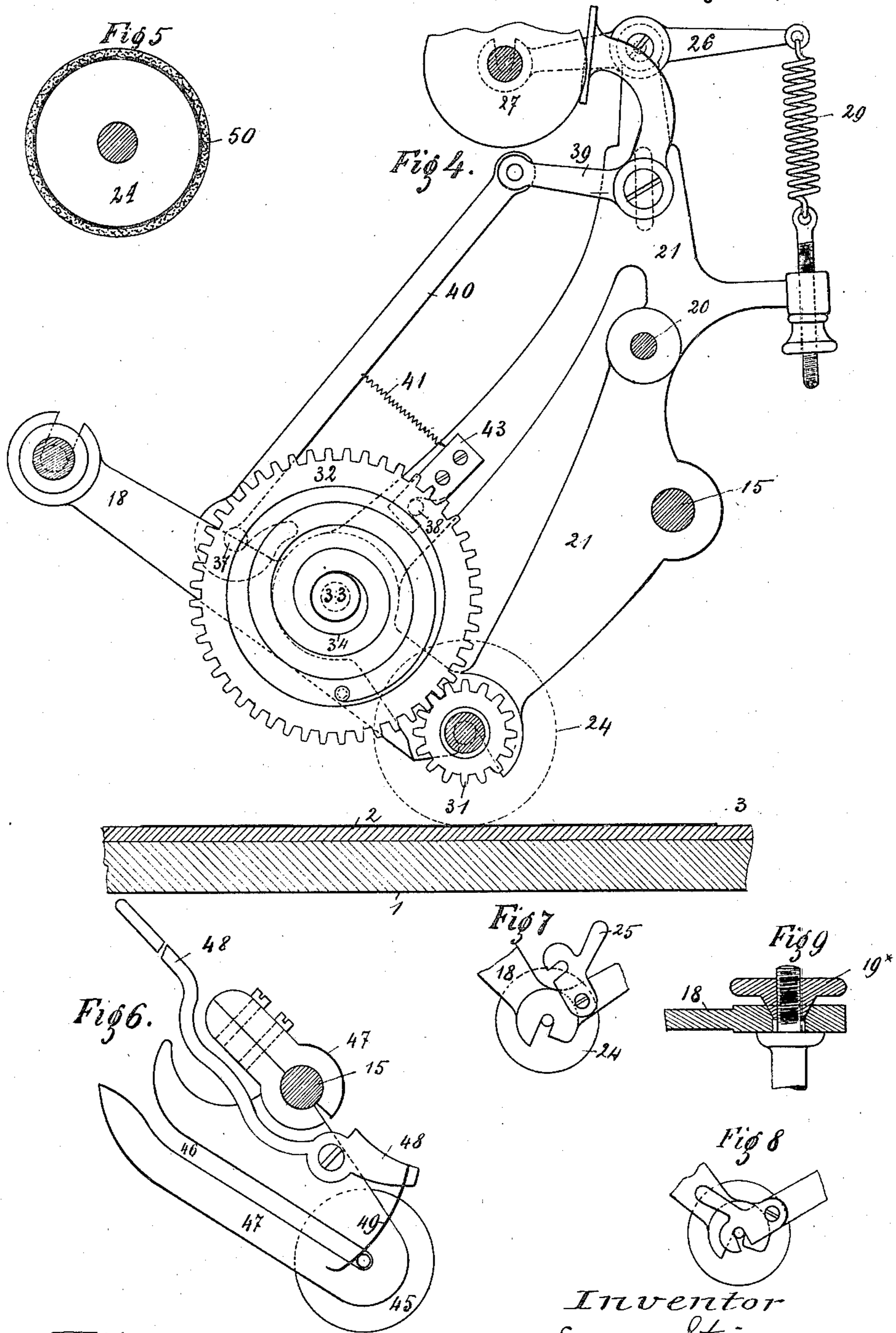
4 Sheets—Sheet 4.

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Patented May 31, 1898.



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UNITED STATES PATENT OFFICE.

EUGEN STEIGER, OF ZURICH, SWITZERLAND, ASSIGNOR TO C. A. MEYER & CIE., OF SAME PLACE.

MACHINE FOR MULTIPLYING COPIES OF MANUSCRIPT.

SPECIFICATION forming part of Letters Patent No. 604,849, dated May 31, 1898.

Application filed April 7, 1897. Serial No. 631,145. (No model.) Patented in Switzerland September 17, 1896, No. 13,131, and in Austria November 10, 1896, No. 46/4,529.

To all whom it may concern:

Be it known that I, EUGEN STEIGER, a citizen of the Republic of Switzerland, residing at Zurich, canton of Zurich, Republic of Switzerland, have invented new and useful Improvements in Machines for the Multiplication of Copies of Manuscript, (for which I have obtained patents in Switzerland, No. 13,131, bearing date September 17, 1896, and in Austria, No. 46/4,529, dated November 10, 1896,) of which the following is a specification.

This invention relates to a machine for the multiplication of copies of manuscript and the like, and distinguishes itself from the hectographs and similar apparatuses hitherto in use in that with it no solid plastic material for the reception of the negative impression is made use of. Consequently the drawbacks inseparable from the application of a fixed negative surface—such as the rolling up of the printed leaves, unequal clearness and intensity of the prints, twisting of the lines, irregularity of registering, washing off of the writing from the mass, &c.—are entirely done away with.

From this machine can be obtained not only hectographic prints in number to about two hundred impressions, but the apparatus also will supply black print with ordinary printers' ink and in practically unlimited number without any important alteration of the arrangement and manipulation of the machine. This kind of print is distinguished from that produced by means of the mimeograph and other systems acting upon the stencil principle for the reproduction of their prints by the sharpness and accuracy of its prints, similar to lithographic reproductions, and these prints are obtainable from easily-prepared written (not perforated) originals without the use of a stone or a metal plate, and possesses, moreover, the advantages hereinbefore set forth.

The machine possesses as an essential part an endless band coated with a gelatinous substance. This endless band passes over rollers and is capable of taking up the writing and of imprinting it upon the copying-sheets, which band is brought into connection with suitable devices in order to return the part which has been rolled over back to the rolls

and in order to return the pressing-roller to the initial point of its course.

Such being the nature and object of my invention, the following is a complete description of same, reference being had to the accompanying drawings, in which—

Figures 1 and 2 are elevations of the machine in different positions of the sliding plane. Fig. 3 is a plan of the machine. Fig. 4 is a longitudinal section taken on the line xx' , Fig. 3, and seen in the direction of the arrow x' . Fig. 5 is a cross-section of the pressing-roller. Fig. 6 is an elevation of the support for the inking-roller. Figs. 7 and 8 are detailed views of the hook-levers supporting the pressing-roller, and Fig. 9 shows the movable connection of the handle-bar to the frame of the machine.

All numbers of reference denote the same parts.

The bed-plate 1 of the machine bears a soft-rubber plate 2, upon which the original sheet of writing or an imprinted sheet 3 is placed, as shown by dotted lines in Fig. 3. In order to bring the said sheet 3 exactly into register, the machine is provided with an adjustable gage-bar 4. By means of the clamp 12, provided with a soft-rubber cover 6 and connected by means of the shaft 7 and levers 8, 9, and 10 with the drawing-spring 11, the sheet 3 is pressed firmly upon its support 2.

Four corner-pillars 13 are secured to the bed-plate 1, of which the two which are placed upon the same side are respectively connected together by means of a bar 14. Along the bar 14 sleeves 16, connected together by means of the piece 15, are mounted to slide. The rubber rings 17 form elastic buffers limiting the course of the sleeves 16. Upon the thickened ends of the cross-piece 15 there is revolvably mounted the frame 21, formed of the two side shields 18 and reinforced by the removable handle-bar 19, as well as by the cross-piece 20. By releasing the conical screw-nuts 19*, Figs. 1, 3, and 9, the handle-bar 19 may be removed from the frame 21, whereby an easy access to the parts of the machine is obtained. The springs 23, fastened on the one side to the arms 22, secured upon piece 15, and on the other side to

the frame-piece 20, are devised to hold the frame uniformly high—that is, away from the plate 2.

In the lower part of the frame 21 is placed
5 a pressing-roller 24, Figs. 1, 7, and 8, the
pivots of which are held in position by means
of the hook-levers 25. In order to remove the
roller 24, the hook-levers 25 are turned up, (see
Fig. 7,) so that the pivots of the roller are
10 free. On the draw-levers 26, Figs. 1, 3, and
4, revolvably adjusted in the upper part of the
frame, there is supported a second roller 27.
Around the two rollers 24 and 27 there is
15 placed an endless band 28, capable of receiv-
ing the writing, in connection with which the
springs 29, supported on the one hand by
means of regulating-screws on the frame 21
and on the other hand by means of the draw-
20 lever 26, produce the tension of the band 28.
The band 28 consists of paper parchment
coated with a gelatinous substance.

The machine operates as follows: Let it be
assumed that the machine is in the position
shown in Fig. 1 and that the original docu-
25 ment written with hectographic ink has been
placed in the machine and held down by
means of the clamp 12. Now the right hand
of the operator seizes the handle-bar 19,
presses the frame 21 down upon the original
30 sheet, and, maintaining the pressure, pulls
the frame in the direction of the arrow, Fig.
1. In consequence of this the band 28 rolls
over the original inscription and takes the
writing in a similar manner to that in which
35 the hectographic mass takes up the inscrip-
tion upon itself. Arrived at the opposite end
of the machine (see Fig. 3) the handle-bar 19
is released, upon which the springs 23 lift the
frame 21 from the plate 2 until the piece 20
40 strikes against the arms 30, fixed to the piece
15. On the advance of the frame 21 in the
direction of the arrow in Fig. 1 the spiral
spring 34, one end of which is attached to the
pivot 33 of the toothed wheel 32 and the other
45 end of which is attached to the wheel 32, (see
Fig. 4,) is wound by means of the toothed
pinion 31, fixed upon the shaft of the press-
ing-roller 24, and of the gear-wheel 32, revolvably fixed on the frame 21. When the frame
50 21 is pulled under pressure in the direction
of the arrow, Fig. 1, the roller 24 revolves
and the pinion 31 is turned by the shaft of
the roller 24. As soon as upon the completed
course of the frame 21 and raising the same
55 the roller 24 has been lifted up from the plate
2 the spring 34 is released and causes the
roller 24 to revolve back by means of the
toothed wheels 32 and 31, so that the band
28, with the writing, returns again into the
60 position which it had at the beginning of the
operation. Shortly before the completion of
the movement of the frame 21 the right-hand
reinforcement 35 of the piece 15 comes into
connection with the bent arm 36 of the angle-
65 lever 10, Figs. 1 and 2, and pushes down this
arm. Hereby the clamp 12, connected with

the lever 10 through the parts 7, 8, and 9, is
raised, so that the original writing can be re-
moved and a fresh sheet 3 can be placed upon
the plate 2. The frame 20 is then pushed 70
back to the left without pressing upon the
handle-bar 19, on which the spring 11 imme-
diately presses the clamp 12 down again as
soon as the reinforcement 35 releases the arm
36. The frame 21 is then pressed down and 75
again pulled forward, whereupon the band,
with the writing 28, prints itself off upon the
sheet of paper, and thus is produced the first
impression. At the conclusion of the move-
ment of the frame 21 the clamp 12 is again 80
raised, so that the exchange of the sheets can
take place. In this manner the operation is
repeated until the required number of im-
pressions have been taken.

In order to prevent on the release of the 85
spring 34 a turning back of the rollers 24 and
27 beyond the required point, there is placed
upon the wheel 32 a pin 37, and upon the
frame 21 an angular brake-lever 39. The
upper end of the draw-bar 40 is connected to 90
the brake-lever, whose lower end is in the
form of a hook. The spring 11 draws the
bar 40 backward, whereby the brake-lever 39
is lightly pressed on the side brake-disk 42 of
the roller 27. When the wheel 32 springs 95
back, the pin 37 engages in the hook end of
the bar 40, turns the same, and thereby also
the brake-lever 39, so that the roller 27 is
braked. In order that the spring 34 should
never entirely release itself, the wheel 32 has 100
a pin 38, which limits the revolution of the
wheel 32 by striking on the plate 43. When
the roll 27 is taken out, the pin 44 of the arm
40 prevents too great a dropping of the bar
40, because it engages on the frame 21. 105

In order to be able to produce autographic
copies in black upon the aforesaid machine,
the same is provided with an inking-roller
45, Figs. 1 and 6. On the piece 15 are se-
cured two bearing-supports 47, each provided 110
with an open inserting-slot 46, in which the
pivots of the inking-roller 45 is placed. The
levers 48, pivoted to the supports 47, bear
springs 49, which engage over the pivots of
the roller 45 and impart to the same an elas- 115
tic resistance. When using the inking-roller
45, the pressing-roller 24 is provided with a
soft cover 50, Fig. 5, so that the inking-roller
does not act in conjunction with a hard sur-
face. In order to maintain the parchment- 120
band 28 moist and flexible, the soft cover 50,
which preferably consists of felt, is to be moist-
ened from time to time; but it remains moist a
very long time. Besides the addition of the
inking-roller 45 and cover 50 the machine is 125
the same as above described.

After the gelatinous-parchment band 28 has
taken up the inscription upon itself by being
rolled over the original writing prepared with
suitable ink the inking-roller 45 is placed in the 130
supports 47. At the moment when the band
28 begins to travel by pulling the frame 21

the inking-roller 45 transmits the ink to the writing on the face of the band 28, receiving thereby impressions in black.

As a matter of course to obtain hectographic copies hectographic ink and to obtain black copies autographic ink have to be used to prepare the original writing. The inking-roller is only necessary in the latter case and has to be blackened with ordinary printer's ink.

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

1. In combination, the table, the guide-frame, the carrier moving thereon comprising a pivoted portion, the traveling band, the rollers therefor on the carrier, the driving-disk having connections to the band for driving the same through contact with the sheet, the spring for returning the band to normal position and means for lifting the pivoted carrier-frame when it reaches the end of its course whereby the driving-roller will be lifted and the band will be free to return to normal position, substantially as described.

2. In combination, the table, the guide-frame, the carrier-frame, the band thereon with means for operating the same including a spring-drum for returning the band to normal position and the brake for controlling the band, said brake being in turn controlled by the spring-drum, substantially as described.

3. In combination, the table, the guide-frame, the carrier thereon comprising the pivoted part, the traveling band on the carrier, the spring-drum connected with the band, the means for operating the drum, the rollers for carrying the band on the carrier, the brake controlling one of the rollers, the draw-bar connected with the brake, the pin on the spring-drum for operating the draw-bar and the stops 43, 38, substantially as described.

4. In combination, the table, the guide-frame, the carrier moving thereon, the printing device on the carrier, the clamp for holding the sheet to the table and the connections leading to the clamp for operating the same, said connections being operated by the carrier as it reaches the limit of its movement.

5. In combination, the table, the guide-frame, the carrier moving thereon, the printing device on the carrier, the clamp 6, the arm 12 carrying the same, the lever 8, rod 9 and the lever 10 having the arm 36 in the path of a part of the carrier, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in the presence of two subscribing witnesses.

EUGEN STEIGER.

Witnesses:

H. LACHART,
HERMANN HUBER.