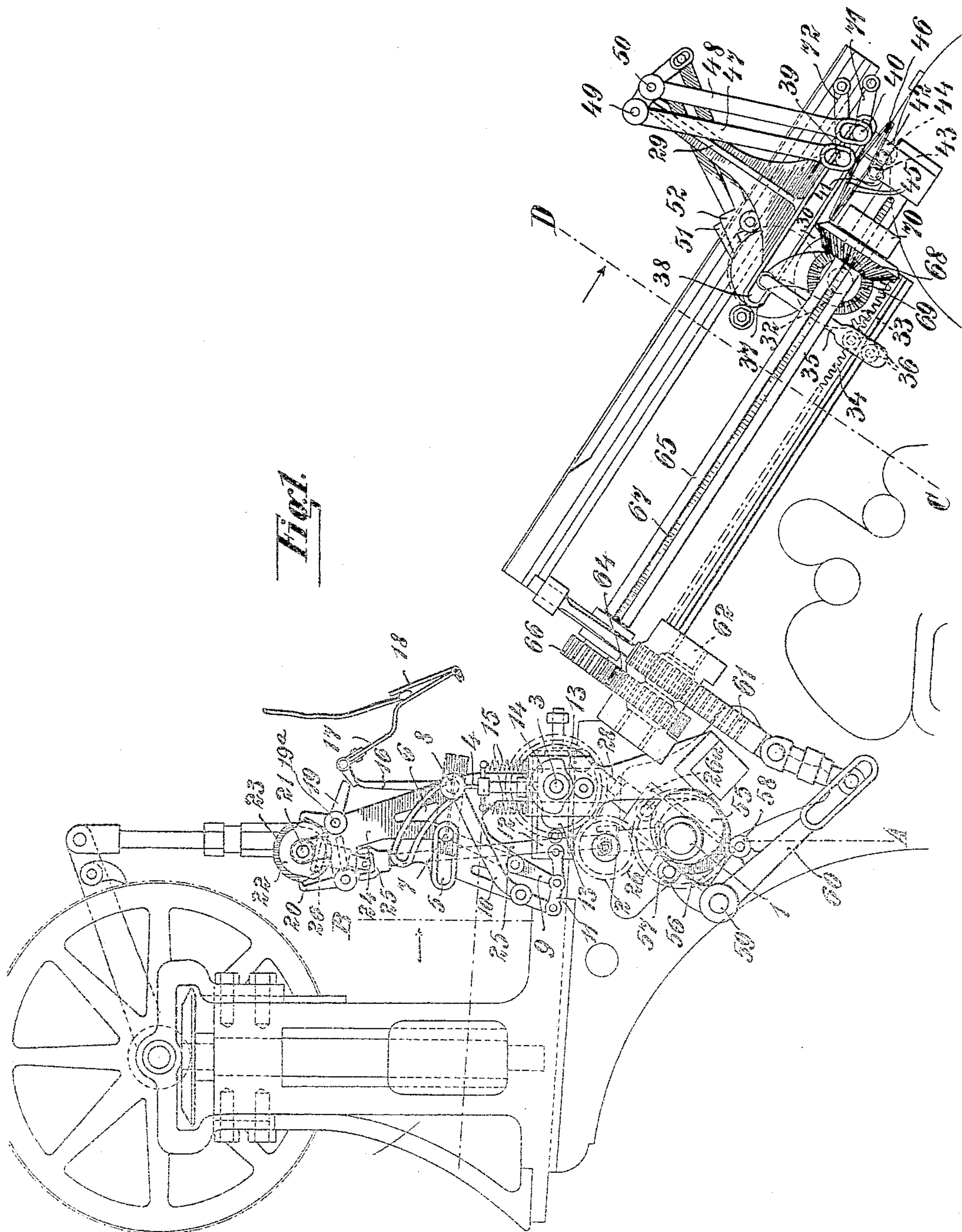


L. SGAL & J. SCHWANDA.
 SELF FEEDER FOR PRINTING PRESSES.
 APPLICATION FILED NOV. 27, 1907.

962,866.

Patented June 28, 1910.

8 SHEETS—SHEET 1.



Witnesses:
 C. C. Smith
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 By Knight Bros, Attys.

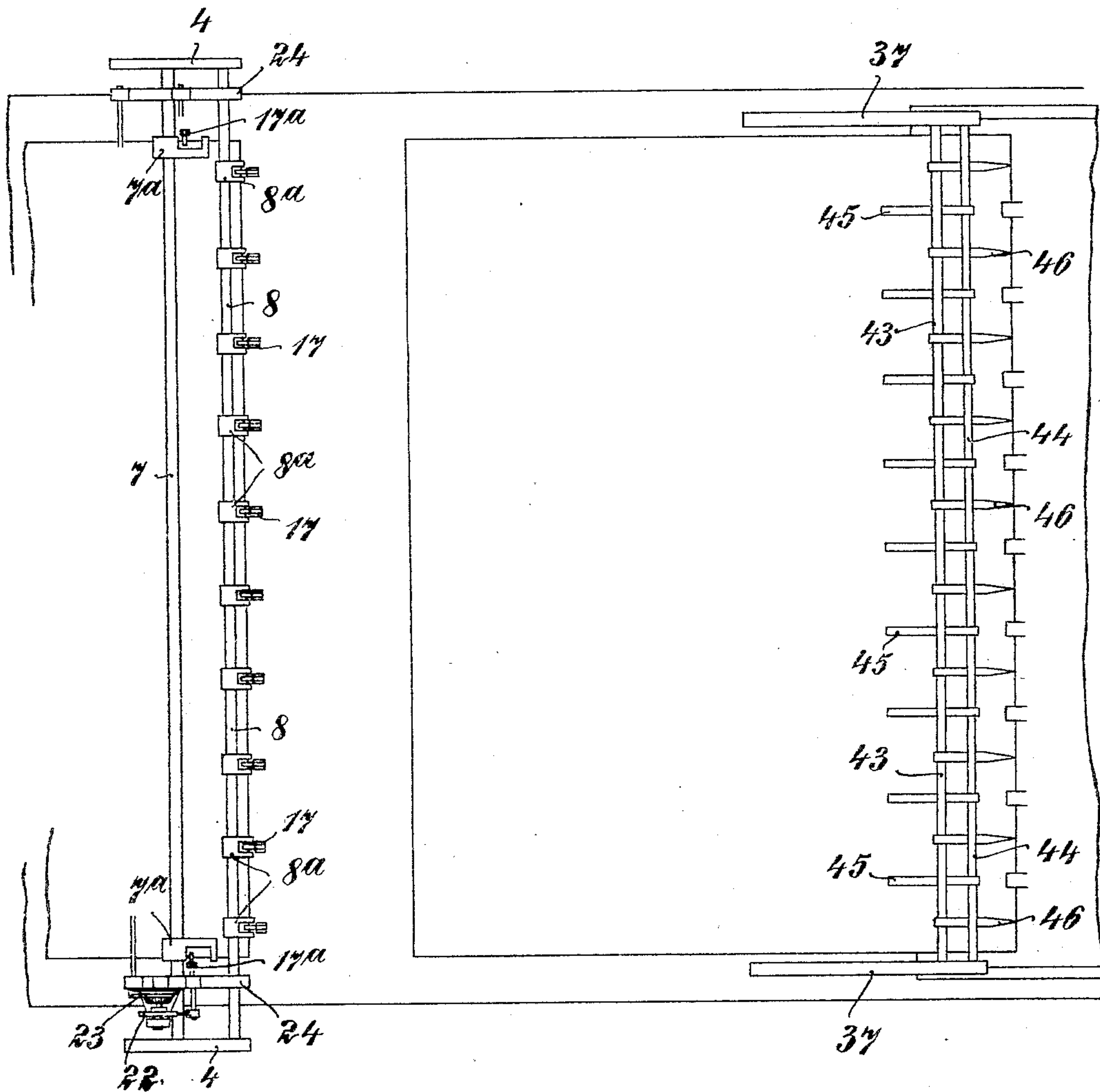
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8 SHEETS—SHEET 2.

Fig. 1a.



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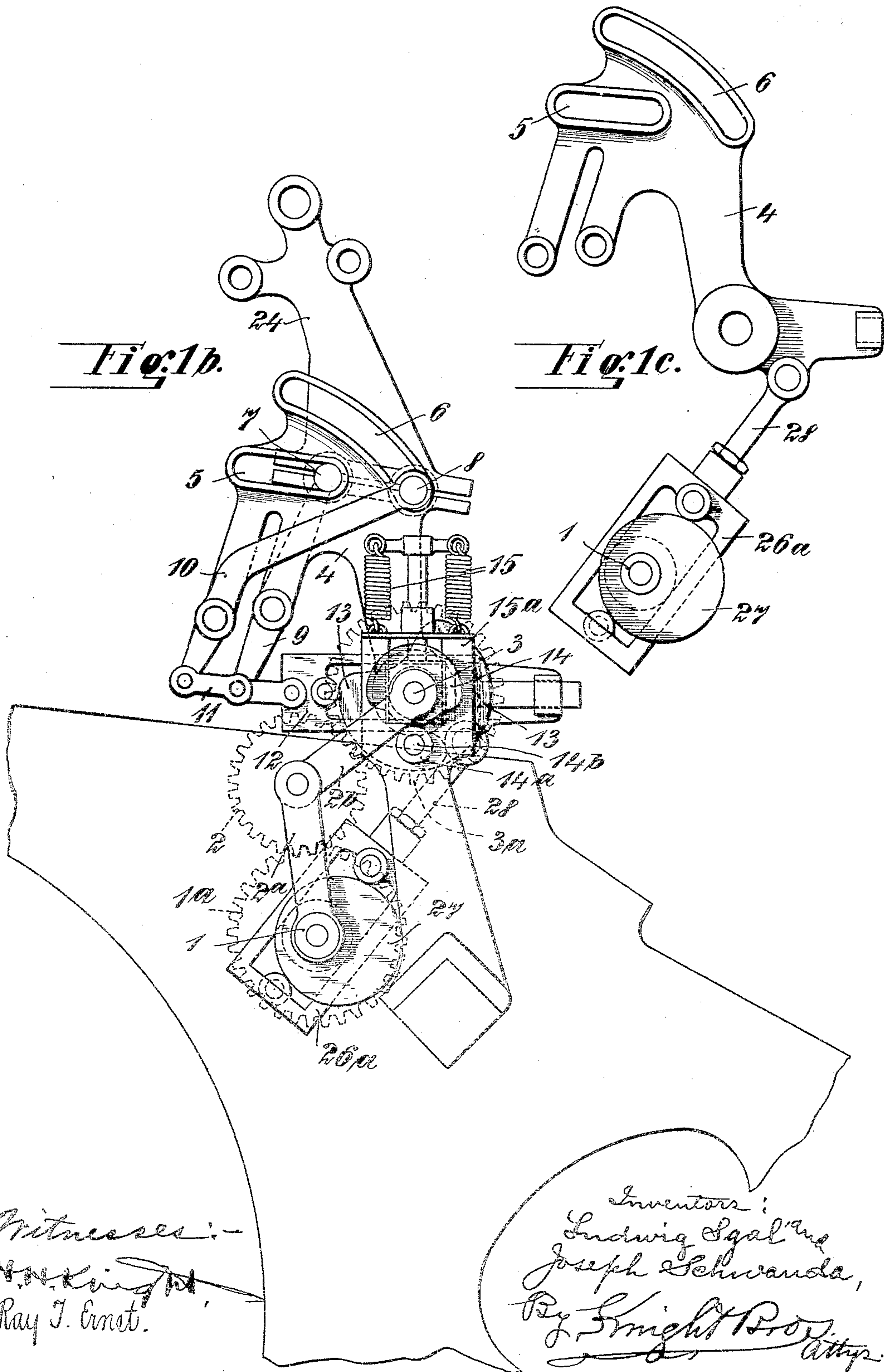
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8 SHEETS—SHEET 3.



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8 SHEETS—SHEET 4.

Fig. 2.

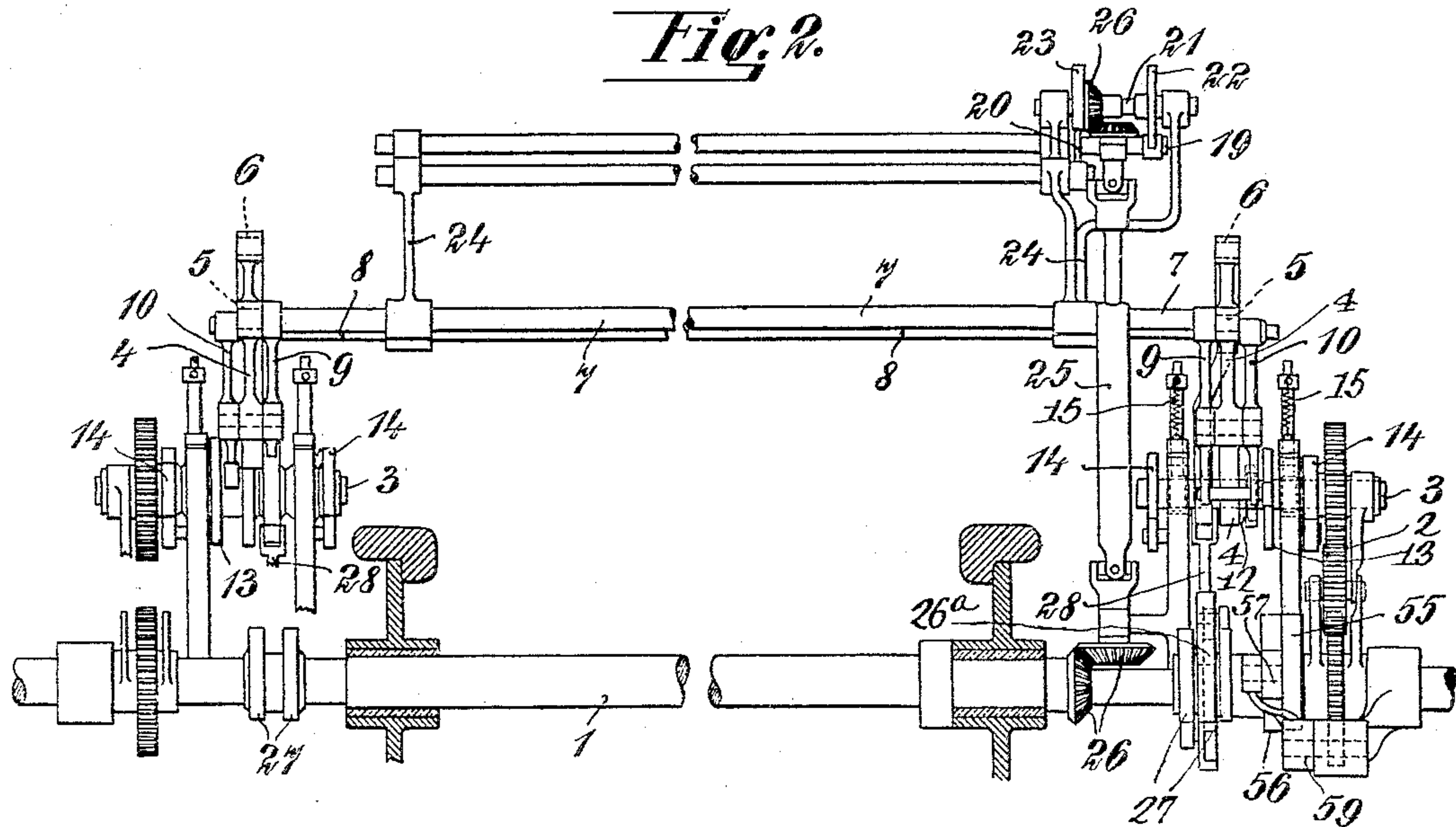
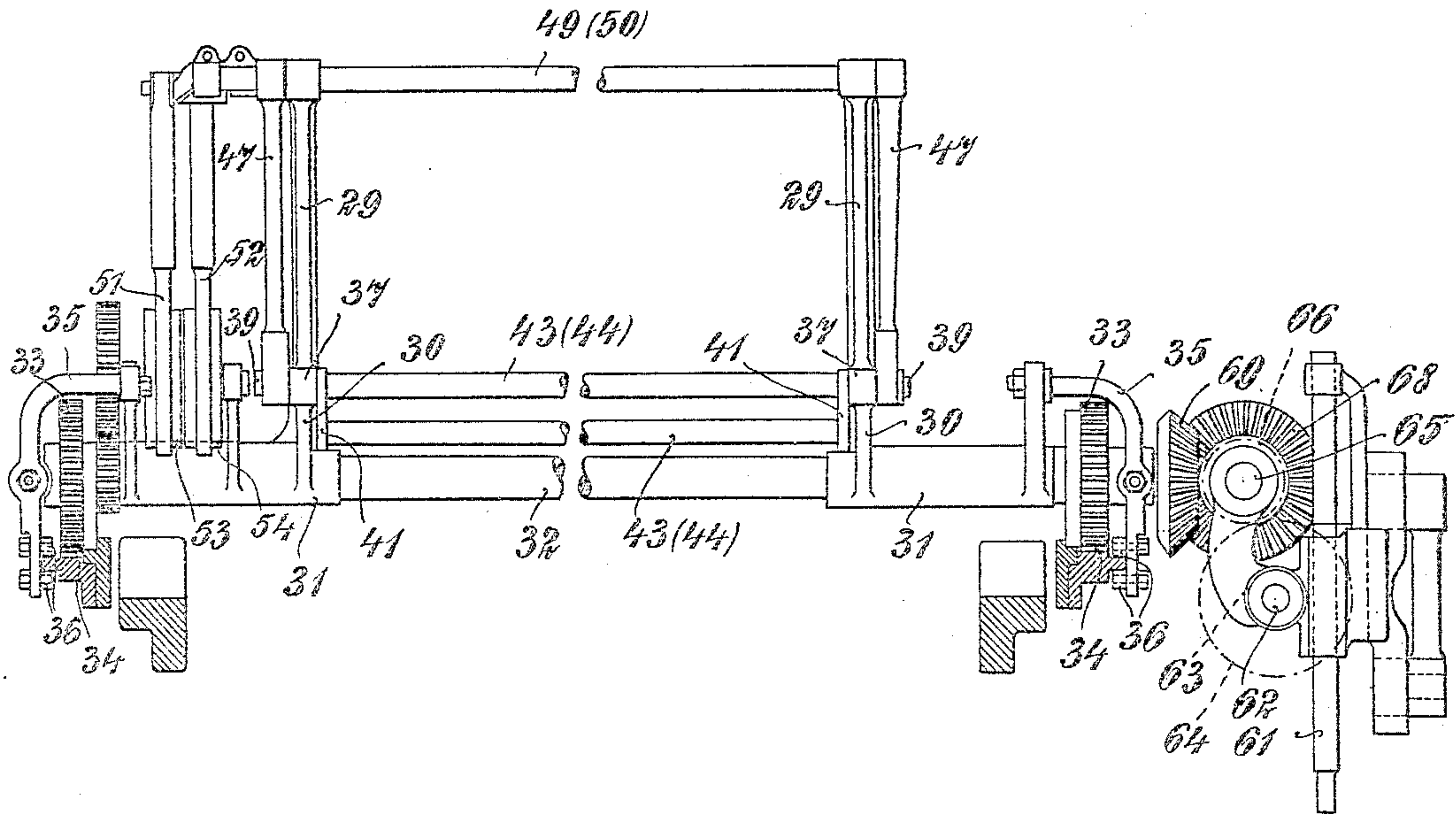


Fig. 3.



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8 SHEETS—SHEET 5.

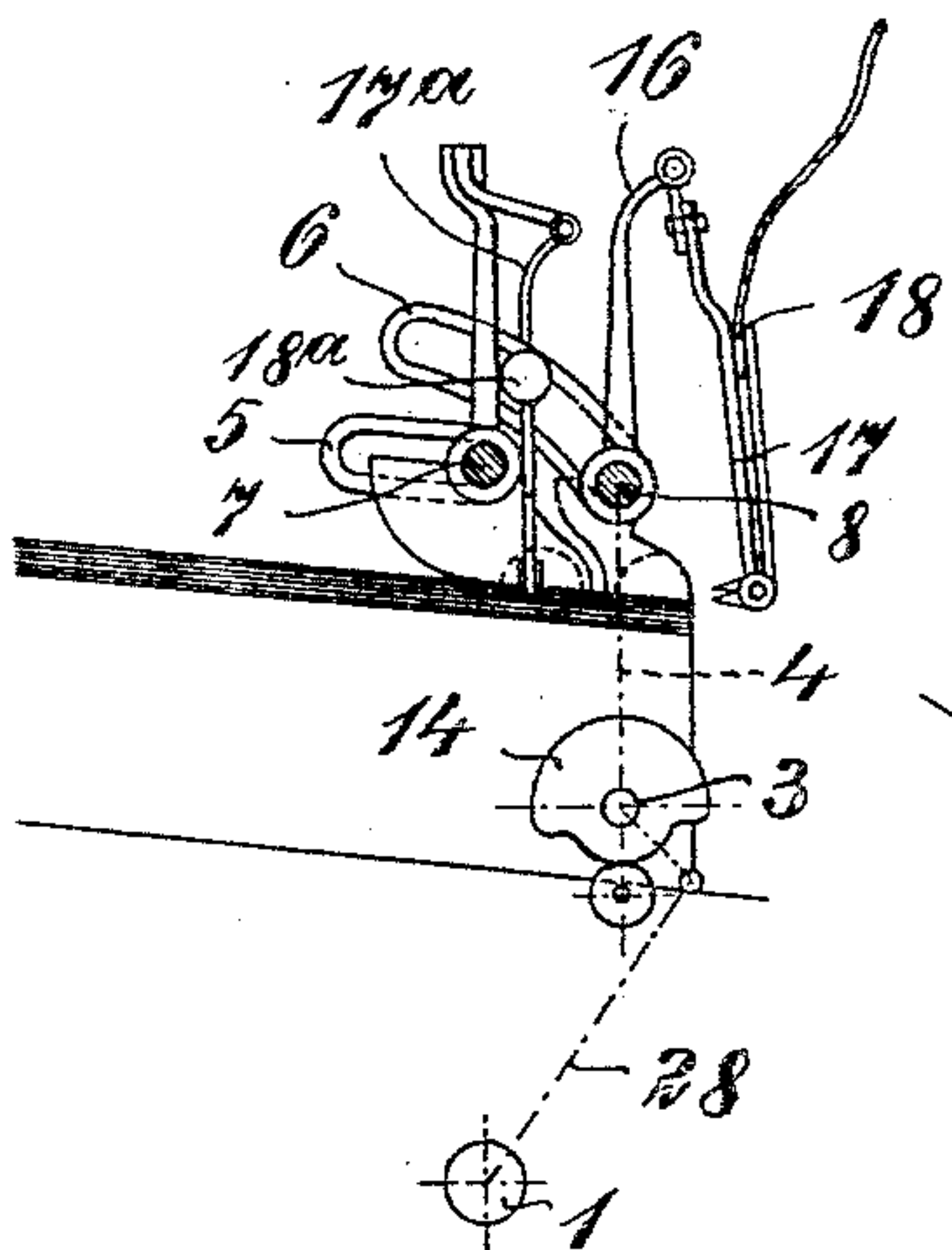


Fig. 4.

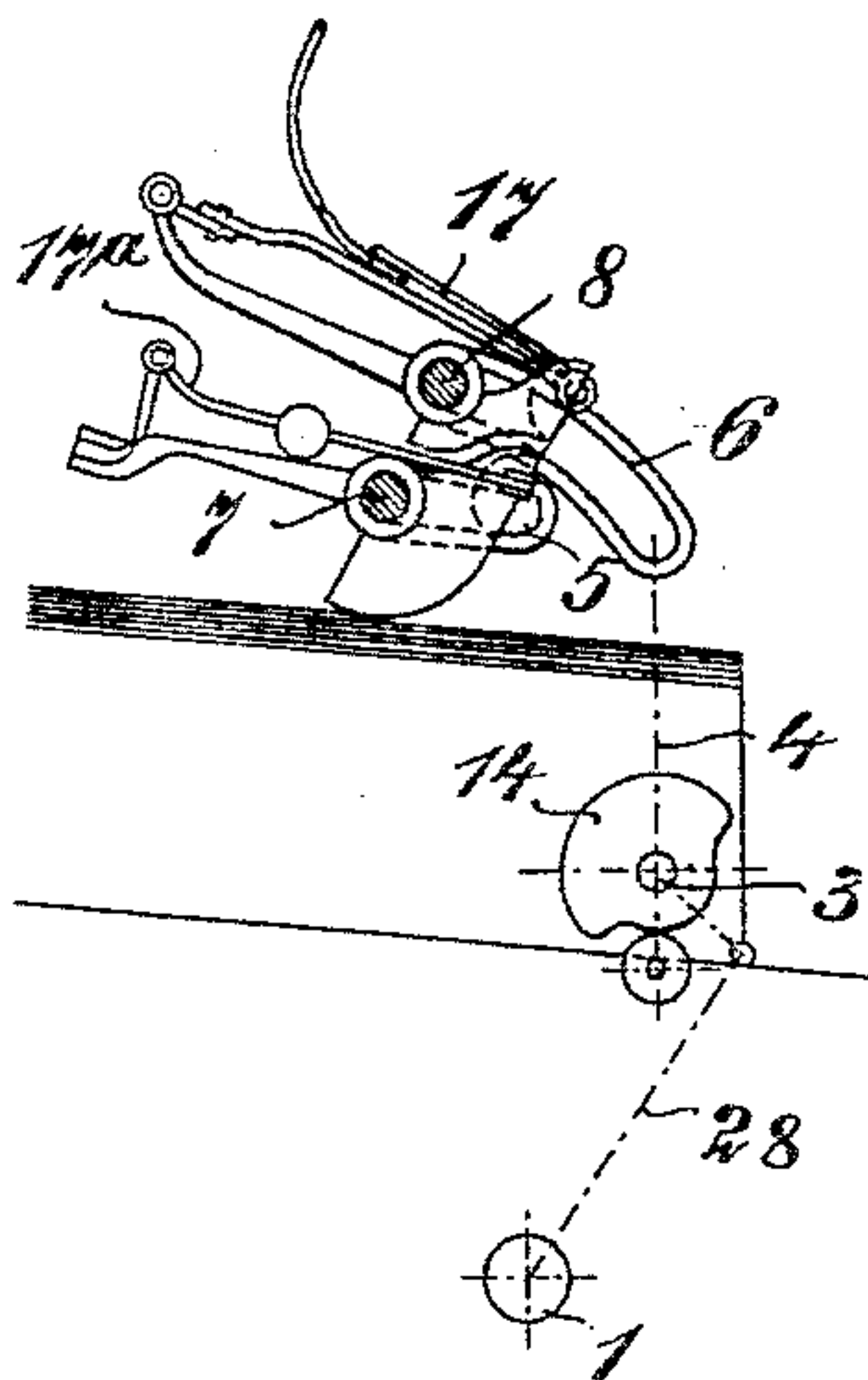
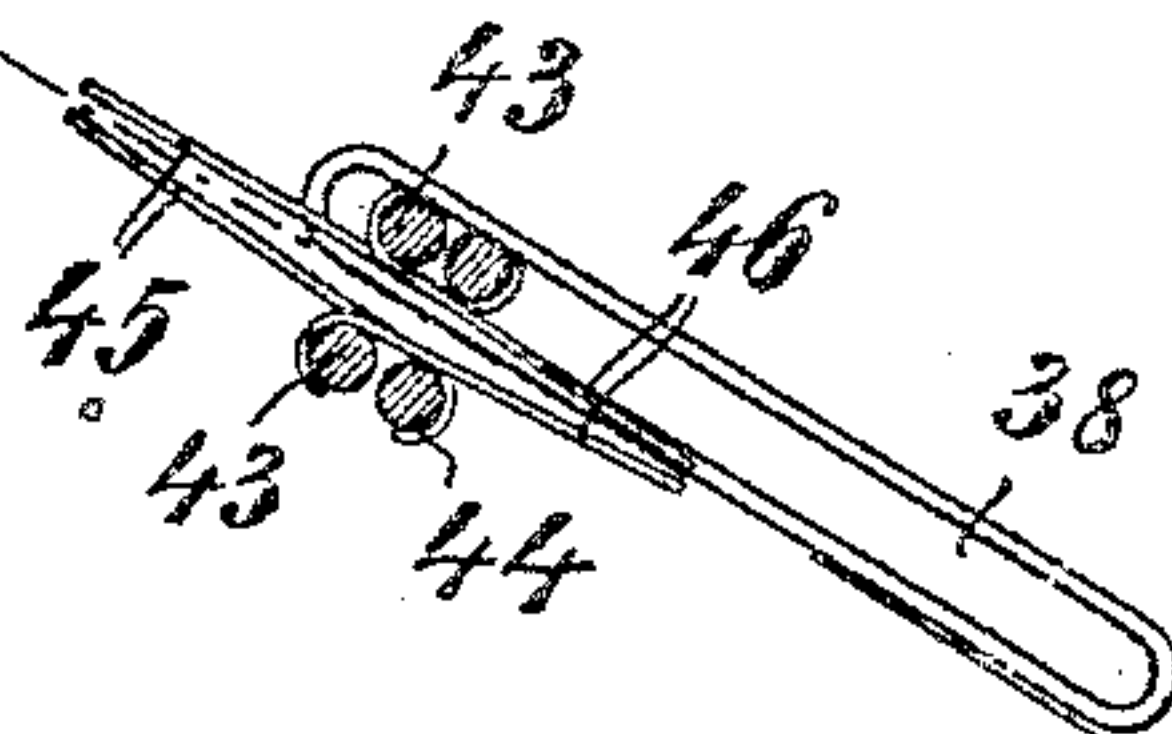
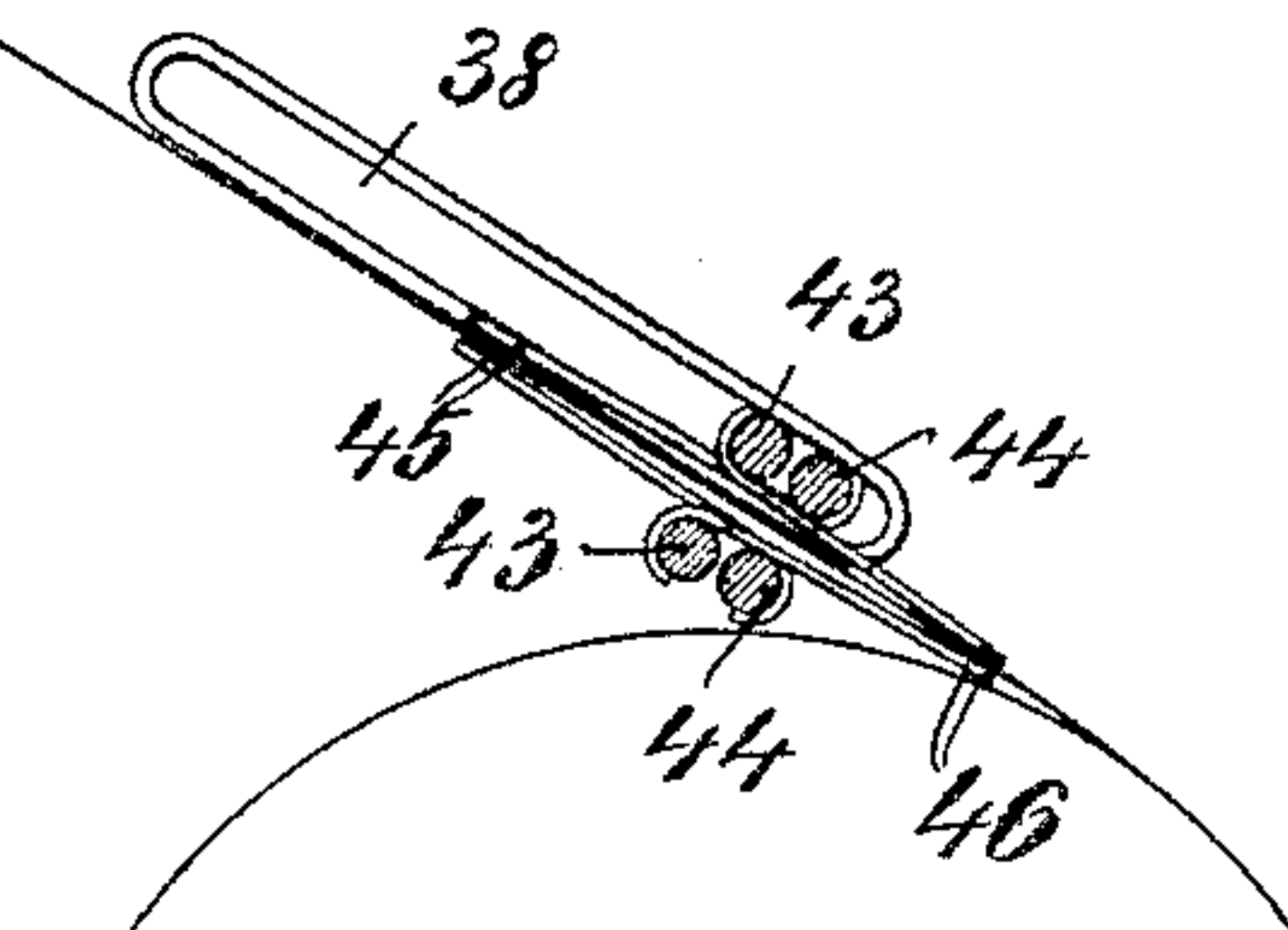


Fig. 5.



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8 SHEETS—SHEET 6.

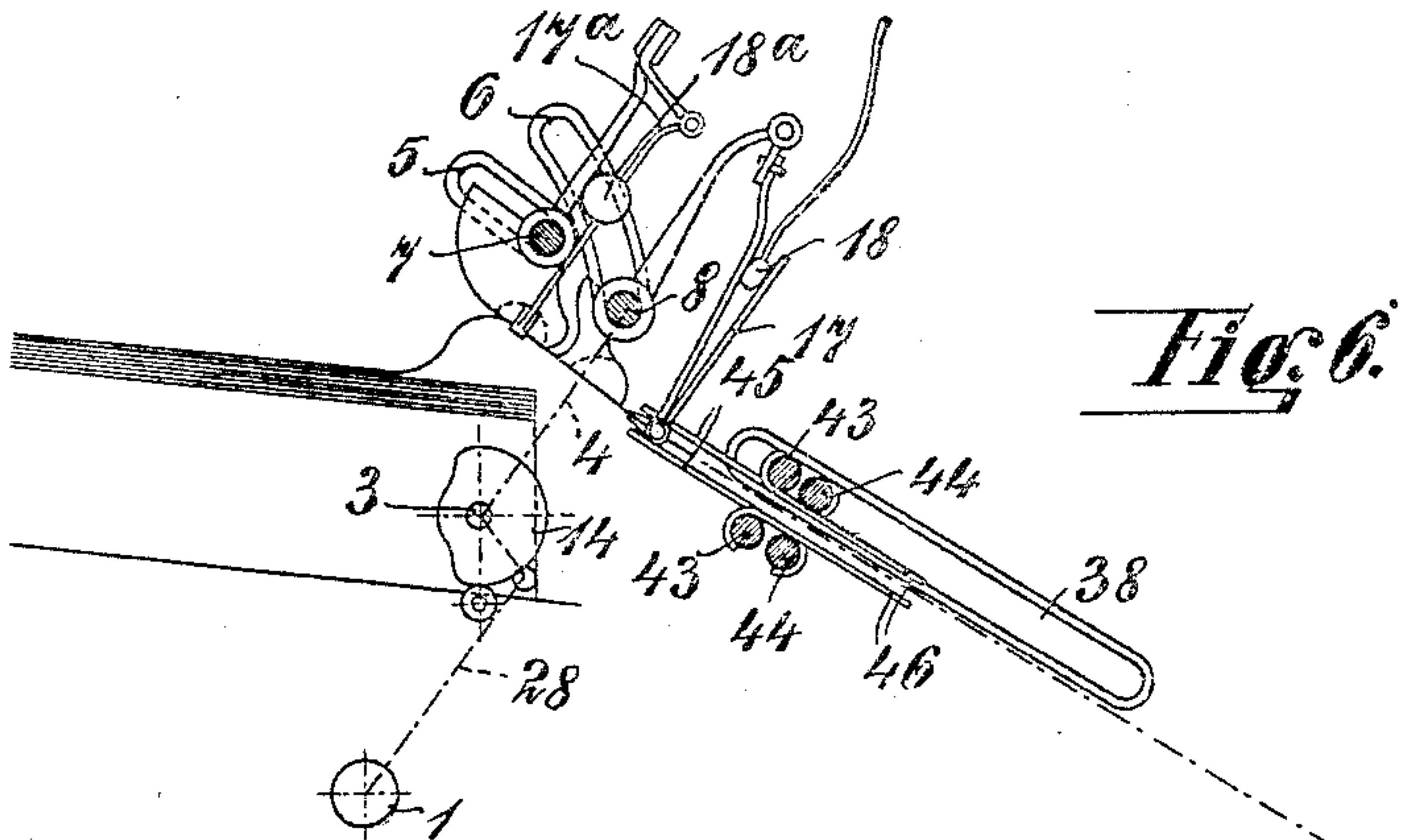


Fig. 6.

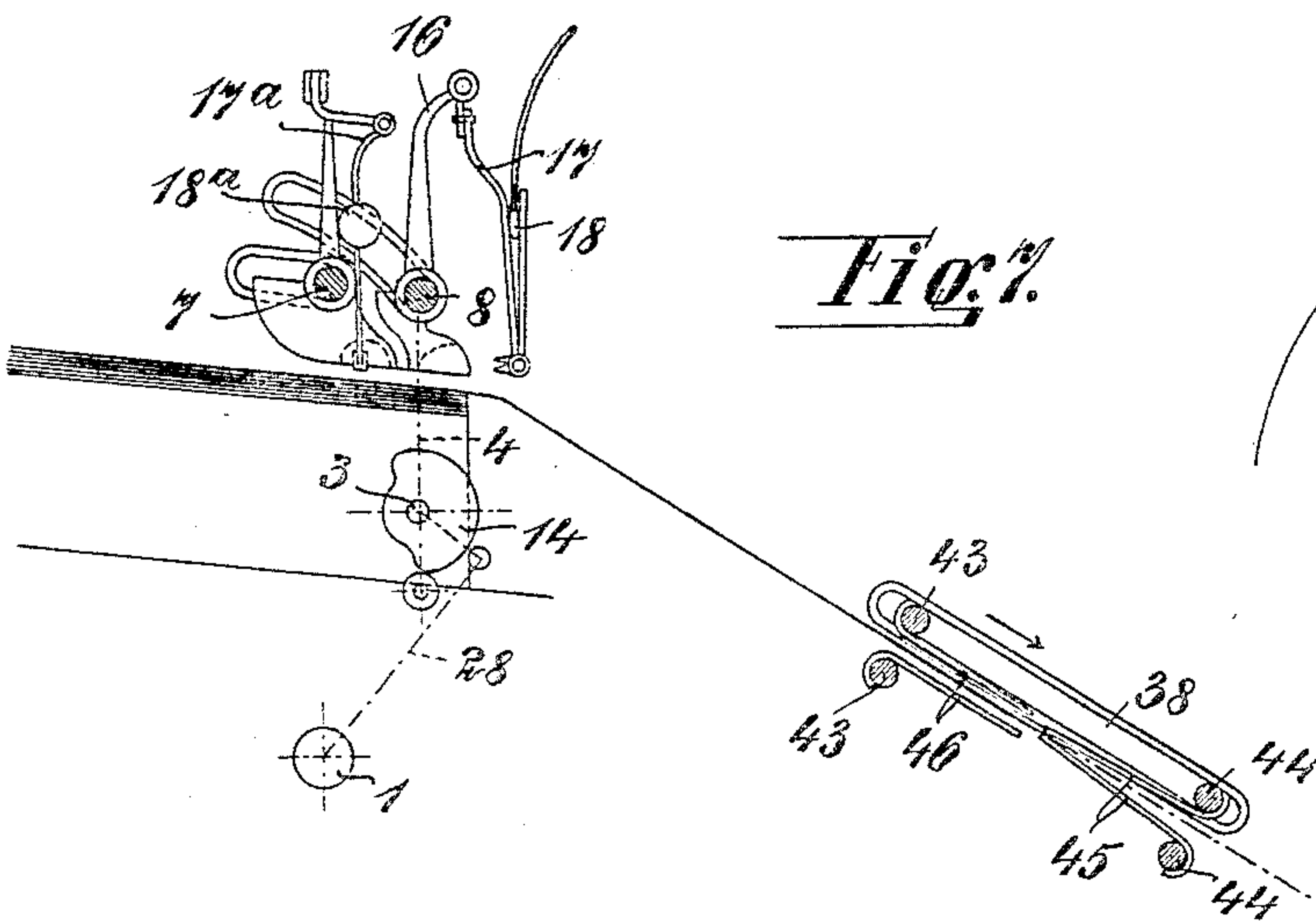


Fig. 7.

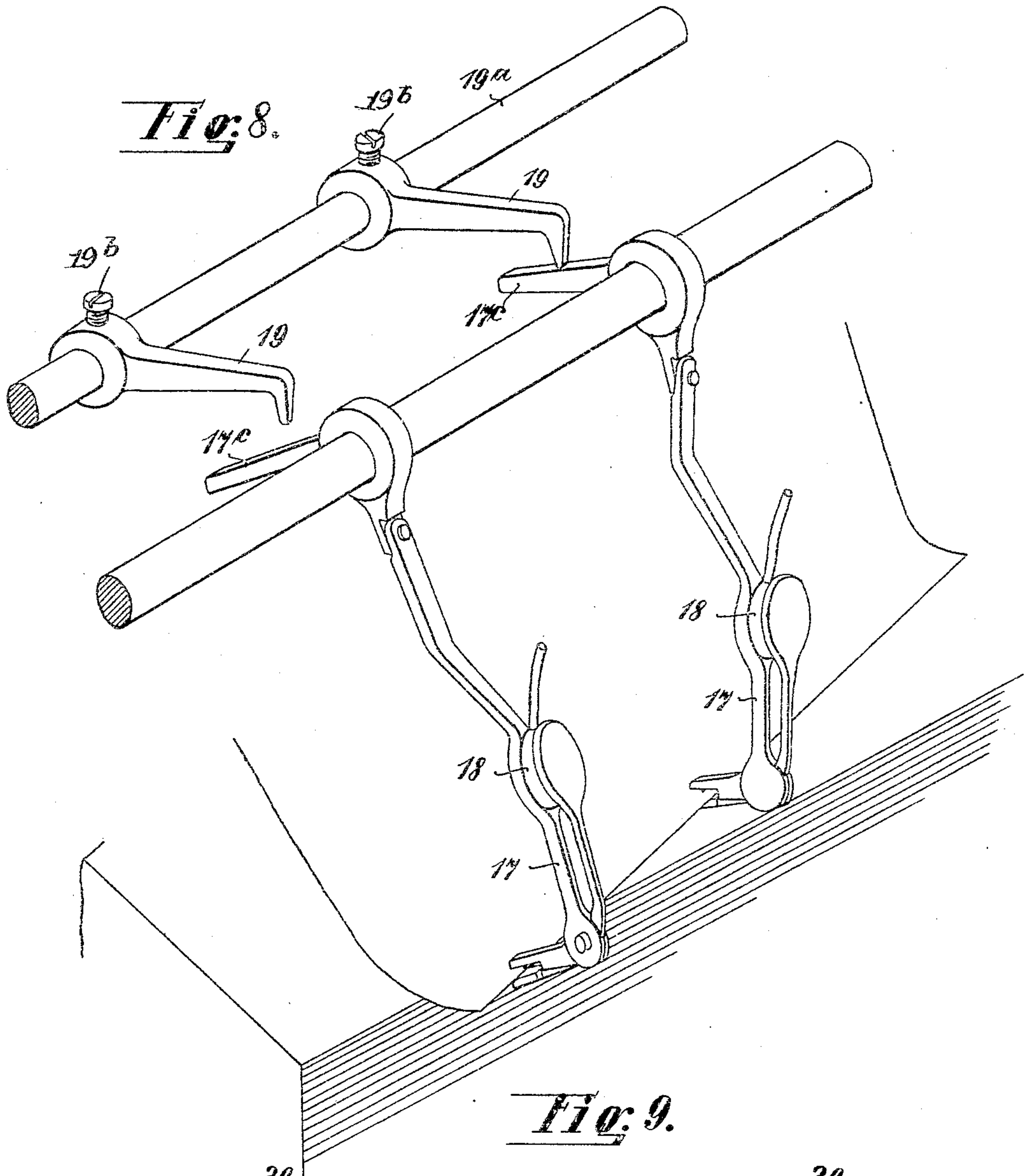
Witnesses:
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L. SGAL & J. SCHWANDA.
 SELF FEEDER FOR PRINTING PRESSES.
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962,866.

Patented June 28, 1910.
 8 SHEETS—SHEET 7.



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962,866.

Patented June 28, 1910.

8 SHEETS—SHEET 8.

Fig. 10.

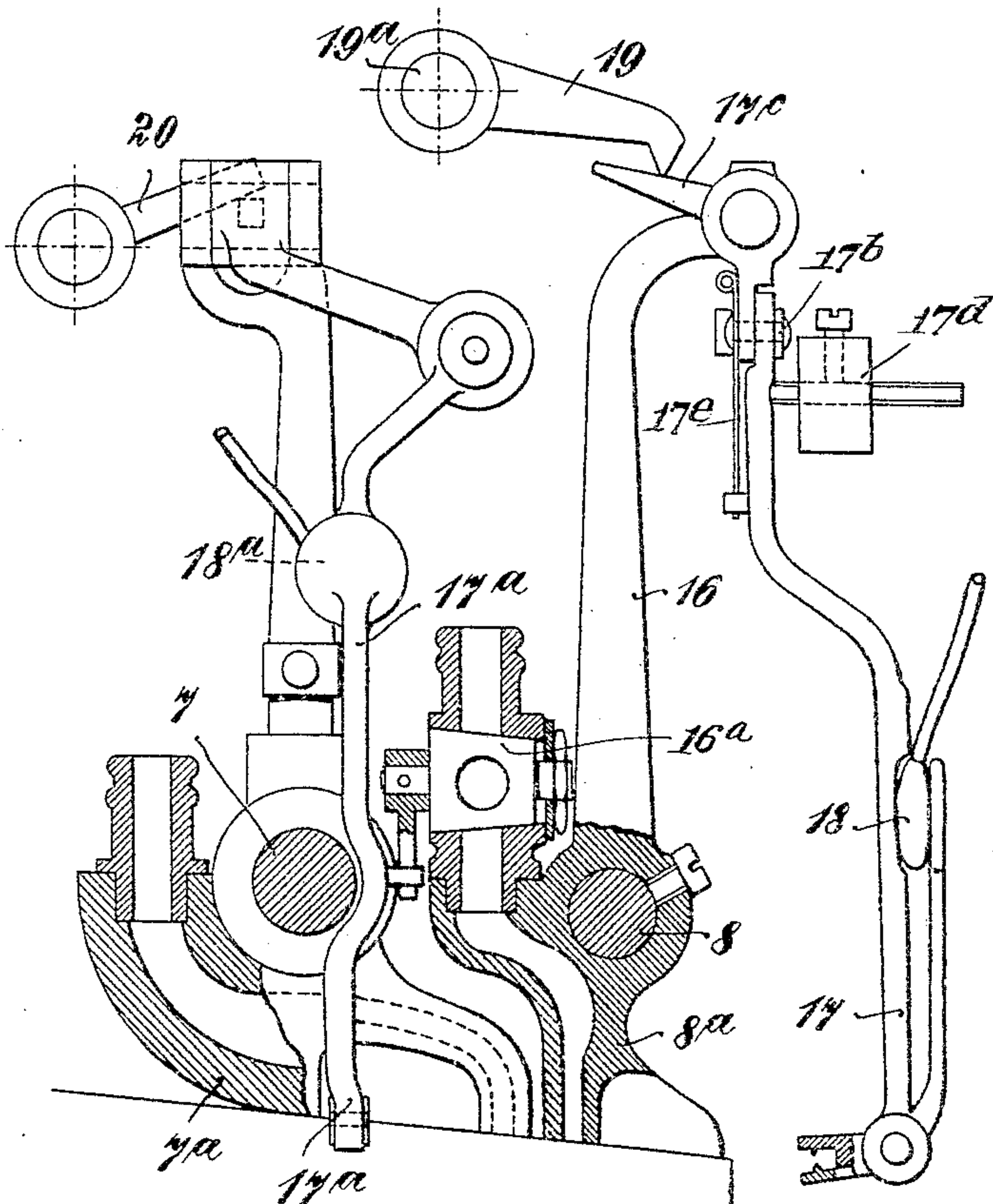


Fig. 11.

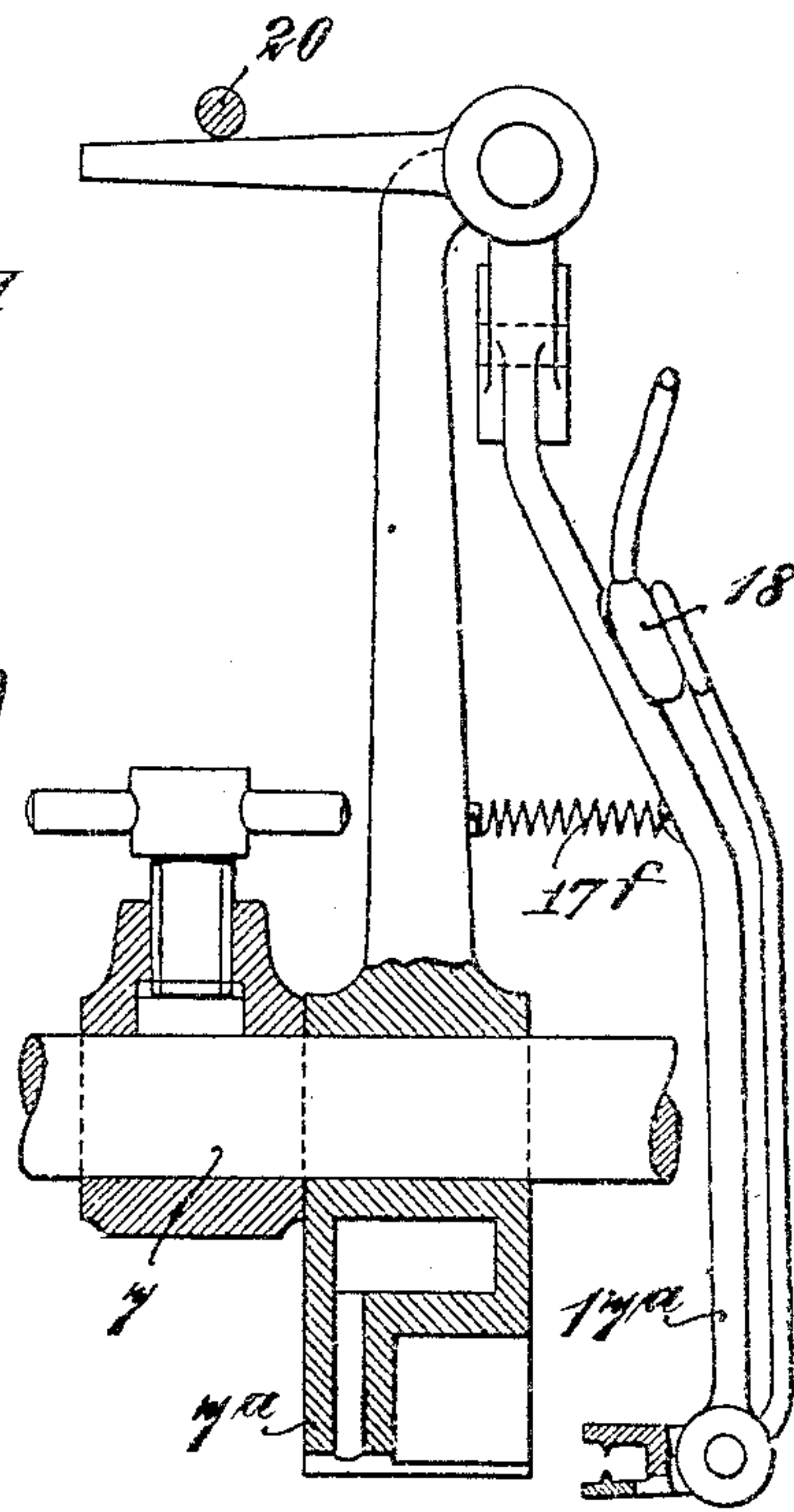
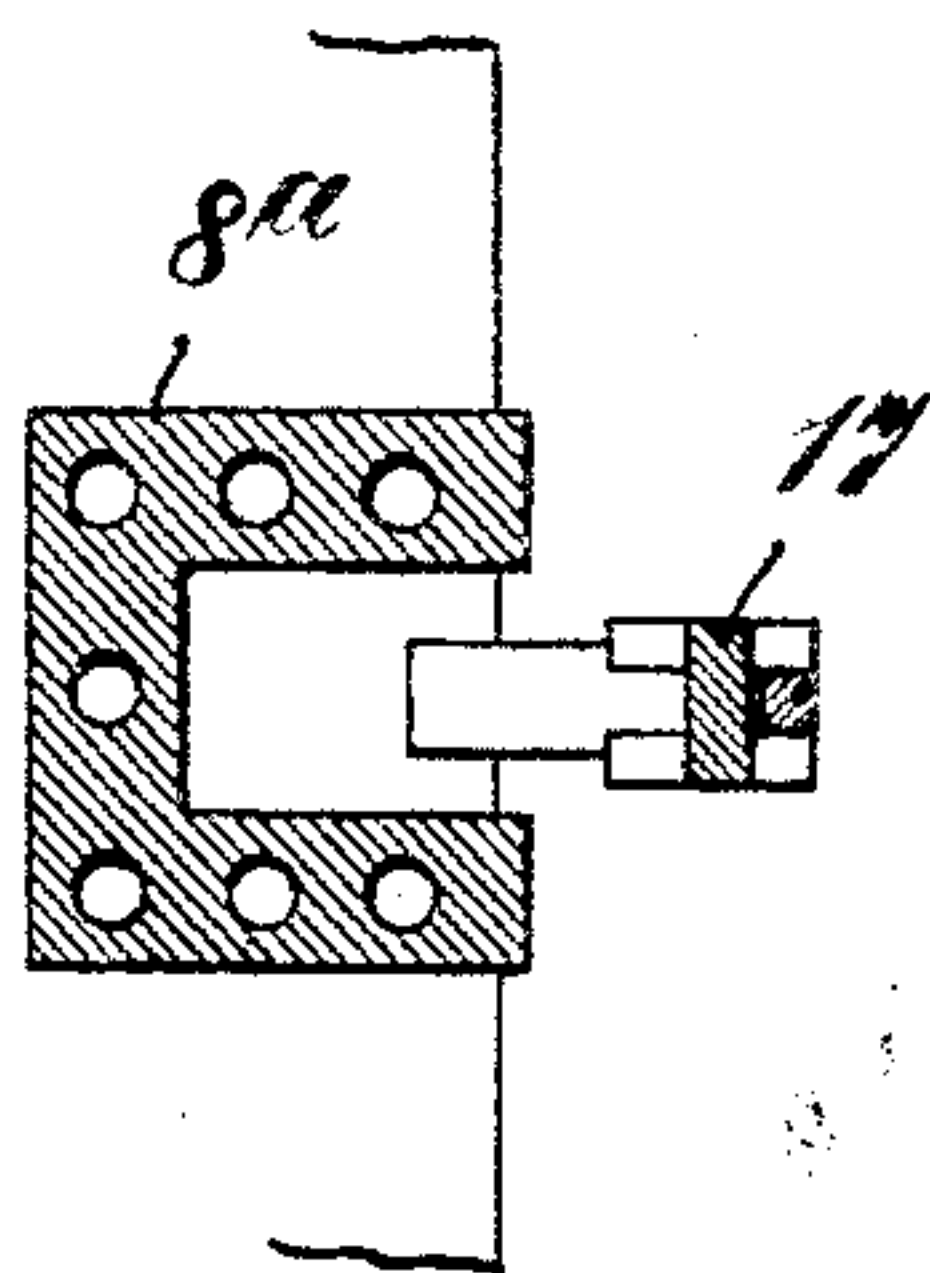


Fig. 12.



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UNITED STATES PATENT OFFICE.

LUDWIG SGAL, OF CHISLEHURST, ENGLAND, AND JOSEPH SCHWANDA, OF VIENNA, AUSTRIA-HUNGARY, ASSIGNORS TO PIONEER ENGINEERING SYNDICATE LIMITED, OF LONDON, ENGLAND.

SELF-FEEDER FOR PRINTING-PRESSES.

962,866.

Specification of Letters Patent. Patented June 28, 1910.

Application filed November 27, 1907. Serial No. 404,173.

To all whom it may concern:

Be it known that we, LUDWIG SGAL and JOSEPH SCHWANDA, citizens of the Austro-Hungarian Empire, residing at Chislehurst, England, and at Vienna, Austria-Hungary, respectively, have invented certain new and useful Improvements in Self-Feeders for Printing-Presses; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to an automatic feeder for printing presses, whereby the top sheet is taken from the pile, adjusted to the composition and fed to the printing cylinder.

Our improved feeder belongs to that class in which the front part of the topmost sheet is picked up from the pile by suckers, and is then bent upwardly through tilting of the latter, air being at the same time blown in between sheet and pile in order to facilitate lifting.

The essential features of our invention are the peculiar motion of the suckers, by means of which the sheet is separated from the pile in a novel manner. Secondly the simple yet absolutely certain manner in which the sheet is adjusted with the aid of tongs. Several of these latter automatically advance to the front edge, and one to each side edge of the sheet, and they adjust the sheet now released by the suckers, so as to register exactly with the form, by being themselves adjusted by the parts of the machine set for the particular size of sheet or position of the form. A third feature of the invention is the manner in which the lifted sheet is fed to the printing cylinder with the aid of two systems of grippers to which the tongs deliver the sheet, and of which the one system serves for the first part, and the second for the last part of the work of carrying over the sheets. During the entire period of lifting the sheet from the pile, effecting register, and carrying over, up to the moment of seizing of the sheet by the cylinder, the sheet is firmly held by the one or other devices so that it can not possibly get displaced by a current of air or other external means.

Our invention is illustrated in the accompanying drawings, which show one form of construction of the apparatus.

Figure 1 is a side elevation, the suckers and lateral feed tongs being omitted. Fig. 1^a is a diagrammatic plan of the apparatus. Fig. 1^b is an enlarged side elevation of a portion of the mechanism shown at the left hand in Fig. 1. Fig. 1^c is a detail side elevation of one of the guide levers 4 and link 26^a with connecting pitman 28. Fig. 2 is a cross section on the line A—B of Fig. 1, looking from the front of the apparatus some of the parts shown on the right and which are duplicated on the left of the machine, being omitted from the drawing on the left. Fig. 3 is a section on the line C—D of Fig. 1. Figs. 4–7 illustrate diagrammatically on a reduced scale, the operation of the apparatus, four different positions of the parts being shown, and all less important members being omitted. Fig. 8 is a perspective view drawn to an enlarged scale and showing the sheet in the course of adjustment by the tongs. Fig. 9 is a view drawn by a reduced scale and showing the lateral tong feed devices. Fig. 10 is a sectional view, showing a front and one lateral pair of tongs. Fig. 11 is a sectional view showing a lateral pair of tongs in side elevation. Fig. 12 is a sectional plan of a front sucker.

The main shaft 1 by means of intermediate gearing 2 drives the shaft 3 which actuates the sucker-rod guide-levers 4. Said guide-levers 4 are swingingly mounted upon the shaft 3 about which they are oscillated by pitman 28 driven by cam 27. Each of these levers is provided with two slots 5, 6. In the former slot there engages the rear sucker-rod 7 with the two lateral suckers; and in the slot 6 there engages the front sucker-rod 8 with the front suckers. The back sucker-rod 7 is guided by a double armed lever 9 and the front sucker by the lever 10. The levers 9, 10 are jointed together by members 11, and are actuated in their slots by the link 12, which is operated by the cam disks 13, there being two of such disks on each side of the machine so as to insure exact coöperation between the parts. Owing to this motion the two rows of suckers are rolled backward through an arc whose center lies in the axis of the sucker-rod 7. They thus execute a rotary and oscillatory motion (see Fig. 5). During the second half of the rolling motion, the cam disks 14 keyed to the shaft 3 in pairs on each side of the machine

and resting upon rollers 14^a which are rotatably supported by pins 14^b fixed to the machine frame serve to raise the shaft 3 (see Figs. 1^b and 1^c). A rectangular gliding
 5 piece mounted loosely upon shaft 3, is guided by the uprights 15^a. The movement of the pitman 28 derived from the slotted link 26^a, causes the part 4 with the sucker rods 7 and 8 to swing about the shaft 3. During
 10 this movement, the idler 2 is maintained in gear with gears 1^a and 3^a by means of links 2^a and 2^b which are pivotally mounted upon shafts 1 and 3 respectively. During all these operations blowers (not shown in the draw-
 15 ings) blow air from the front between sheet and pile.

The construction of the suckers is shown in Figs. 10 and 12. They are of horseshoe section, so that the edge of the paper lies
 20 free between the two limbs of the horseshoe, and the tongs can enter between the said limbs and seize the taut edge of the sheet. A valve 16^a (see Fig. 10), serves to control the flow of air through the suckers so as to
 25 provide means for rendering those suckers inactive which are not being used for lifting the sheets in those cases in which the sheets are not very broad so that the middle suckers alone suffice to lift them.

30 On the front suckers 8^a of the rod 8 there are mounted vertical arms 16, from whose upper ends the front tongs 17 are pendent, said tongs being capable of oscillating freely forward and backward under the action of
 35 an adjustable weight 17^a, and of also swinging laterally on the pivot 17^b under the action of a weak spring 17^c. The tongs are closed at a suitable moment with the aid of rubber balls 18 (or by springs) by a blowing
 40 or pressure device (not shown). The vertical oscillations of the tongs are influenced by levers 19, secured to a rocking shaft 19^a mounted in brackets 24 and running parallel to the shaft 21, the said levers being adjusted
 45 to suit the size of the sheets and positions of the forms by means of set screws 19^b, that they just contact with the horizontal arms 17^c of the tongs when the latter, or the sheet, is in the register position.

50 The lateral tongs 17^a are mounted on the two lateral suckers 7^a, which must be adjusted to the particular width of paper in use. The two lateral tongs with the sheet are brought into the register position by le-
 55 vers 20 (similar to the levers 19). With the lateral tongs it is not the lateral, but the oscillating motion forward and backward (relatively to the edge of the paper) that is limited by springs 17^d, and the levers op-
 60 erate them sidewise.

The rocking-shaft 19^a with the levers 19, and the pins of the levers 20 are actuated by the shaft 21 by means of cam disks 22, 23. The shaft 21 is mounted in a frame 24, which
 65 is secured to the suction rods 7, 8. It is ro-

tated by the main shaft 1 with the aid of the Cardan shaft 25 and bevel gearing 26. The front tongs descend by gravity during the rolling up of the sheet toward the front
 70 edge of the paper, enter between the limbs of the suckers up to the paper and close upon it. Should the sheet lie at angle, the distance of the tongs from the vertical will be different, and will be the greater the
 75 more the edge of the sheet projects beyond the normal position. The distance of the tongs-arm 17^c from the corresponding lever 19 will also then be the greater, and the arm of this pair of tongs will therefor subse-
 80 quently be struck by the lever 19, as the tongs approach the vertical position. These will therefore be first influenced by their le-
 85 vers, so that the tongs are forced into the register position in succession and at the same time the rearward part of the front edge of the sheet will be drawn forward. Of the two lateral tongs 17^a, which are
 90 pressed against the side edges of the paper by a weak spring, the tongs whose arm is least far removed from the corresponding lever 20 will be first actuated by the latter and then effects lateral pulling over of the
 95 sheet into the normal position. Immediately after the sheet has been seized by the tongs, the suction action of the suckers ceases and the sheet now hangs from the tongs alone.

During adjustment, which proceeds as above described, the suction rods return to their initial position. At the same time the
 100 guide-lever 4 is caused to swing forward by the link 26^a, which is actuated by the cam disks 27 arranged in pairs adjacent to each end of the main shaft 1. The guide lever 4 and link 26^a are connected by the jointed rod
 105 or pitman 28 as shown most clearly in Figs. 1^b and 1^c. On forward swinging the tongs bring the sheet into the position in which the transport grippers can seize it (Fig. 6).

110 The transport device consists of two cruciform uprights 29 connected to constitute a carriage whose pendent arms 30 embrace a shaft 32 by means of long bosses 31. On this shaft there are mounted on each side
 115 two pinions 33, which run on two laterally mounted racks 34. The uprights 29 are prevented from tipping over by projecting arms 35, which take below the racks and have guide rollers 36. The horizontal cross arms
 120 37 each present a slot 38, in which there slide two pins 39, 40. From these pins there hang lugs 41, 42; between each pair of the latter there lie two superposed rods, those between the lugs 41 being marked 43, and
 125 those between the lugs 42 being marked 44. The rods turn on their own axis in the lugs. On the rods 44 are mounted the grippers 45 which act first, that is, those which engage
 130 backward between the first rods, 43, and open backward. On the rods 43 are mounted

grippers 46 which engage forwardly between the rods 44 and open forward. The lugs 41, 42 are reciprocated in the slot 38 by slotted levers 47, 48, which are keyed upon two shafts 49, 50, mounted at the top in the vertical cross arms. These shafts receive a swinging motion about their own axis through pendent link levers 51, 52, which are actuated by cam disks 53, 54. The latter receive their motion from the main shaft 32 of the transport device by means of toothed gearing.

The transport device is driven from the main shaft 1. On the latter there are mounted two cam disks 55, 56. Against these disks there lie the two arms 57, 58 of a fork which oscillates on the pin 59. The cams 55, 56 are so set relatively to each other that the fork swings to and fro with positive motion. On the fork there is mounted a long lever 60, to which a toothed rod 61 is jointed, which in reciprocating up and down turns a pin 62 to and fro by means of a toothed wheel 63. On the pin there is mounted a large toothed wheel 64 which engages with the small toothed wheel 66 mounted on a longitudinal shaft 65 of the transport device. The shaft 65 is thus turned to and fro by the main shaft 1.

The shaft 65 has a longitudinal groove 67, in which is guided a bevel wheel 68 mounted on the shaft. This bevel gear meshes with the bevel gear 69 keyed to the main transport shaft 32. The bevel gear 68 is shifted by a yoke in the slot 67 of the shaft 65 on reciprocation of the transport carriage. The latter thus slides to and fro on the inclined racks.

The paper is taken from the tongs by the grippers in the following manner. In the topmost position of the carriage all the gripper rods are located in the upper part of the slot; the grippers 45 facing the paper are open and seize the paper held by the tongs (Fig. 6). They are closed by the grooved levers 71, 72 which are in turn operated by the slotted levers 47 and 48. Said slotted levers 47 and 48 are actuated by cam disks 53 and 54 through the pendent levers 51 and 52. The tongs open, release the paper and swing upward. The carriage begins to roll down. At the same time front gripper bars 44 with their grippers 45 are pushed forward in the slot and draw the paper through between the rods 43 and their opened grippers 46. The rods 43 remain temporarily in the upper part of the slot (Fig. 7). Immediately the bars 44 have arrived at the bottom end of the slot, however, the two grippers 46 close, the grippers 45 release the paper and the grippers 46 slide downward with their rods 43 and the paper and push the paper between the bars 44 and the open grippers 45 downward, toward the printing cylinder. Immediately the cylin-

der fingers have seized the paper, the grippers 46 open also. The carriage rolls back again and the gripper rods slide upward in the slot. The grippers meanwhile remain open and are ready to carry down the next sheet.

With the above-described device in contradistinction to all prior like contrivances, the whole of the swinging parts execute but short oscillations and can therefore, be of small dimensions and weight. From this results the advantage of rapid working with small expenditure of power, and essentially less wear and tear of the moving parts. The peculiar rolling motion of the suckers admits of automatic descent by gravity of the front tongs toward the edge of the paper. Through delivery of the paper sheet by the suckers to the readily adjustable tongs, the register of the paper is rendered essentially simpler and more exact. The straight-line motion of two systems of transport grippers, which work simultaneously but at the same time independently enables more rapid working in so far that the path to be traversed by the transport carriage is considerably shortened. The sheet, again, is never neglected from the moment of lifting, to the time when it is seized by the printing cylinder; on the contrary, it is always under control and can thus, when once adjusted, never change its position relatively to the form.

It is to be understood that the machine described and the mechanisms for accomplishing the different requirements of the machine serve as a specific illustration of the principles of this invention and we do not limit ourselves, therefore, to such a design.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a self feeder for printing presses in combination means located above the paper pile for lifting the uppermost sheet, tongs fastened to said lifting means and adapted to seize the lifted sheet; and means for bringing the tongs and seized sheet into the position corresponding to the register position of the latter, whereby exact register is insured prior to the sheet being fed to the printing roller; substantially as described.

2. In a self feeder for printing presses in combination, suckers located above the paper pile; tongs fastened to said suckers and adapted to seize the lifted sheets; and means for bringing the tongs and seized sheet into the position corresponding to the register position of the latter, whereby exact register is insured prior to the sheet being fed to the printing roller; substantially as described.

3. In a self feeder for printing presses, in combination, front and side suckers located above the paper pile, tongs, presenting

arms fastened to the front and side suckers and adapted to seize the sucked sheet; rocking shafts presenting levers adjustable to the size of the sheet and the position of the
 5 form, and projecting into the path of the tong-arms and depressing the latter when the tongs are displaced, whereby all the tongs are kept properly adjusted, and exact register insured; substantially as de-
 10 scribed.

4. In a self feeder for printing presses, in combination, front and side suckers located above the paper pile, oscillating spring actuated tongs, adapted to seize the
 15 lifted sheet, fastened to the front and side suckers, the front tongs being adapted to swing freely backward and forward but being spring controlled in lateral direction, while the lateral tongs are adapted to
 20 swing forward, but are spring controlled in the direction to and from the paper; and means for bringing the tongs and seized sheet into the position corresponding to the register position of the latter, whereby ex-
 25 act register is insured; substantially as described.

5. In a self-feeder for printing presses, in combination, suckers of horseshoe cross-section; oscillatable tongs carried thereby and
 30 adapted to enter the gap of said horseshoe section to seize the sheet; and means for bringing the tongs and seized sheet into the position corresponding to the register position of the latter.

35 6. In a self feeder for printing presses, the combination of the suckers oscillatable first in an arc backward and upward and then forward and downward; tongs carried by said suckers and adapted to seize the
 40 sucked sheet; and means for bringing tongs and sheet into the position corresponding to the register position of the latter, whereby exact register is secured.

7. In a self-feeder for printing presses, in
 45 combination, means for lifting the uppermost sheet of a pile and for bringing same into the register position, whereby exact register is insured; and two independent sets of grippers for feeding the sheet to the
 50 printing cylinder, the one set performing the first part of the operation and the other set the final part thereof; substantially as described.

8. In a self-feeder for printing presses,
 55 in combination, means for lifting the upper-

most sheet of a pile and for bringing same into the register position, whereby exact register is insured; a carriage and two independent and successively operating sets of grippers carried thereby for feeding the
 60 sheet to the printing cylinder; substantially as described.

9. In a self-feeder for printing presses, in combination, suckers located above the paper pile; tongs carried by said suckers, 65 said tongs being adapted to seize the sucked sheet; means for bringing tongs and sheet into the position corresponding to the register position of the latter, whereby exact register is insured; and two independent 70 sets of grippers for feeding the sheet to the printing cylinder, the one set performing the first part of the operation and the other set the final part thereof; substantially as described. 75

10. In a self-feeder for printing presses, in combination, suckers located above the paper pile; tongs carried by said suckers and adapted to seize the sucked sheet; means for bringing tongs and sheet into the posi- 80 tion corresponding to the register position of the latter, whereby exact register is insured; a carriage; and two independent and successively operating sets of grippers carried thereby for feeding the sheet to the 85 printing cylinder; substantially as described.

11. In a self-feeder for printing presses, in combination, suckers located above the paper pile; tongs carried by said suckers and adapted to seize the sucked sheet; means for 90 bringing tongs and sheet into the position corresponding to the register position of the latter, whereby exact register is secured; a carriage; and two sets of grippers carried thereby, the front set gripping the sheet and 95 carrying it through the rear set and then releasing it, whereupon the rear set conveys the sheet through the front set to the printing cylinder; substantially as described.

In testimony that we claim the foregoing 100 as our invention, we have signed our names in presence of two subscribing witnesses.

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