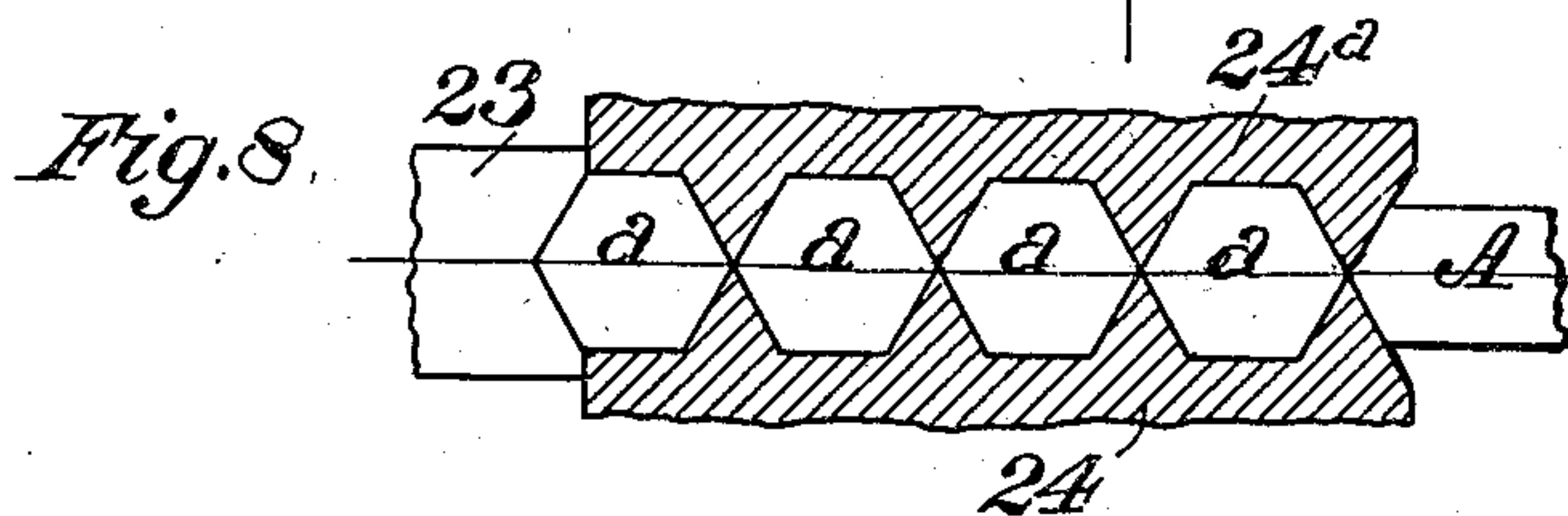
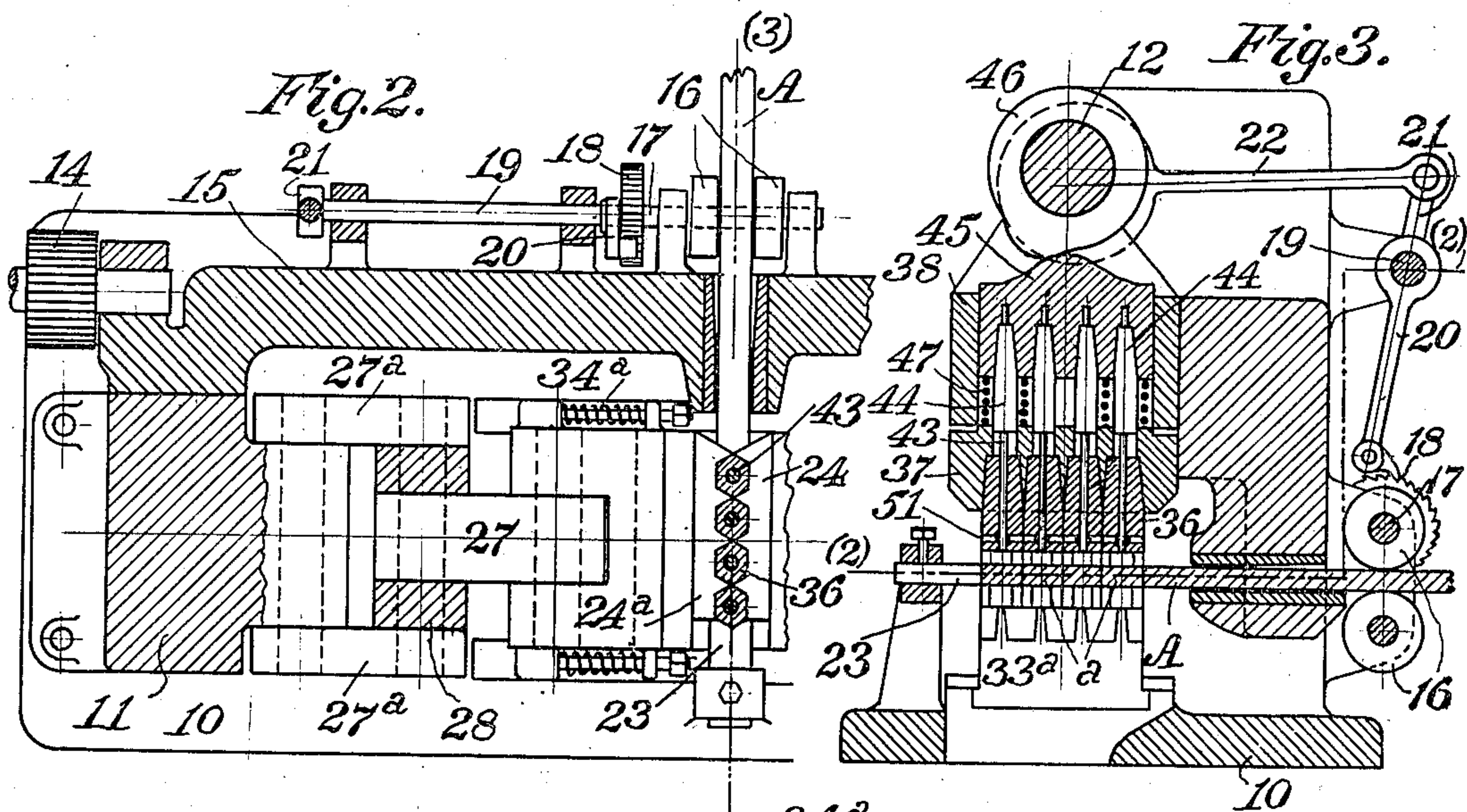
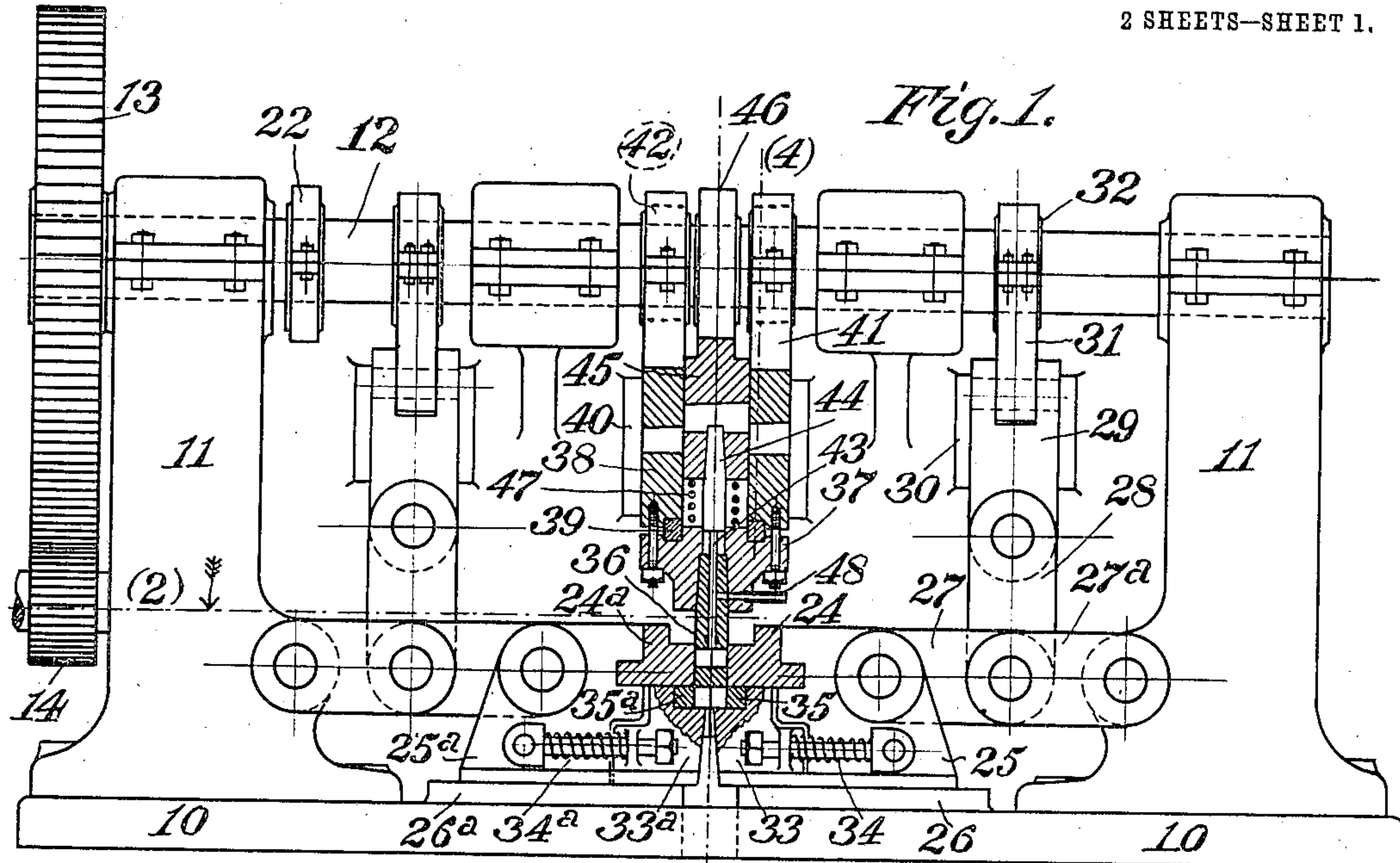


No. 837,435.

PATENTED DEC. 4, 1906.

P. G. TRUEBE.
NUT MAKING MACHINE.
APPLICATION FILED MAR. 13, 1905.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4.

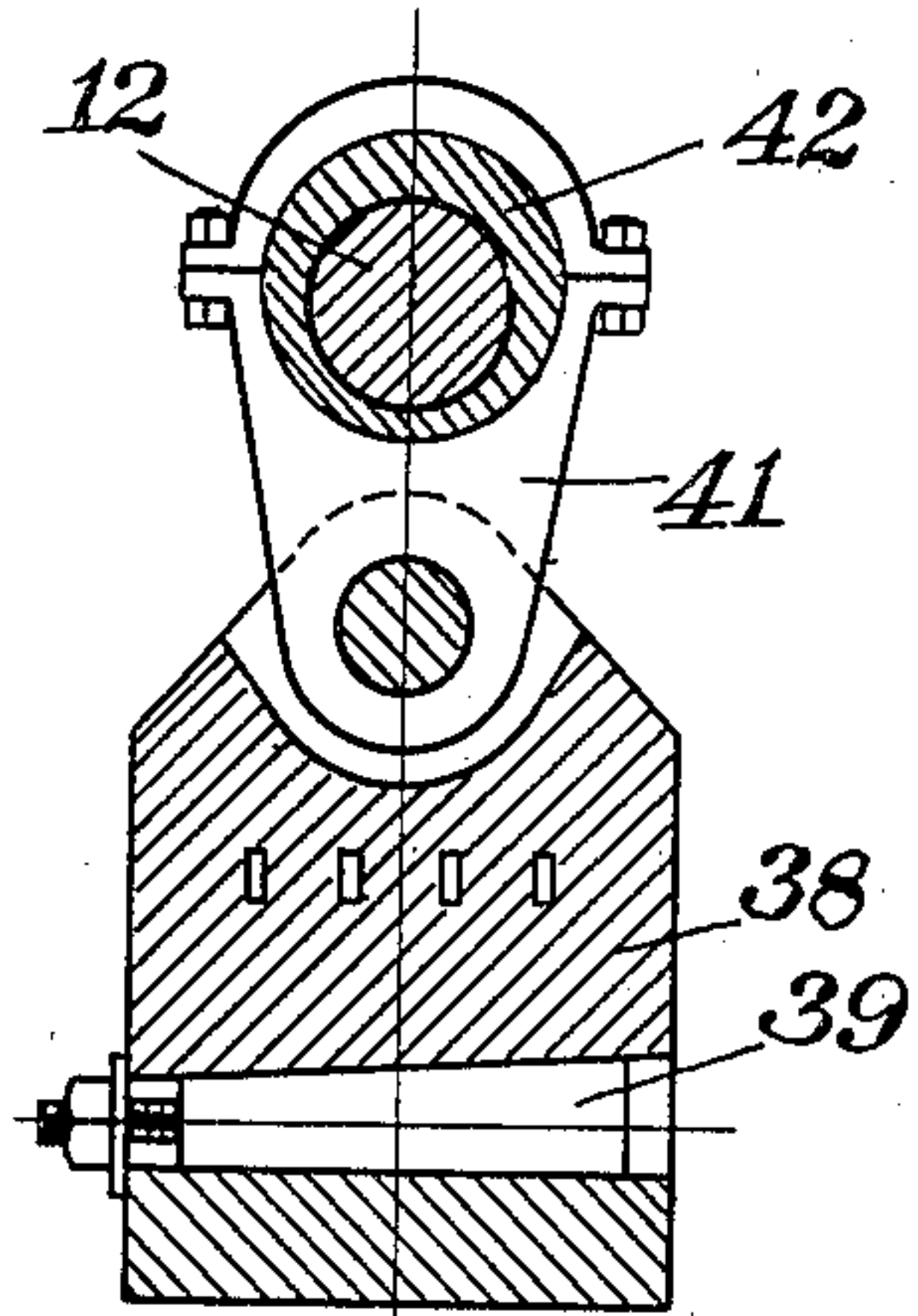


Fig. 5.

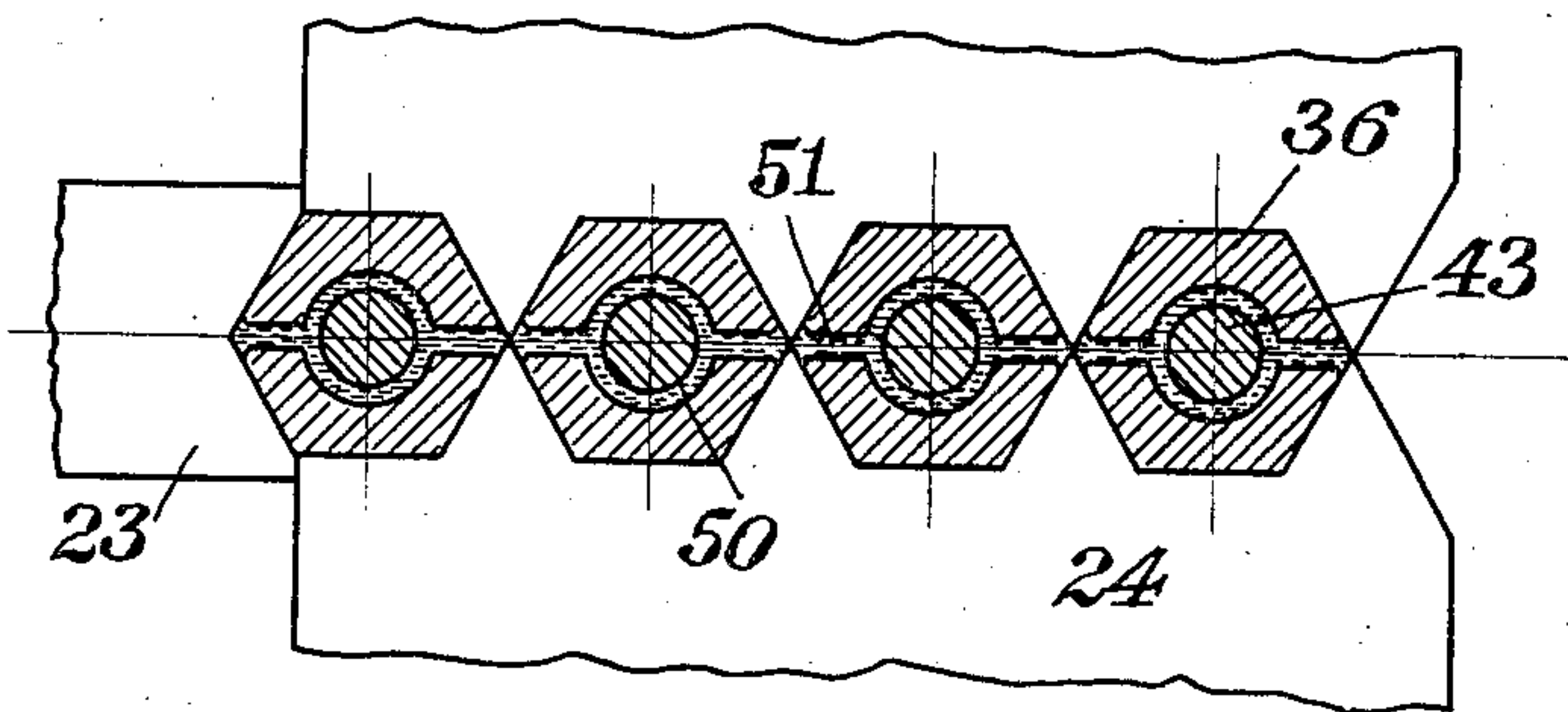


Fig. 6.

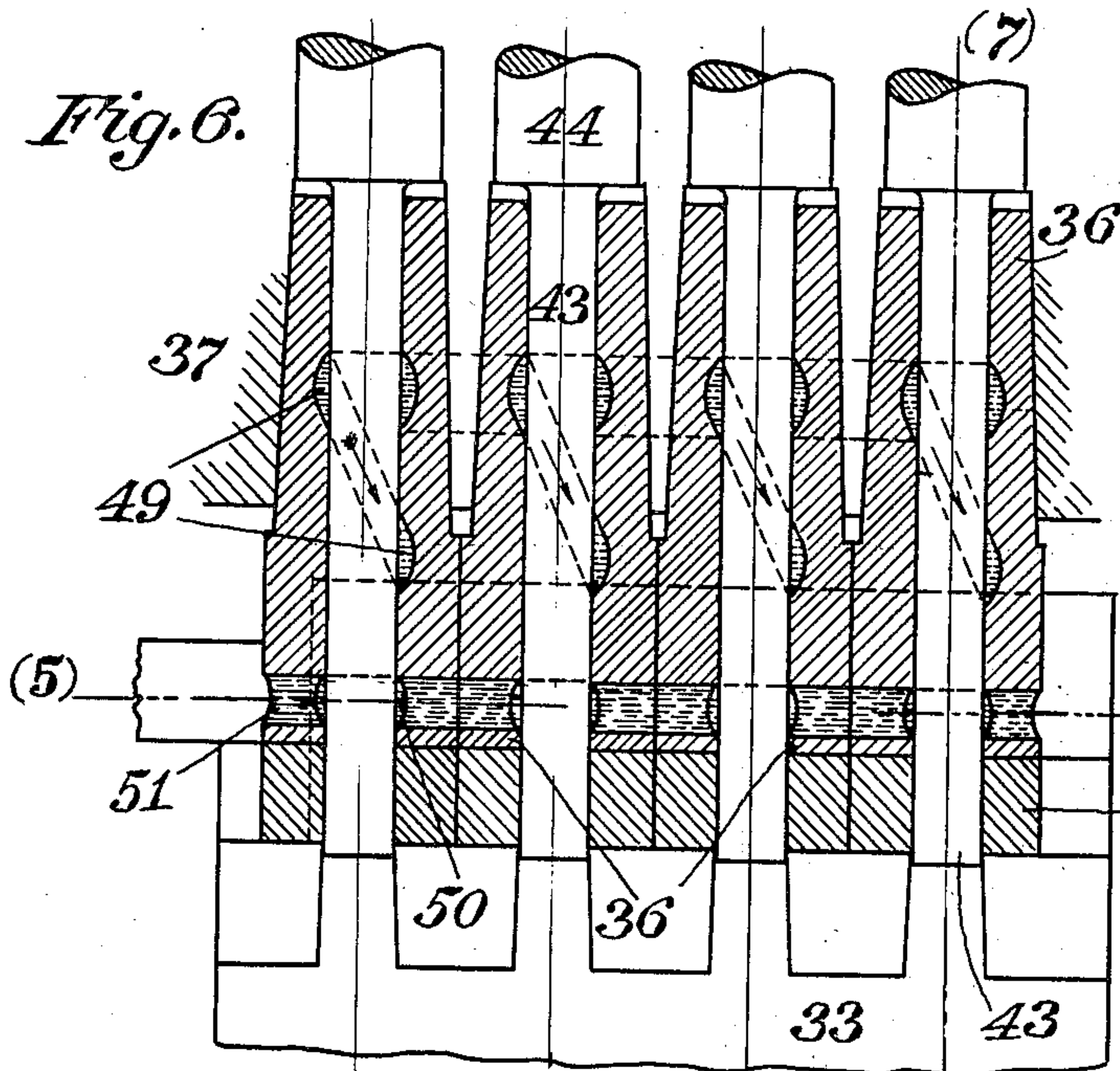
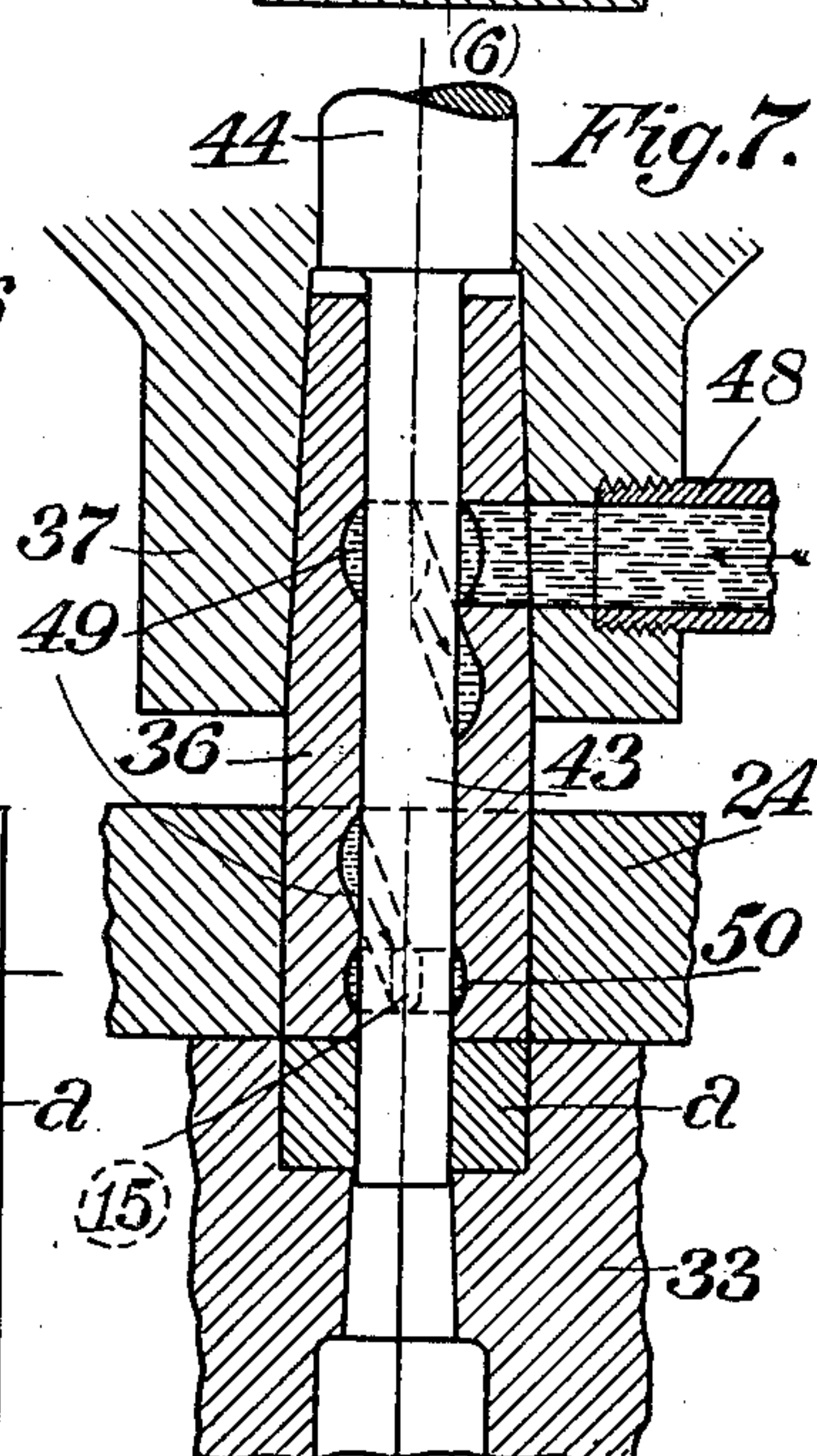


Fig. 7.



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PAUL G. TRUEBE, OF ALLEGHENY, PENNSYLVANIA.

NUT-MAKING MACHINE.

No. 837,435.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed March 13, 1905. Serial No. 249,767.

To all whom it may concern:

Be it known that I, PAUL G. TRUEBE, a subject of the German Emperor, now residing at Allegheny, in the State of Pennsylvania, have invented certain new and useful Improvements in Nut-Making Machines, of which the following is a specification.

My invention relates to mechanism for automatically forming the blanks of metallic nuts ready for threading, and its primary objects are, to form the nut blank without shearing, to press the nut into finished shape and punch it at one operation without moving the nut, to provide more efficient feeding and ejecting devices for such machines, to provide superior cooling means for the punches, and to generally simplify and make a more accurate operation of nut forming machines. These objects and other advantages which will hereinafter appear, I attain by means of the construction illustrated in a preferred form in the accompanying drawings, wherein—

Figure 1 is a side elevation of the whole machine with parts of the dies shown in section;

Figure 2 is a partial horizontal section of the machine taken on line (2) in Figure 1 and line (2, 2) in Figure 3;

Figure 3 is a partial vertical section through the machine taken along the line (3) in Figure 2;

Figure 4 is a detail partly in section on line (4) in Figure 1, showing the means for operating the plunger head;

Figure 5 is a partial horizontal section through the punches, taken along the line (5) in Figure 6;

Figure 6 is a partial vertical section through the plungers, showing the punches in action and the means for cooling the punches;

Figure 7 is a section taken at right angles to the section of Figure 6, and

Figure 8 is a partial sectional view showing the operation of the forming dies in cutting off and shaping the nut blanks.

In order to avoid waste of the metal in making the blanks from bars, I shape the blank in the first instance by forming dies which cut and press the shape and do all the necessary shearing in compressing the hot metal into the form of the blank at once, leaving no waste. (See Figure 8.) In order to simplify the machine, I punch the central hole in the blank at the same time that the

blank is pressed in the finishing die to give it its final shape, and have arranged the operating parts so that the nut does not materially move during the operation from its original position as cut off from the stock bar. The machine is shown in its simplest and most compact form in the drawing, but it will be understood that its general features are applicable to different forms of nuts and like articles and the machine may be elaborated to more efficiently affect the various operations, the example shown being merely illustrative of the general features and the principle of operation.

In the accompanying drawings it will be seen from Figure 1 that I have provided upon a base 10, two uprights 11, which carry a heavy horizontal shaft 12 driven by a large gear wheel 13, which in turn may be driven by a gear 14 from a pulley shaft or otherwise supplied with power as may be desired. Referring to Figures 2 and 3 especially; the bar of hot stock metal A is preferably fed into the machine direct from a heating furnace, and drawn between two rollers 16 which are mounted upon shafts 17 attached to a vertical plate or other support 15 on the back side of the machine. The shaft 17 carries a ratchet wheel 18 and above its shaft, upon a supplemental shaft 19 I have mounted a feeding dog upon a pivoted arm 20 which has an upward extension 21 and this is operated by the link 22 which has a head engaging an eccentric upon the shaft 12, as will be seen from Figure 3. This mechanism automatically advances the bar of stock metal A into the machine at intervals, and a predetermined distance.

The bar A being fed in a horizontal direction through the machine, sliding on top of the finishing dies to be hereinafter described, is brought into proper position by means of an adjustable stop bar 23 shown in Figures 2, 3; and 8, and the present machine is arranged to make four nuts at a time. The bar being in place is cut by the horizontally reciprocating forming or shaping dies 24 and 24^a, which are mounted upon horizontally sliding brackets 25 resting upon the plates 26 on the base 10 of the machine. They are reciprocated to and fro by means of the toggle links 27, 27^a, which are spread horizontally by the downward motion of a link 28 which is connected to a sliding cross-head 29 guided in fixed guides 30 and moved by means of a link 31, which has a yoke engag-

ing an eccentric 32 upon the horizontal driving shaft 12. It will be clear from Figure 8 how the coming together of these two serrated dies 24, 24^a, will form a series of nut
 5 blanks *a, a*, pressing and cutting them off from the bar and at the same time giving them a hexagonal form.

Mounted upon the front of the sliding brackets 25, on plate 26 and beneath the
 10 dies 24, 24^a, is a two-part finishing die 33, 33^a, with properly formed steel faces 35 as may be desired, and they are mounted to reciprocate with the sliding brackets 25, but also having a motion independent from
 15 them, being first closed together by means of compression springs 34 upon pivoted bolts on the bracket as shown in Figure 1. It is to be noted that in the horizontal reciprocating motion of the brackets 25, the finishing
 20 dies 33, 33^a, will be brought together before the forming dies 24, 24^a meet, and in the reverse motion the forming dies will open first and afterward the finishing dies will be drawn open.

25 The blanks for the nuts having been pressed as shown in the form of Figure 8, it will be seen from Figure 1 especially, that I have provided a pressing plunger 36 which is carried in a head 37 adjustably attached to
 30 a reciprocating cross-head 38 by means of bolts and adjustable therein by the wedges 39 to the proper height. The cross-head 38 reciprocates in fixed guides 40 and is moved as shown in Figure 4, by means of a link 41
 35 which has a yoke engaging an eccentric 42 fixed upon the main driving shaft 12 of the machine. The plungers 36 descending at the proper time will press the nut blanks *a, a, a, a*, through the forming dies and into the
 40 finishing dies 33, 33^a. Immediately thereupon a punch 43 descends to form the hole in the nut. This punch is carried in a stock 44 which is firmly secured in a cross-head 45 guided inside of the head 38 and is forced
 45 down at the proper time by means of the cam 46 which is fixed upon the shaft 12. The head 45 is normally pressed upward in head 37-38 by means of coil springs 47 or by any other means as may be desired. The
 50 punch 43 descends and coöperates with a properly formed hole in the bottom of the finishing dies 33, 33^a to punch out the thread hole. Thereupon the brackets 25 first recede carrying with them the finishing dies 33,
 55 33^a and immediately upon these being opened the punch 43 is withdrawn from the nut, which is thus left entirely loose from all surrounding parts and drops down from contact with the plunger 36 through the dies and to
 60 the bottom of the machine in a finished condition.

From Figures 5, 6, and 7 especially, it will be observed that I have provided for the cooling of the punches 43 by means of a water pipe 48 which may enter through head

37 to plunger 36, to a continuous passage 49 formed spirally around the interior in contact with the punches and ending at the bottom in annular space 50 with outlets 51
 70 which communicate with the other plungers. It will be seen that the stream of water keeps the punches cool and also the contiguous surfaces of the pressing plunger as well as the several dies.

From the above description it will appear
 75 that the operation is as follows: The bar A being inserted in the machine in hot condition is set forward a sufficient distance to bring its end against the stop 23 by means of the roller 16 and the ratchet 18 operated as
 80 heretofore described; whereupon the horizontally reciprocating forming dies 24, 24^a, come together and at the same time cut and forge and compact the metal thoroughly, forming a number of blanks for the nuts.
 85 While these dies are still together, the plunger 36 descends and shoves the blank into the finishing dies 33, 33^a, which it will be observed are spring pressed and are brought together a little in advance of the closing of the
 90 forming dies and also remain together a little after the separation of the forming dies. While the nut blank is in the finishing dies and is kept pressed down firmly by the plunger 36, the punch 43 descends and forms a
 95 hole therein, whereupon the forming dies 24, 24^a are first withdrawn and immediately thereupon the finishing dies 33, 33^a, leaving the nut on the punch 43 in contact with the plunger 36; the punch is then withdrawn,
 100 when the nut in finished condition drops into the bottom of the machine, and the same operations are repeated, the plungers and dies being kept cool in the meanwhile by the flow of water through the pipe 48 and its connected
 105 passages as heretofore described. The nut blanks are thus cut off from the stock bar and they are not moved except to shove them from the forming dies, and the punching and final shaping of the nut take place at
 110 the same time, without relative movements of the parts. There is no shearing action proper, and it will be observed that by the form of the dies 24 and 24^a the metal is forged and thoroughly compacted and that
 115 the blank is held upon all sides by the finishing die at the time the punching is done, so that the punching will not distort the shape of the nut or cause the hole to be punched in an inaccurate position. The punch is guided
 120 throughout its length at all times. Other advantages of the machine will readily occur to those familiar with the art and with the operation of such machines.

Having thus described my invention and
 125 illustrated its use, what I claim as new, and desire to secure by Letters Patent, is the following:

1. In a nut making machine, the combination with a pair of cutting and forming dies, 130

of a sectional finishing die beneath and in register therewith, a plunger operating to push the nut out of the forming die and pressing it into the finishing die, a punch carried in and
5 operating simultaneously with the said plunger, and means to properly move the said parts and to open both dies.

2. In a nut making machine, the combination with a pair of reciprocating members carrying coöperating forming dies, and means to move them together, of a sectional finishing die carried on each forming die and in register therewith there being means for holding the finishing dies resiliently in contact with each
15 other, the same moving with and in advance of the forming dies, and a plunger operating to remove the nut from the forming dies and press it into said finishing die at one motion, substantially as described.

3. In a nut making machine the combination with a set of forming dies and a set of finishing dies immediately thereunder and means for closing the dies, of a plunger and a punch located in the plunger, means to operate the plunger and press the blank into the finishing die, means to depress the punch, and means to withdraw all the dies before the punch is withdrawn from the nut, substantially as described.

4. In a nut making machine the combination with suitable dies, of the presser plunger 36 and the punch 43 located therein and means for depressing and raising the plunger both in advance of the movement of the
35 punch therein, substantially as described.

5. In a nut forming machine the combination with operating toggle links and mechanism for reciprocating them, of a pair of reciprocating and forming dies attached to said
40 links, a pair of finishing dies resiliently supported on the forming dies, in advance but in normal alinement therewith, and a suitable plunger and punch for removing the nut

blank from the forming die to the finishing die and punching it in place therein, substantially as described. 45

6. In a nut making machine a punch and a cooling device for the punches comprising a guiding casing having a spirally arranged passage around the punch and means for reciprocating the punch through said casing, whereby all parts of the punch are brought in contact with the water, substantially as described. 50

7. In a nut making machine the combination with the forming dies, of a plunger for removing the nut from said die, and a punch therein for perforating the nut, and a water supply and a passage in said plunger spirally surrounding the punch and having an outlet
60 discharge to cool the dies, substantially as described.

8. In a nut making machine the combination with suitable dies, and a plunger for moving and holding the nut, of a perforating
65 punch operating in the plunger, and means for adjusting the vertical travel of the plunger independent of the punch, substantially as described.

9. In a nut making machine the combination with suitable forming and finishing dies, of a pressing plunger and a punch contained within said plunger, and means to reciprocate it therein so as to perforate the nut while the plunger holds it down in the finishing die,
75 and means for removing of the dies before the withdrawal of the punch from the nut, substantially as described.

In testimony whereof I have hereunder signed my name in the presence of the two
80 subscribed witnesses.

PAUL G. TRUEBE.

Witnesses:

F. E. GAITHER,

ARCHWORTH MARTIN.