

J. C. HANSEN-ELLEHAMMER.  
CIGARETTE MACHINE.

(Application filed June 8, 1901.)

(No Model.)

4 Sheets—Sheet 1.

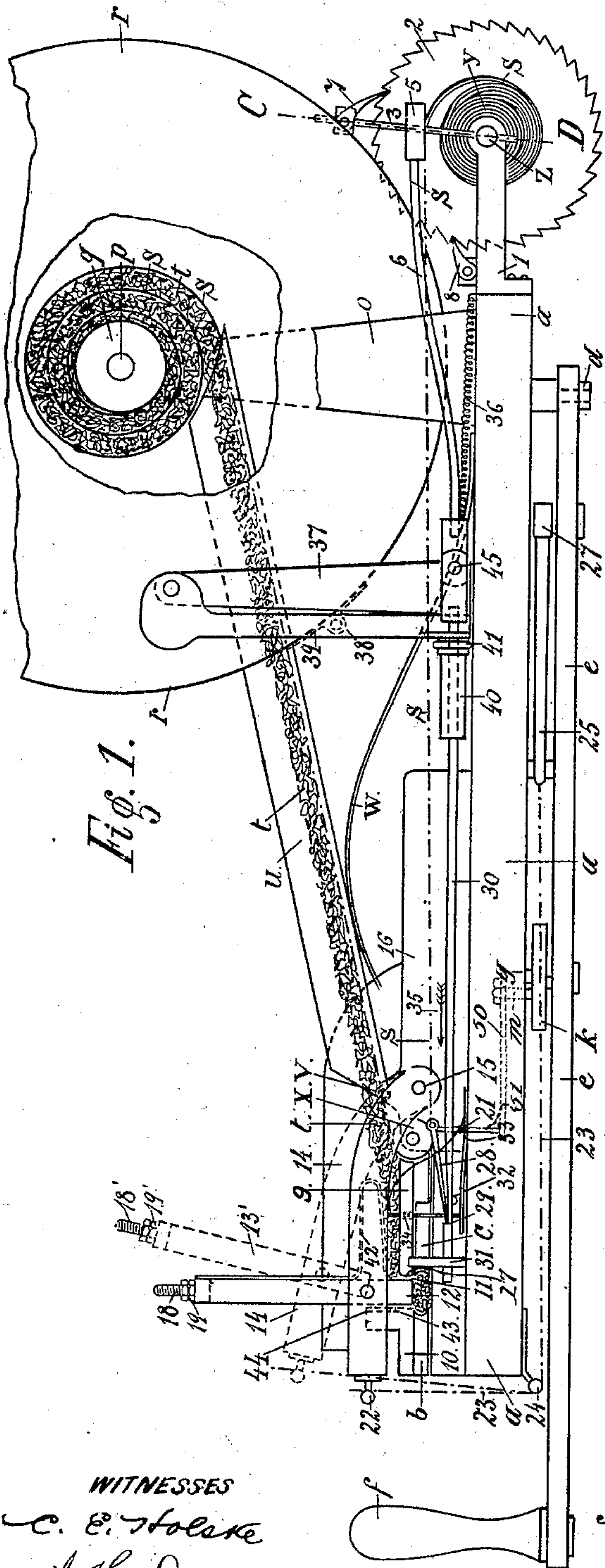


Fig. 1.

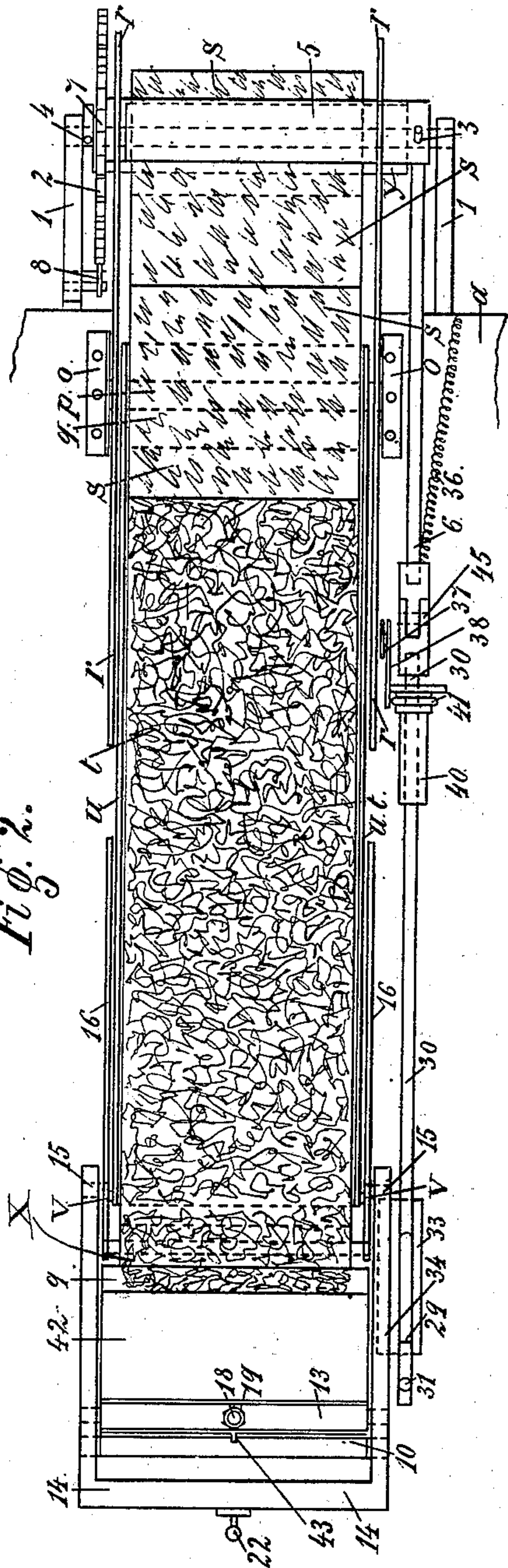


Fig. 2.

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Fig. 3.

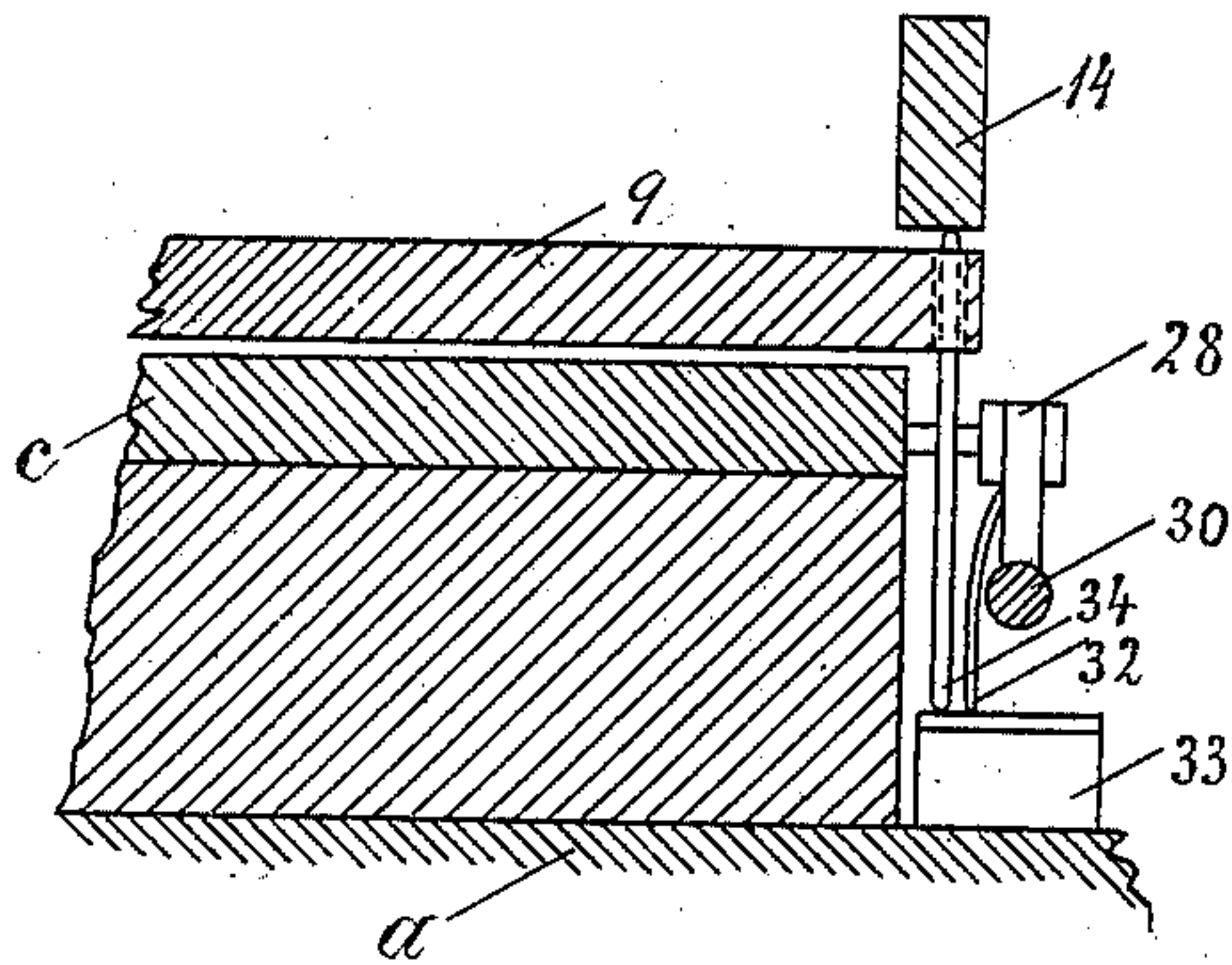


Fig. 4.

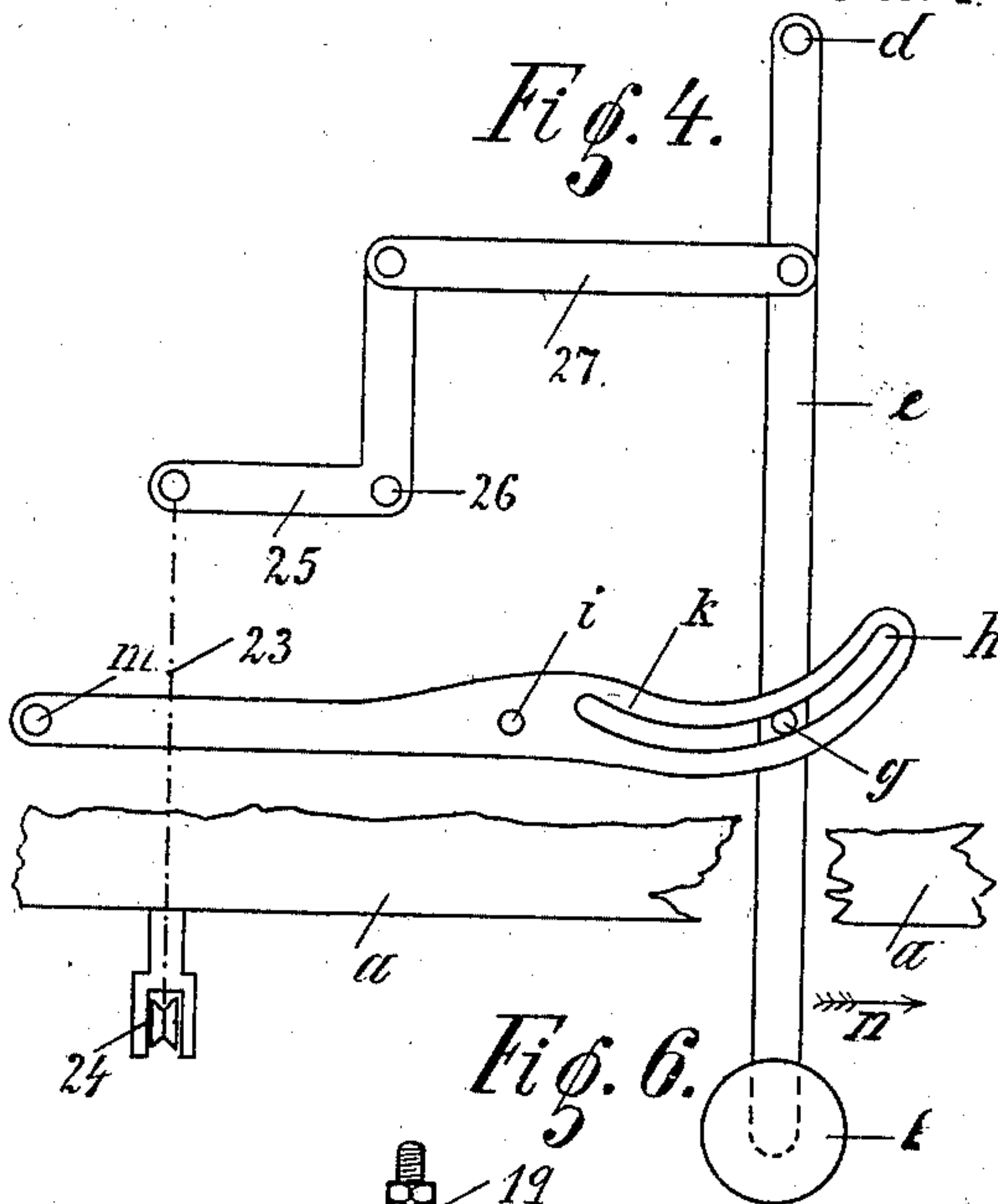


Fig. 5.

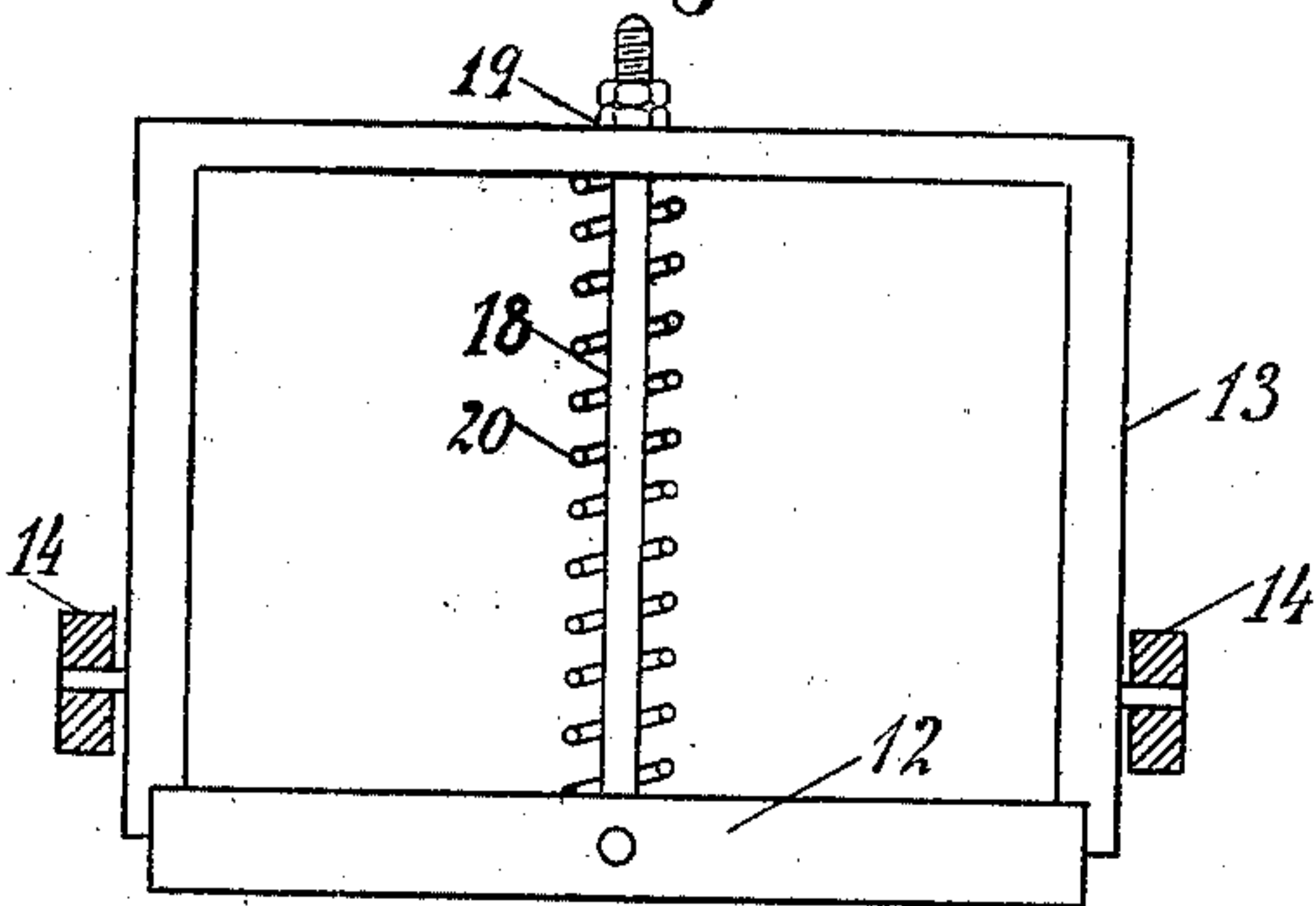


Fig. 6.

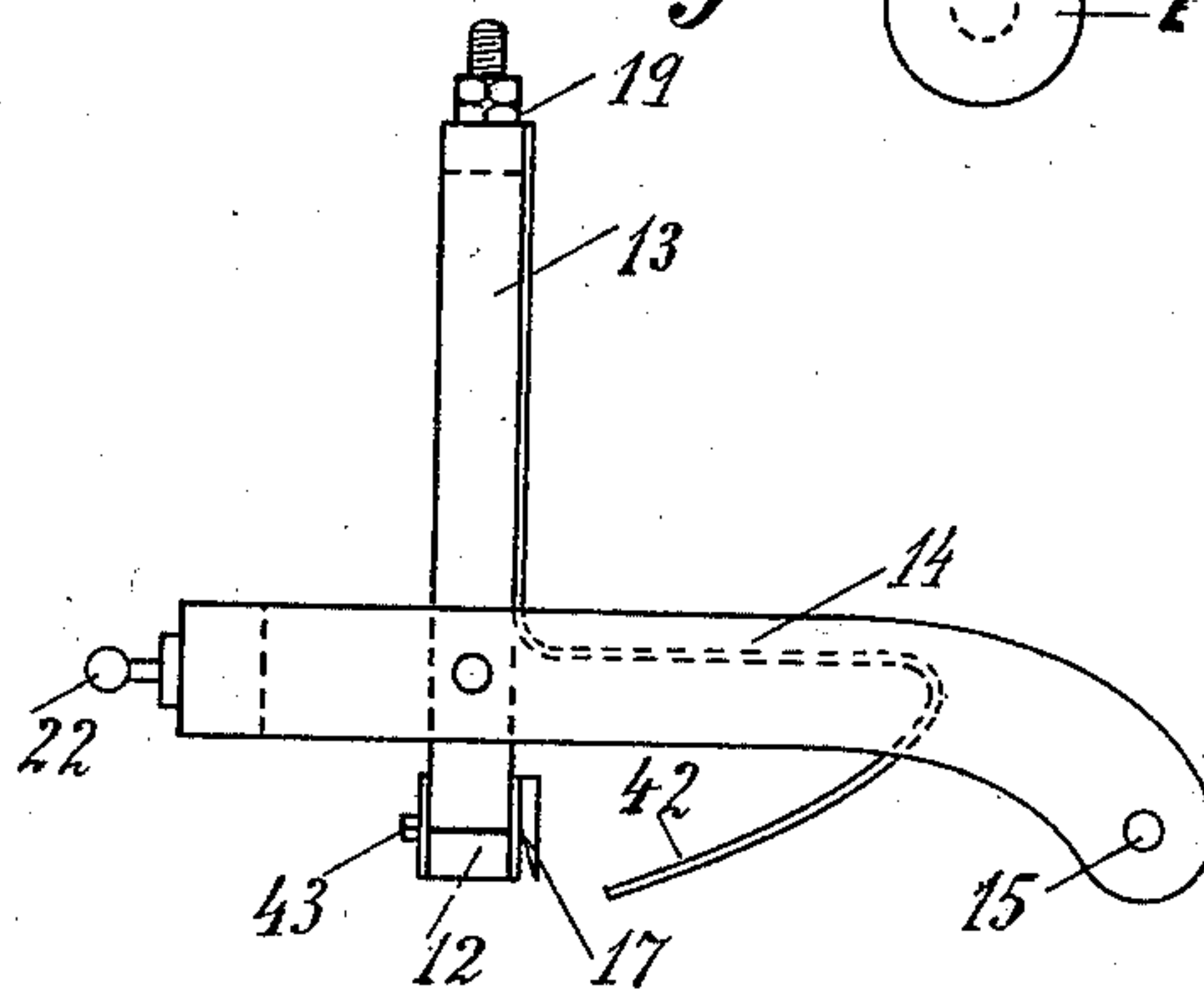


Fig. 7.

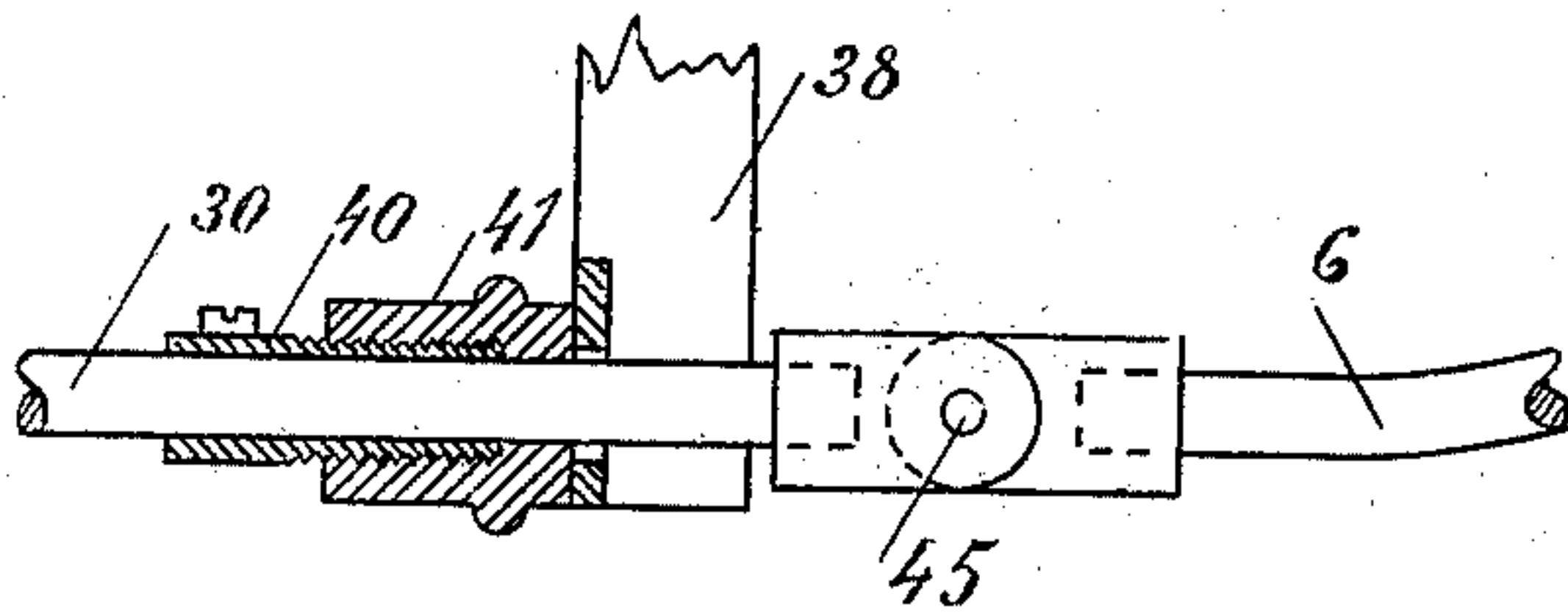
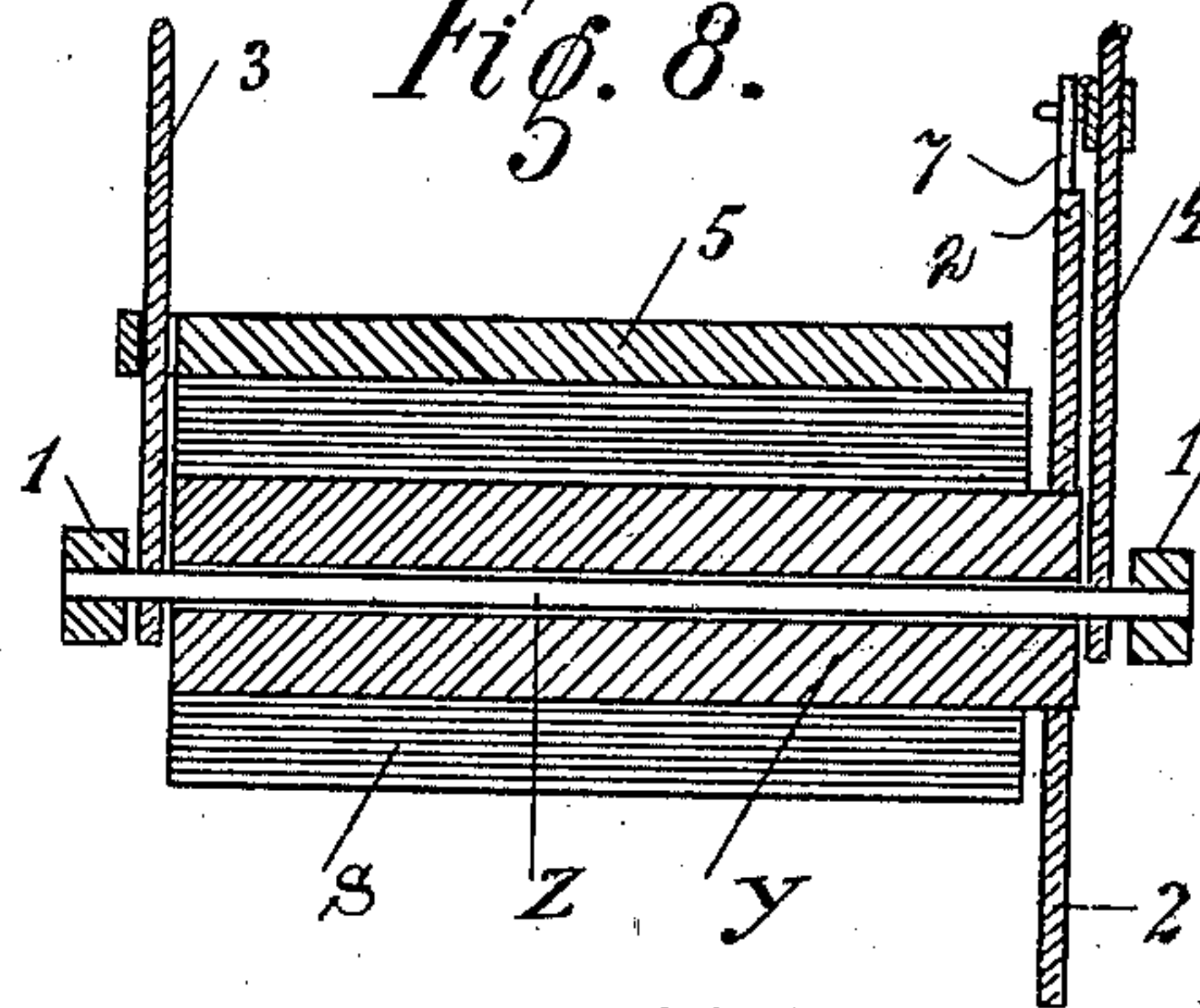


Fig. 8.



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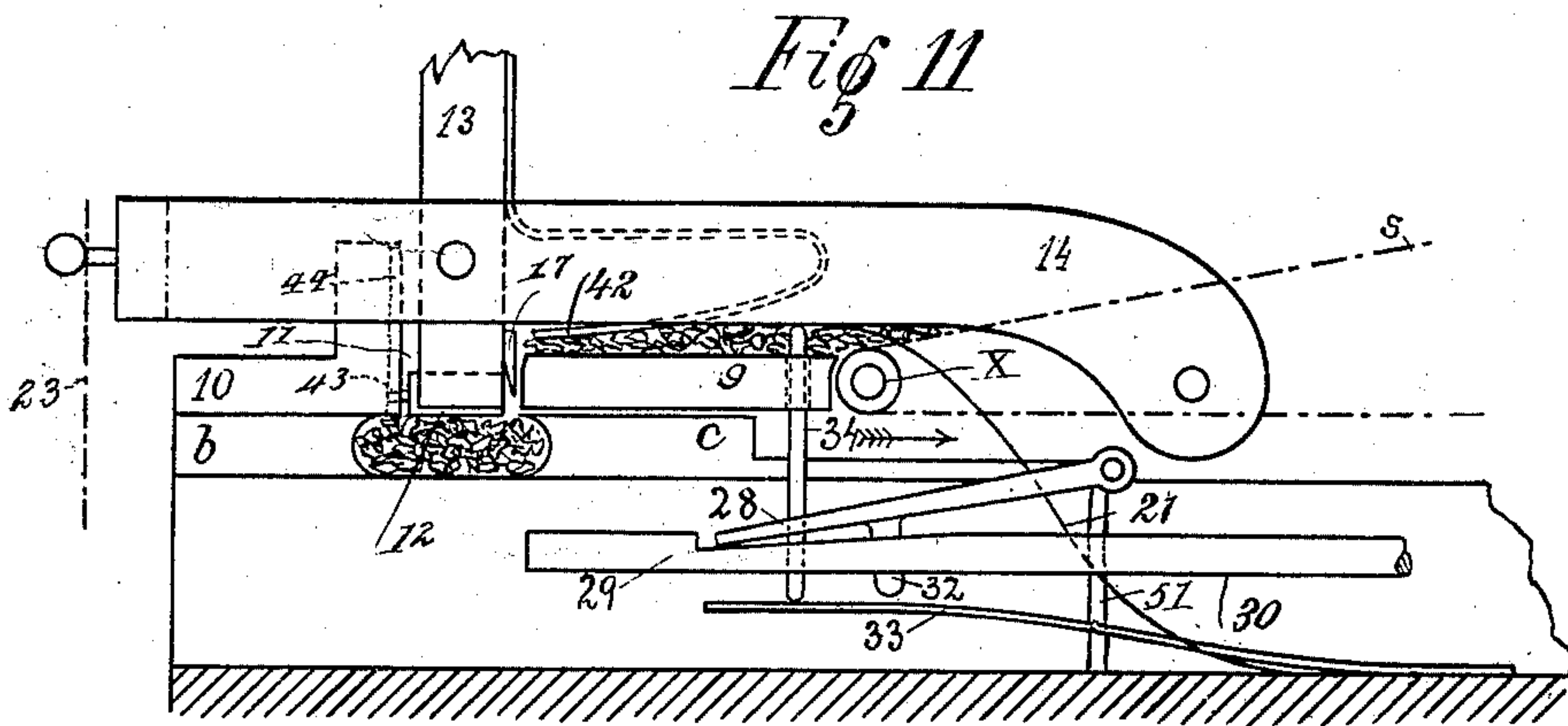
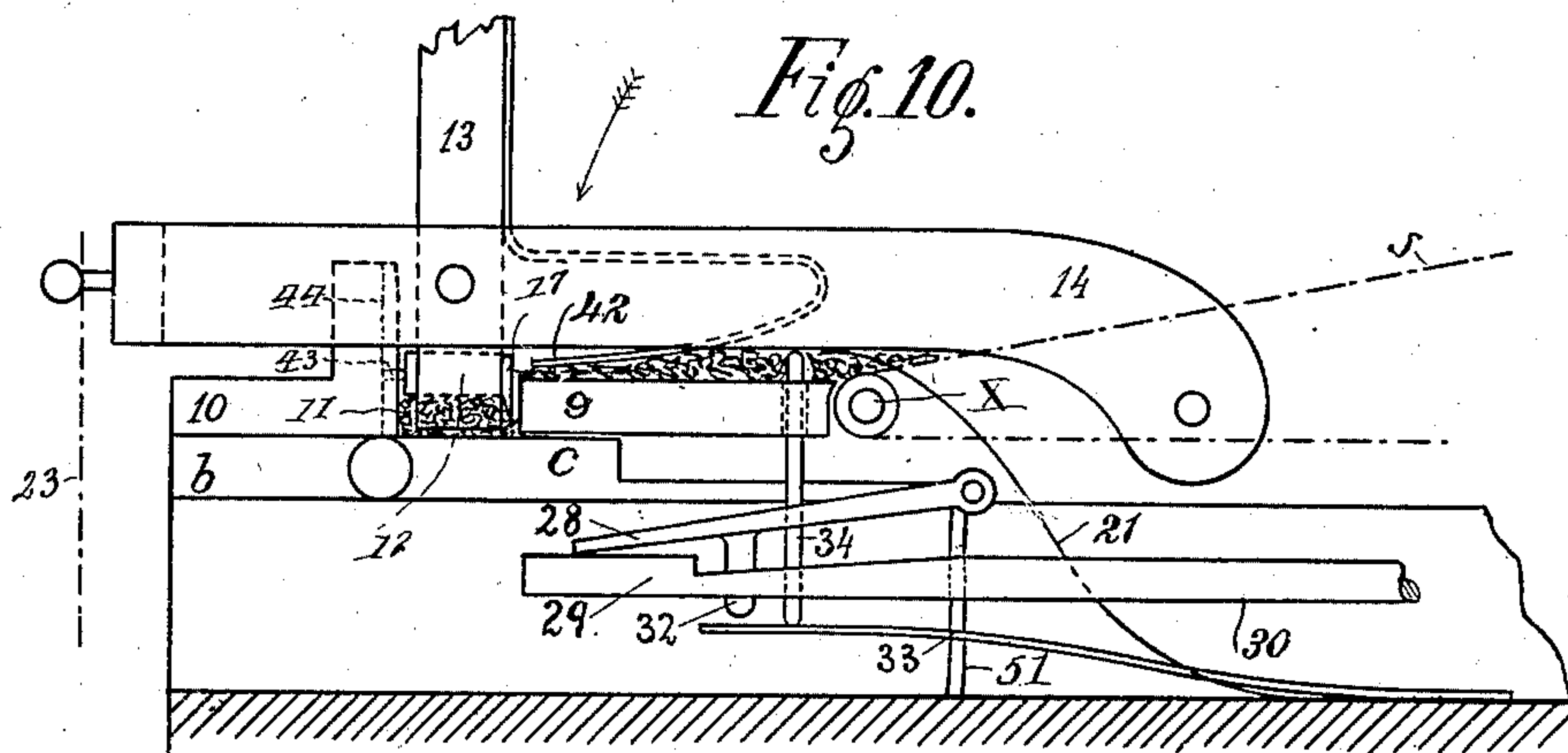
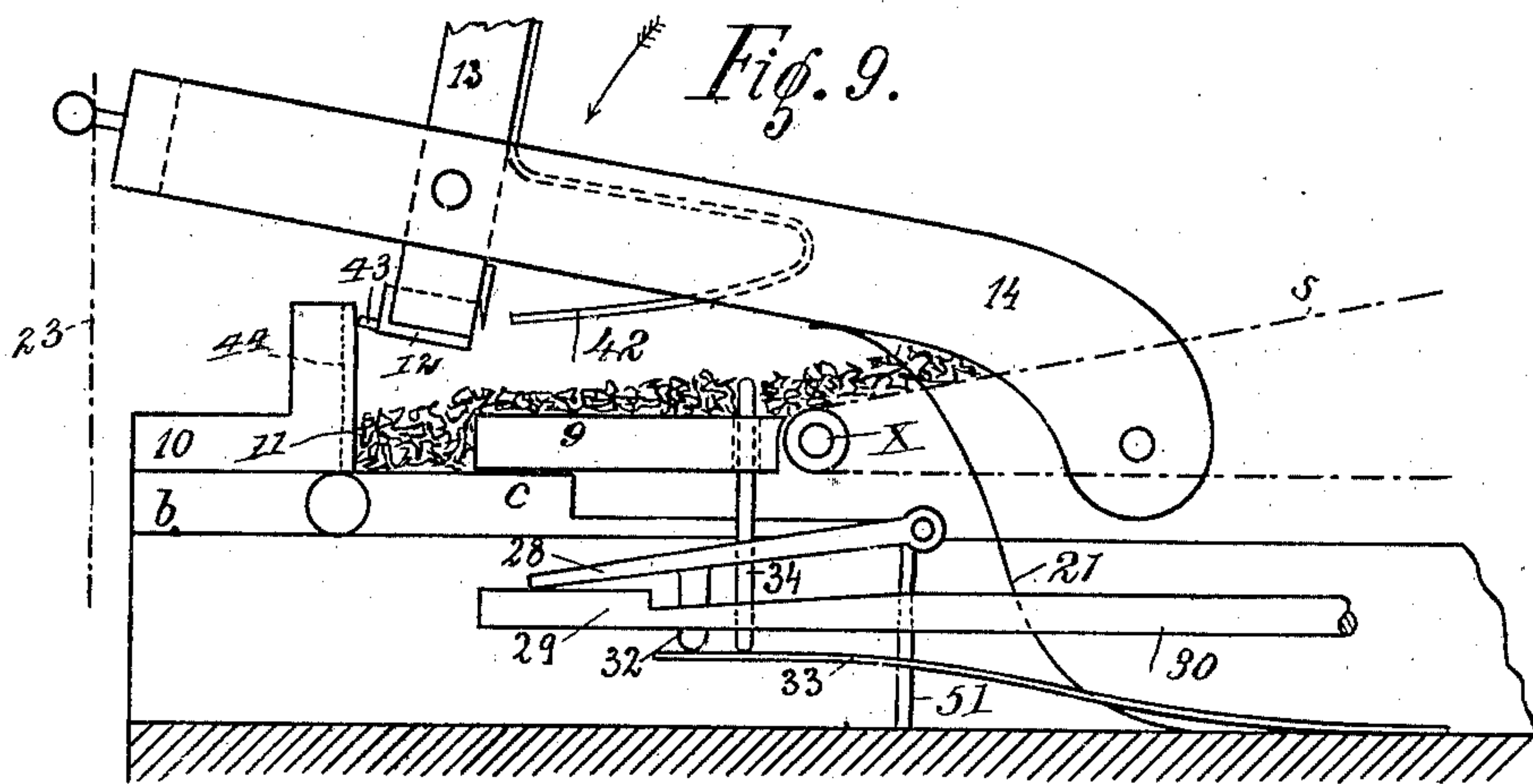
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4 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

JACOB CHRISTIAN HANSEN-ELLEHAMMER, OF COPENHAGEN, DENMARK.

## CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 702,206, dated June 10, 1902.

Application filed June 8, 1901. Serial No. 63,721. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB CHRISTIAN HANSEN-ELLEHAMMER, mechanical engineer, of 22 Oehlenschlaegersgade, Copenhagen, in the Kingdom of Denmark, have invented certain Improvements in Cigarette-Machines, of which the following is a specification.

The object of the present invention is an apparatus for automatically dividing off and filling the tobacco into the pressing-molds of cigarette-machines.

My present invention contemplates the employment of an improved filler-forming mechanism, to be hereinafter fully described, in which I employ a mold to which is delivered a layer of tobacco that is divided or cut off by the action of a combined plunger and cutter mechanism, the same being capable of reciprocatory movement. The plunger serves to pack the tobacco and press it down between the pressing-molds and also to shut off the space in which the tobacco is located as the molds are nearing each other in such a manner that the totality of the tobacco cut off is gathered together and no portion of same is lost by escaping to the sides of the molds during the process of pressing.

The present invention is further characterized thereby that the feeding of the tobacco is effected by means of a band wound upon a revolving drum and between the windings of which band the tobacco is placed. During the work of the machine the said band is moving intermittingly.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 shows the machine in side elevation. Fig. 2 shows the machine seen from above. Figs. 3 to 8 are details. Figs. 9 to 13 show the molds and the ram in different positions.

$a$  is the base of the apparatus;  $b$  and  $c$ , the two pressing-molds. The mold  $b$  is stationary, while the mold  $c$ , by means of a lever system below the base-plate, Figs. 1 and 4, may be moved away from or toward the mold  $b$ . The said lever system consists of a lever  $e$ , capable of turning on a pin  $d$  and provided with a handle  $f$ . On the lever  $e$  is a pin  $g$ , arranged to move in a slot  $h$  in a lever  $k$ , which lever can turn around a fixed pin  $i$  and whose other end is provided with a pin  $m$ , which,

by means of a rod 50, is attached by the pin 51 to the mold  $c$ , as shown in Fig. 1. When the handle  $f$  is moved in the direction indicated by the arrow  $n$ , Fig. 4, the mold  $c$  will be moved away from the mold  $b$ . To the base  $a$  are fixed two standards  $o$ , forming the bearings for a horizontal shaft  $p$ , carrying the drum  $q$ . This drum is provided with two large flanges  $r$ , of sheet metal or the like, the distance between the two flanges being equal to the width of the band  $s$ , the latter being made of paper, cloth, or any suitable material.

As already mentioned, the band is wound upon the drum  $q$  in such a manner that there is always a continuous layer  $t$  of tobacco between two layers of paper. The band coming from the drum  $q$  is led along a slanting board  $u$ , the lower end of which is arranged to turn on an axle  $v$ , while its upper end is constantly held up against the drum by means of a spring  $w$ . The slanting board will thus always offer a support for the band and the tobacco layer on same.

Close in front of the axle  $v$  is a roller  $x$ . The band is carried around this roller and thence backward to another roller  $y$ , turnably arranged on a shaft  $z$ , which in its turn rotates in suitable bearings in a fork  $l$ . At one end of the roller  $y$  is placed a ratchet-wheel 2. To the shaft  $z$  are fixed two rods 3 and 4, of which the one, 3, is passed through a hole in a plate 5, that bears against the band wound around the roller  $y$ . To the plate 5 is fastened the one end of a rod 6, to which is imparted a forward-and-backward movement, as will be described farther on. The rod 4 carries a pawl 7, that engages into the ratchet-wheel 2. Another pawl 8, fixed to the base, also engages into the ratchet-wheel 2. As the plate 5 is continuously resting against the band wound around the roller, this band will without regard to the circumstances that the diameter of the roller is gradually increasing as the band is wound up upon same, when the plate 5 is moved by the rod 6, be wound upon the roller  $y$  in such a manner that equally large pieces of the band are wound up for each movement of the plate 5 to the one side.

In front of the roller  $x$  is located a small fixed table 9, upon which the tobacco slides down as the band moves around the roller  $x$ .



Between the table 9 and another fixed table 10 is arranged a slit or pocket 11, into which a ram 12 may move up and down. The ram is arranged in a frame 13, Fig. 5, which may move slightly in a link 14, which in its turn is capable of turning on pins 15, Fig. 2, fixed to plate 16, Fig. 1, attached to the base. To the frame 13 is further attached a fixed cutter 17, Fig. 6. The ram 12 is capable of moving up and down in the frame 13 and carries a rod 18, projecting through the upper part of the frame, the projecting extremity being provided with a nut 19 and lock-nut for the purpose of being able to adjust the ram in relation to the fixed cutter 17. Between the upper part of the frame 13 and the ram is arranged a spring 20, that tends to force the ram downward.

The ram is adjusted by means of the nut 19 so that its lower surface protrudes a little below the edge of the cutter 17 when the nut 19, actuated by the spring, bears upon the frame 13. Springs 21, attached to the base *a*, tend to turn the link 14 upward in the position shown in Fig. 9. The downward movement of the link 14 is effected by means of a cord 23, attached to a stud 22 and carried over a guide-roller 24 to the one arm of a crank-lever 25, arranged below the base *a* and capable of turning on a pin 26. The other arm of the crank-lever is, by means of a rod 27, connected with the lever *e*.

When the handle *f* is moved in the direction indicated by the arrow *n* in Fig. 4, the mold *c* is, as already mentioned, moved away from the stationary mold *b*, and at the same time the link 14 is turned downward by the pull on the cord 23, while the springs 21 are simultaneously compressed. When the handle *f* is moved in the opposite direction, the mold *c* travels toward the mold *b* and the cord 23 is slackened. The springs 21 will then press the link 14 upward. On the mold *c* is fixed a pawl 28, which when the mold *c* is moved forward catches against a tooth 29 on a rod 30, which, by means of a hinge 45, is connected with the rod 6 in such a manner that this rod, which is fastened to the plate 5, may slightly turn in relation to the rod 30. The extremity of the rod 30 is guided in a slot arranged in a bracket 31 on the base *a*. The pawl 28 is provided with an arm 32, projecting downward and bearing with its extremity against a spring 33, attached to the base *a*. On the spring 33 is resting one end of a pin 34, that passes through a hole in the table 9, the other end of the pin 34 projecting somewhat above the table 9 in such a manner that it may be actuated by the link 14.

When the link 14 moves downward, (see Fig. 10,) it will, by means of the pin 34, press down the spring 33, and the arm 32 may now move so far down as to allow the pawl 28 to catch against the tooth 29 when the mold *c* is in its hindmost position. (See Fig. 11.) When the link 14 is moved upward, the spring 33 will rise and disengage the pawl 28.

Every time the press-molds are closed the rod 30 will move in the direction indicated by the arrow 35, Fig. 1, and when the link 14 has almost reached its uppermost position the pawl 28 is disengaged from the tooth 29. The rod 30 is now, by means of a spring 36, pulled back into its former position, whereby the plate 5 causes the rods 3 and 4 to move together with the pawl 7. The ratchet-wheel 2 will be turned and a piece of the band *s* wound up upon the roller *y*.

On the base *a* is further fixed a standard 37, having a pin at its upper end, on which pin an arm 38 can turn. The arm 38 is provided with a brake 39, bearing against the rim of the flange *r* upon the drum *q*.

At the lower end the arm 38 is provided with a hole through which the rod 30 is passed, and close to the arm 38 the rod 30 is supplied with a bush 40, carrying a nut 41. Actuated by the spring 36, the rod 30 will move in a direction opposite to the one indicated by the arrow 35 until the nut 41 bears against the arm 38 and the brake 39 against the flange *r*. It is hereby obtained that the drum *q*, off which the band *s* is wound, is braked the very moment the winding of the band upon the roller *y* ceases. The band will consequently always have a suitable tension. If the nut 41 be turned, the rod 30 will be pushed either to the one or the other side as regards the arm 38, and the pawl 28 may thereby be brought to catch the tooth 29 on the rod 30 sooner or later. As the travel of the pawl 28 forward and backward is always the same, the distance through which the pawl will move the rod 30 may be varied, which, in other words, means that the length of the piece of band which is fed forward by one movement of the handle *f* may be suitably adjusted.

The working of the machine is as follows: When the lever *e* is moved to the left, Fig. 4, the mold *c* is brought toward the mold *b*. At the same time the cord 23 is slackened, whereby the link 14 is slowly turned upward, actuated by the springs 21. (See Fig. 12.) The ram 12, actuated by the spring 20, remains during the first part of the movement of the link 14 in its lowermost position, its lower surface being on a level with the upper edge of the mold, whereas the cutter 17, that is fixed on the frame 13, is moved upward. The mold *c* may consequently, unhindered, be brought forward and presses the tobacco lying between the molds and underneath the ram toward the mold *b*. The movement of the mold *c* ceases when it has reached the mold *b*, and the tobacco between the molds has then assumed the cylindrical shape. During the movement of the mold *c* the frame 13 has been lifted past the position shown in Fig. 13 to the one shown in Fig. 9, whereby the ram 12 is raised a suitable distance above the table 9. The pawl 28 catching against the tooth 29 has brought forward the rod 30, Fig. 11, whereby the spring 36 is tightened, the pawl 7 dragged



on the wheel 2, and the brake 39 removed from the flange *r*. When the link 14 reaches the uppermost position, the pawl 28 is disengaged from the tooth 29 as the spring 33, that has hitherto been pressed down by the pin 34, now presses upward the arm 32, Fig. 9. Actuated by the spring 36 the rod 30, which is now free, will move back, whereby the pawl 7 will turn the wheel 2 and a piece of the band *s* will be wound up on the roller *y*. At the same time a corresponding piece of the band will be wound off the drum *q*, which turns slowly until the rod 30 has reached its extreme position and the brake thereby has been brought to bear against the flange *r*. The band *s* is meanwhile carried a small distance down the slanting board *u* and part of the tobacco *t* is delivered on the table 9, thus causing the tobacco already lying on the table 9 to fall into the slit between the tables 9 and 10. If the lever *e* be now moved back in the direction indicated by the arrow *n*, Fig. 4, the mold *c* is removed from the mold *b* and at the same time the cord 23 is tightened, whereby the link 14 with the frame 13 and the ram are turned downward, Figs. 10 and 11. A spring 42, attached to the frame 13, is thereby slightly pressed down against the tobacco upon the table 9, while the ram presses the tobacco lying in the slit 11 down between the molds. The ram being raised a little on account of the compression of the spring 20 the cutter 17 is left free and can therefore cut off the said portion of tobacco from the rest. When the link 14 assumes the lowermost position, Fig. 11, the tobacco cut off is pressed together in the space below the ram and the two molds, and when these close together the tobacco cylinder will be formed. The downward movement of the ram is limited by a pin 43 striking against the bottom of the groove 44 in the table 10. During the downward movement of the link 14 the pin 34 has forced down the spring 33 and the pawl 28 is resting against the rod 30, Fig. 10. When, therefore, the pawl 28 is brought forward, it will catch against the tooth 29. When the tobacco cylinder has been formed between the molds, it may be introduced into the cigarette-tube in any of the ways familiar to those skilled in the art and independent of the present invention.

Tobacco of the preferred nature may be supplied to the traveling band or apron *s* by any suitable means. (Not shown by the accompanying drawings and not contemplated by the present invention.)

In practice the parts 9 10 constitute a feed-table which is provided with a vertical pocket or slit 11, through which pocket is adapted to play or travel a vertically-movable plunger 12, having a reciprocatory motion. Below the two-part table 9 10 are arranged the horizontal molds *b c*, one of which normally occupies a stationary operative position relative to the pocket 11, while the other mold (preferably the mold *c*) is slidable in a horizontal

path relative to the table and the stationary mold, whereby such slidable mold is adapted to assume the position indicated by Fig. 11 in order to widen or expand the space between the two molds and to enable the tobacco which is contained in the pocket 11 to be forced in a downward direction by the action of the plunger, the proper quantity of tobacco being thus carried from the pocket 11 by the plunger into the space or cavity provided by and between the coacting molds.

By reference to the diagrammatic views, Figs. 9 to 13, inclusive, it will be noted that the apron *s* is adapted to feed the tobacco across the section 9 of the table, and in operation this apron is adapted to pass around the roller *x*, so that the upper side of the apron will approach the table and the under side of the apron will travel away from the table. The apron is given an intermittent motion in harmony with the opening and closing movement of the molds and the vertical reciprocation of the plunger. On the opening of the molds the apron is moved in a direction and for a suitable distance to push the proper quantity of tobacco across the section 9 of the table and into the pocket 11, whereby the plunger 12 is adapted to descend when the molds are in their open position and the tobacco is forced from the pocket 11 into a mold-cavity, after which the apron is arrested and the molds are closed in a manner to compress the tobacco between them and to thereby form a compressed filler of tobacco, which may be easily placed by suitable mechanism in the cigarette-tube.

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

1. In cigarette machinery, the combination with a table having a pocket, and coöperating molds, of a filler-feed mechanism, a plunger arranged to traverse the pocket in the table, a reciprocatory plunger-frame in which the plunger is slidably mounted, means for giving movement to the plunger in one direction with relation to the plunger-frame, means for actuating the plunger-frame, and a filler-cutting knife having its active edge disposed above the similar face of the plunger.

2. In cigarette machinery, the combination with a table having a pocket, and a filler-feeding mechanism, of coöperative molds, one of which is movable relative to the other, means for opening and closing said molds, a reciprocatory plunger-frame, means controllable by the mold-actuating devices for depressing the plunger-carrying frame when the molds are opened, a plunger yieldably mounted in the plunger-carrying frame, and a filler-cutting knife.

3. In cigarette machinery, the combination of a table provided with a pocket, a filler-feed mechanism disposed in coöperative relation to said table and arranged to force a



- layer of filler material of appropriate thickness across said table and to the pocket therein, a plunger arranged to traverse the pocket in said table, a cutter movable with said plunger and adapted to sever a length of filler material from the layer on said table, means for actuating said plunger and the cutter, and coacting molds in operative relation to the table.
- 10 4. In cigarette machinery, the combination of a table provided with a pocket, cooperating molds in active relation to said table, a filler-feed mechanism disposed to force a layer of filler material of appropriate thickness across said table and to the pocket therein, 15 levers movable relatively to said table, a yieldable plunger actuated by the levers and adapted to traverse the pocket, a cutter controlled by said levers and adapted to sever a length of filler material from the layer on said table, a hand-lever having operative connection with the plunger and cutter-carrying levers, and means connected with said carrying-levers to normally hold them, the plunger, and the cutter, in raised positions.
- 20 5. In cigarette machinery, the combination of a table provided with a vertical pocket, cooperating molds in active relation to said table, a filler-feed mechanism disposed to force a layer of filler material of appropriate thickness across said table and to the pocket therein, a yieldably-mounted plunger arranged to traverse said pocket, and a knife movable with said plunger into and from the pocket, 35 and having its active edge normally occupying a position raised above the under face of said yieldable plunger.
- 40 6. In cigarette machinery, the combination of a table provided with a pocket, cooperating molds in active relation to said table, a filler-feed mechanism disposed to force a layer of filler material of appropriate thickness across said table and to the pocket therein, a reciprocatory frame normally sustained above said table, suitable means for positively actuating said frame, a plunger yieldably mounted in said frame and arranged to traverse the pocket in the table, and a knife carried by the frame and adapted to be moved 45 with the plunger to and from the pocket of the table.
- 50 7. In a cigarette-machine, the combination with a feed-table and a filler-compressing mechanism, of a traveling apron movable around a suitable guide and having upper and lower lengths which diverge from said table, separate drums on which are coiled said upper and lower lengths of the apron and means for imparting intermittent feed motion 55 to said apron.
- 60 8. In a cigarette-machine, the combination with a table and a filler-compressing mechanism, of a guide-roller adjacent to said table, a traveling apron fitted to the roller and having its upper length arranged to deposit tobacco upon the table, a drum on which the upper length of the apron is wound, another drum adapted to receive the lower length of the apron, and means for rotating one of said drums. 70
9. In a cigarette-machine, the combination with a table and a filler-compressing mechanism, of a guide adjacent to said table, a drum, an apron coiled on said drum and having engagement with said guide to occupy an operative relation to the table, a take-up drum on which the idle portion of the apron is coiled, and automatic feed mechanism for intermittently turning the take-up drum. 75
10. In a cigarette-machine, the combination with a filler-compressing mechanism and a feed-apron, of a drum on which the operative length of the apron is wound, a take-up drum receiving the idle length of said apron, means for intermittently turning the take-up drum, 80 and a brake mechanism adapted to have engagement with the supply-drum and to release the latter on the operation of the feed mechanism for the take-up drum. 85
11. In a cigarette-machine, the combination with a filler-compressing mechanism and a traveling feed-apron, of a feed-drum for said apron, and a brake mechanism in operative relation to the feed-drum and controlled by the filler-compressing mechanism to release the apron feed-drum when said filler-compressing mechanism is open to receive a charge of tobacco. 90
12. In a cigarette-machine, the combination with a filler-compressing mechanism and a feed-apron, of a feed-drum for said apron, a brake mechanism normally engaging with said feed-drum, and connections between the brake mechanism and the filler-compressing mechanism. 95
13. In a cigarette-machine, the combination with a filler-compressing mechanism and an apron, of a take-up roller on which the idle length of the apron is coiled, a pawl-and-ratchet feed mechanism for turning the said take-up roller, and operative connections between the filler-compressing mechanism and the ratchet of said feed mechanism, whereby the take-up roller is rotated when the filler-compressing mechanism is closed upon a charge of tobacco. 100
14. In a cigarette-machine, the combination with a filler-compressing mechanism, an apron, a feed-drum for said apron and a take-up roller for the apron, of a feed-rod operated by connections with the filler-compressing mechanism, a brake normally in active engagement with the apron feed-drum and controllable by said feed-rod, and a feed mechanism engaging with the take-up roller and having operative connection with said feed-rod. 105
15. In a cigarette-machine, the combination with a slidable mold, a feed-apron, and suitable drums for the operative and idle lengths of the said apron, of a feed-rod provided with a shoulder, a pawl actuated by the slidable 110
- 115
- 120
- 125
- 130



mold, a pawl-retractor for holding the pawl in an inactive position, and a plunger having operative connections with the pawl-retractor, as and for the purpose described.

- 5 16. In a cigarette-machine, the combination, with a feed-apron and a feed-drum therefor, of a brake-lever having means for engagement with said feed-drum, a feed-rod slidable relative to said brake-lever and provided with  
10 a bushing, and a collar engaging adjustably

with said bushing and having operative relation to the brake-lever.

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

JACOB CHRISTIAN HANSEN-ELLEHAMMER.

Witnesses:

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