No. 695,640. Patented Mar. 18, 1902.

G. A. HAGELBERG & L. LINDELÖF.

MACHINE FOR FILLING PAPER CIGARETTE TUBES.

(Application filed Nov. 5, 1898.)

(No Model.) 4 Sheets—Sheet 1.

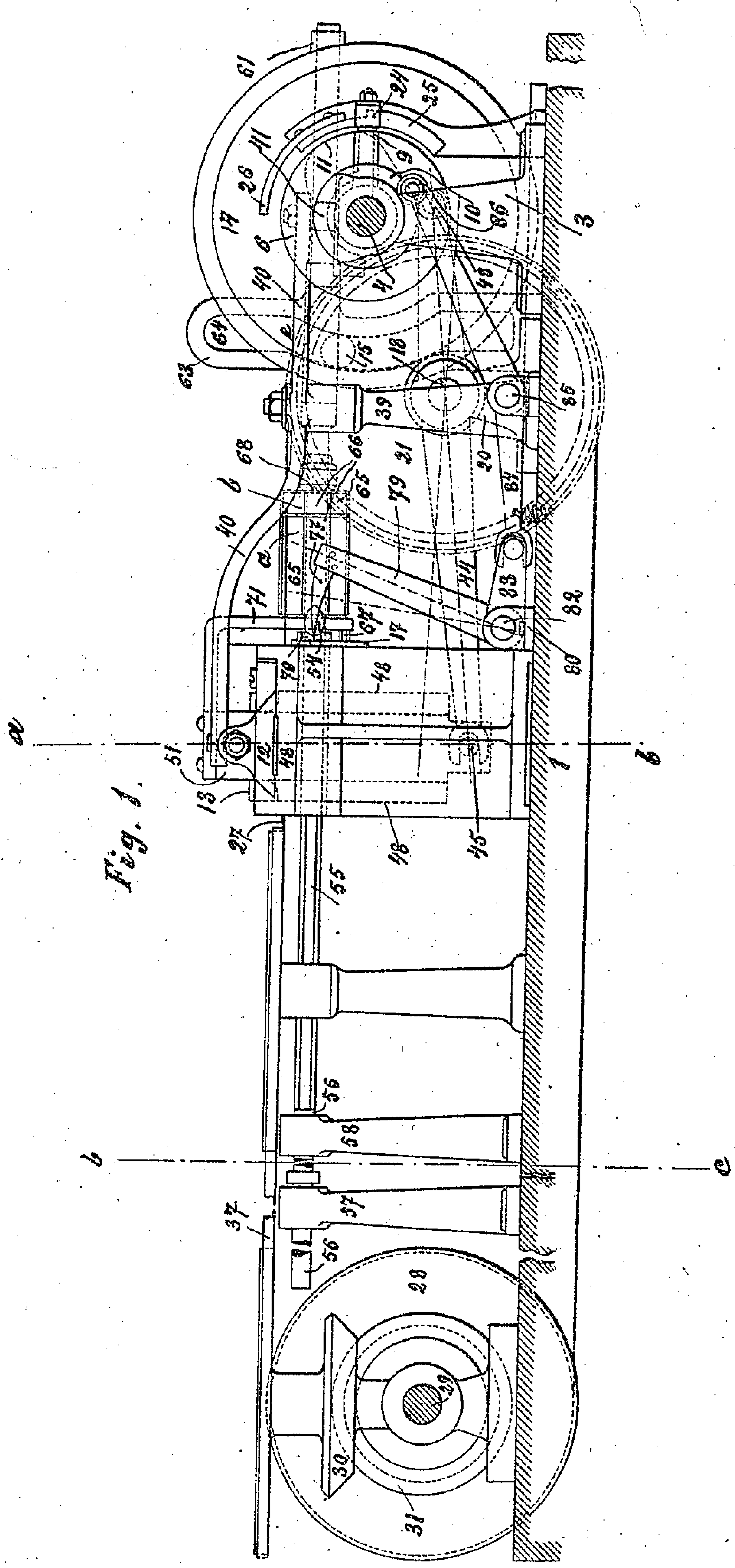


Fig. 1.

Witnesses:
Gustaf Asfalt.
T. Sarnström

Inventors.
Gustaf Adolf Hagelberg
Leonard Lindelöf
by Olof Dahl
their atty

No. 695,640.

Patented Mar. 18, 1902.

G. A. HAGELBERG & L. LINDELÖF.

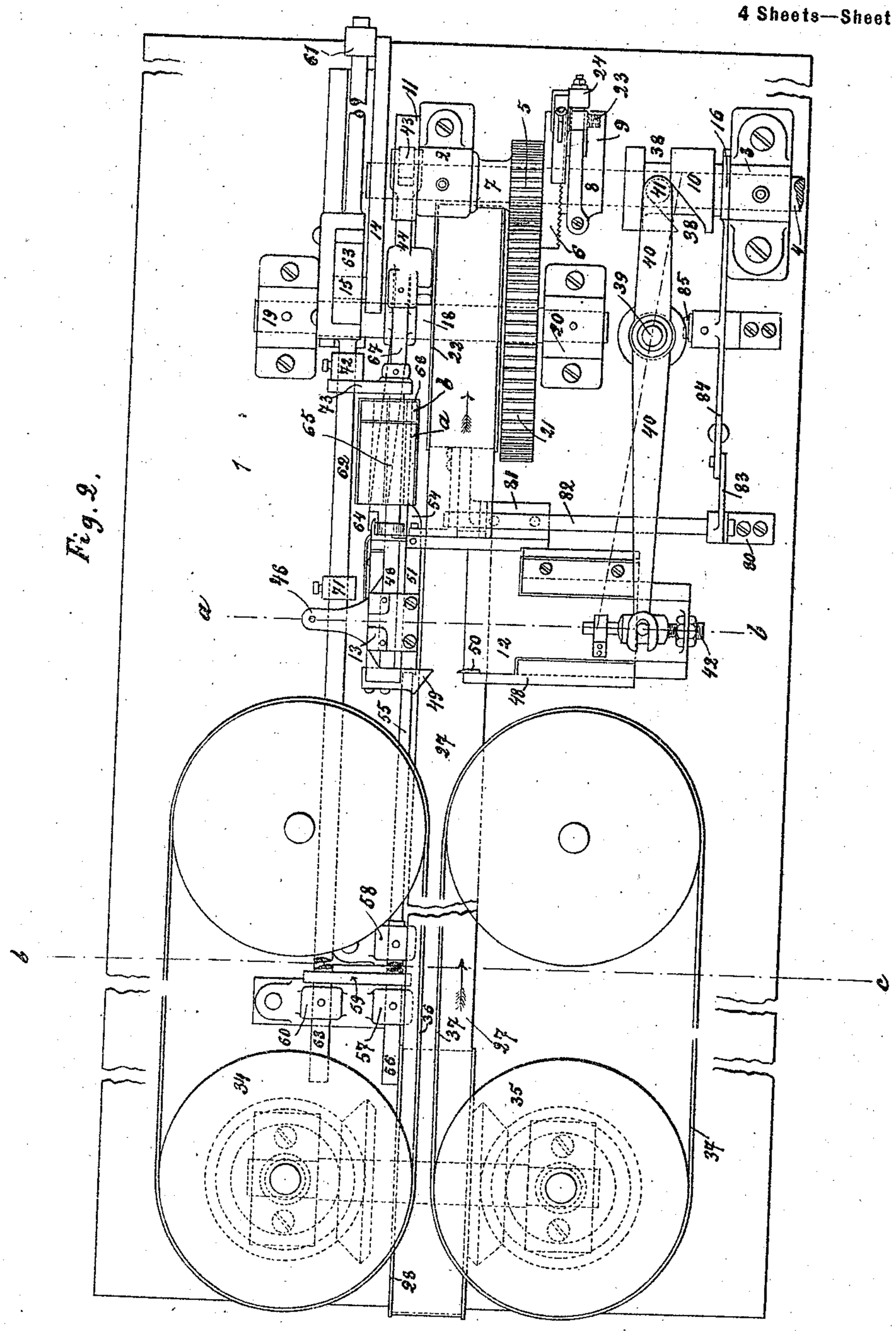
MACHINE FOR FILLING PAPER CIGARETTE TUBES.

(Application filed Nov. 5, 1898.)

(No Model.)

4 Sheets—Sheet 2.

Fig. 2.



Witnesses:
Gustaf Tisdet.
T. Sandström

Inventors
Gustaf Adolf Hagelberg
Leonard Lindelöf
by Roseldahl
their Att'y

No. 695,640. Patented Mar. 18, 1902.

G. A. HAGELBERG & L. LINDELÖF.

MACHINE FOR FILLING PAPER CIGARETTE TUBES.

(Application filed Nov. 5, 1898.)

(No Model.) 4 Sheets—Sheet 3.

Fig. 4.

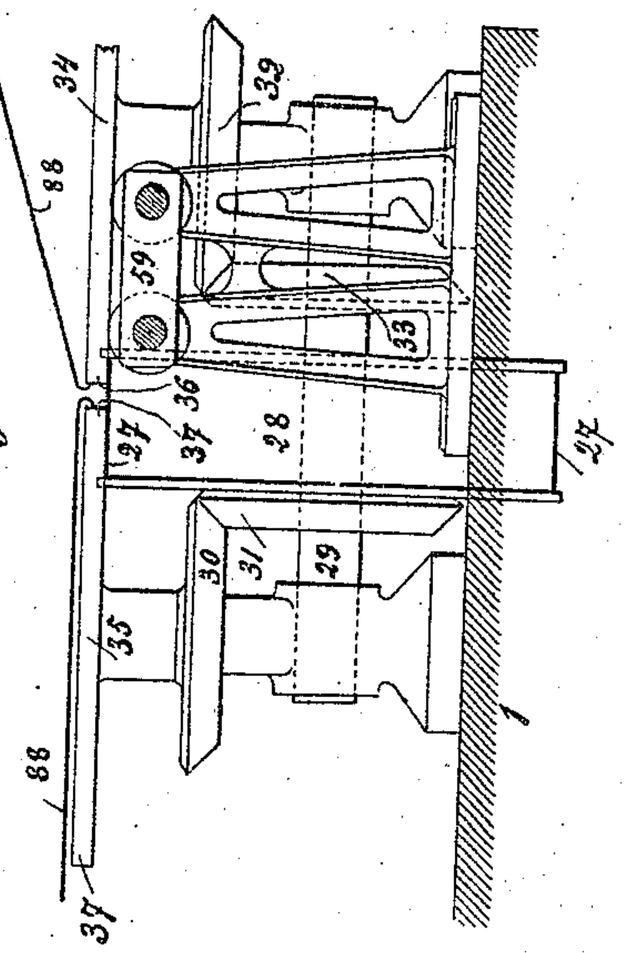


Fig. 5.

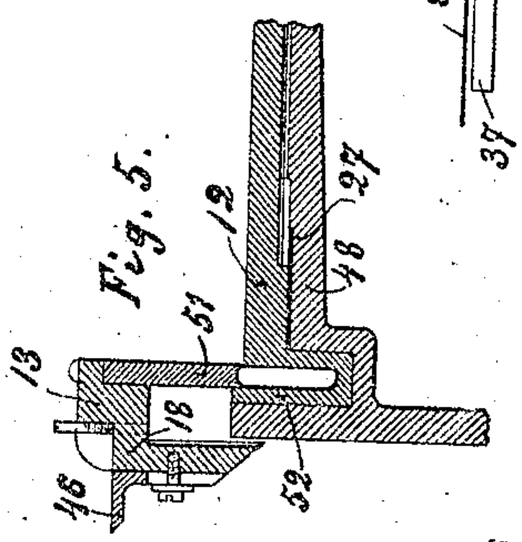


Fig. 6.

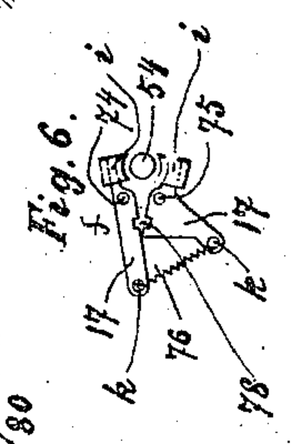
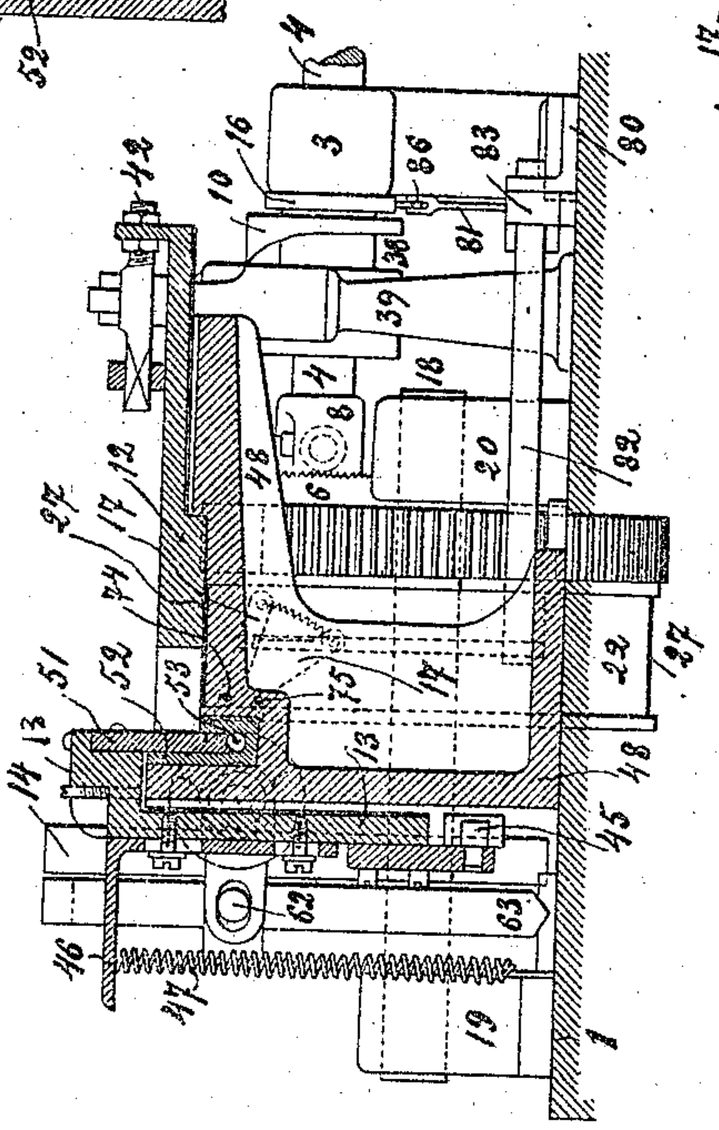


Fig. 3.



Witnesses:
Gustaf Tilgatt.
T. Sandström

Inventors
Gustaf Adolf Hagelberg
Leonard Lindelöf
by Olof Dahl
their atty

No. 695,640. Patented Mar. 18, 1902.

G. A. HAGELBERG & L. LINDELÖF.

MACHINE FOR FILLING PAPER CIGARETTE TUBES.

(No Model.) (Application filed Nov. 5, 1898.)

4 Sheets—Sheet 4.

Fig. 7.

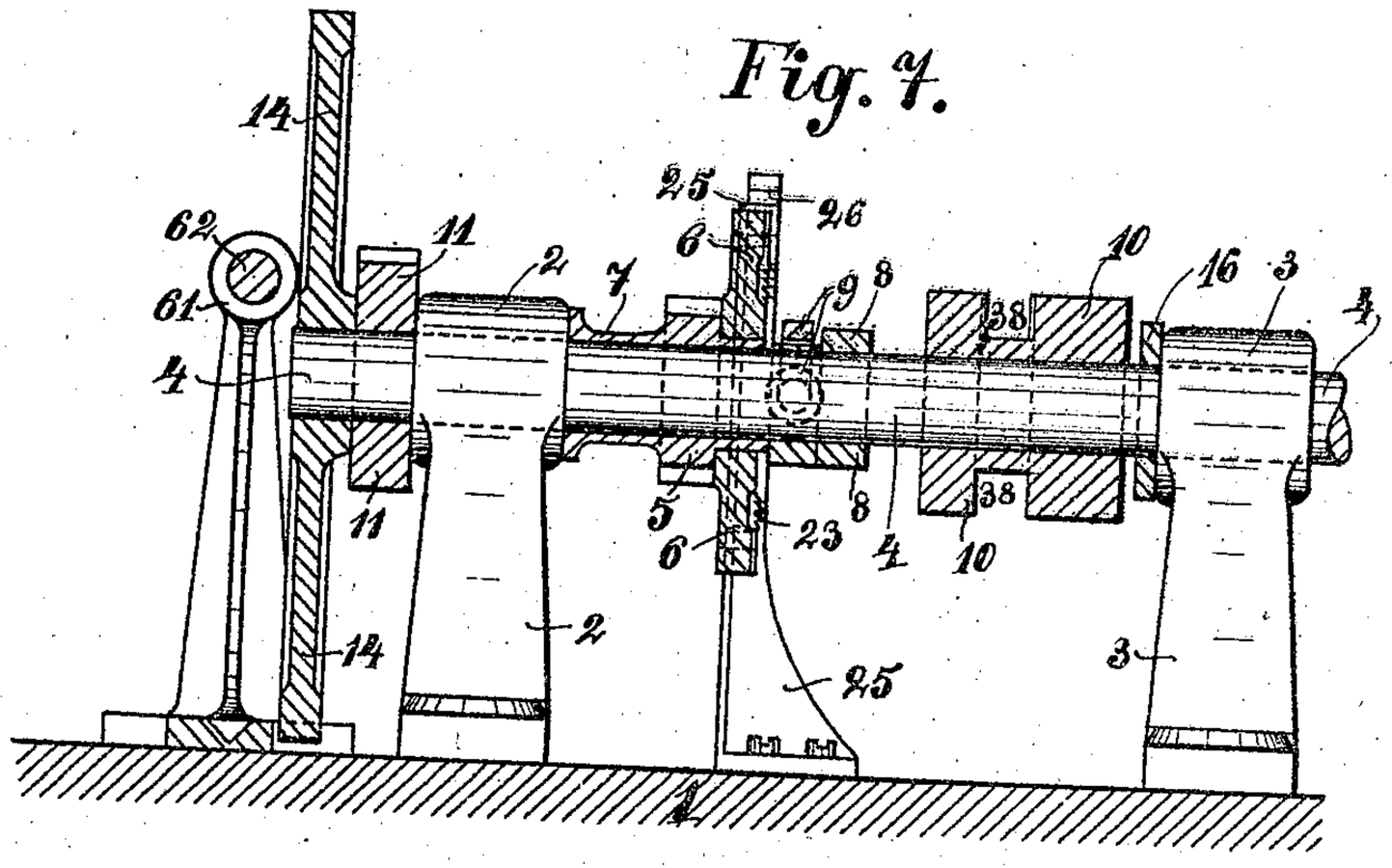


Fig. 8.

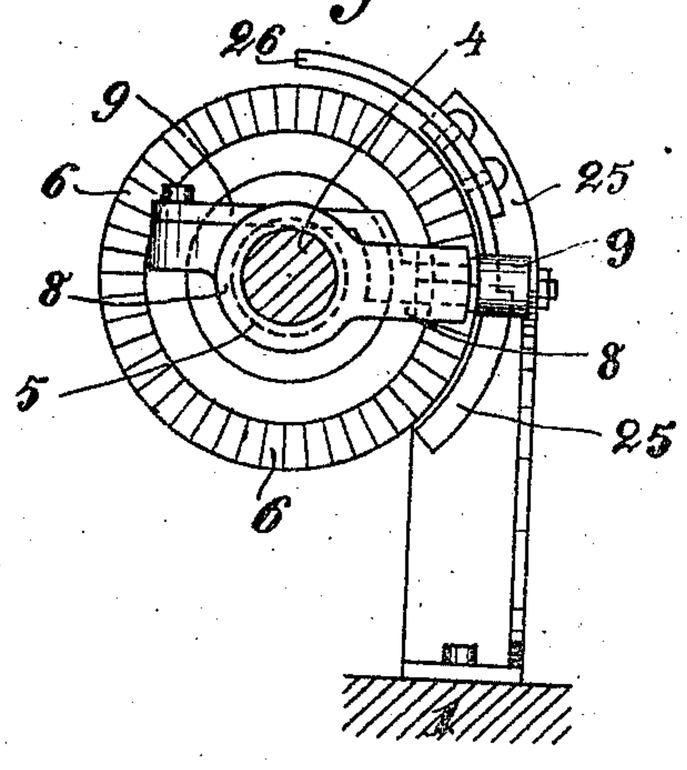
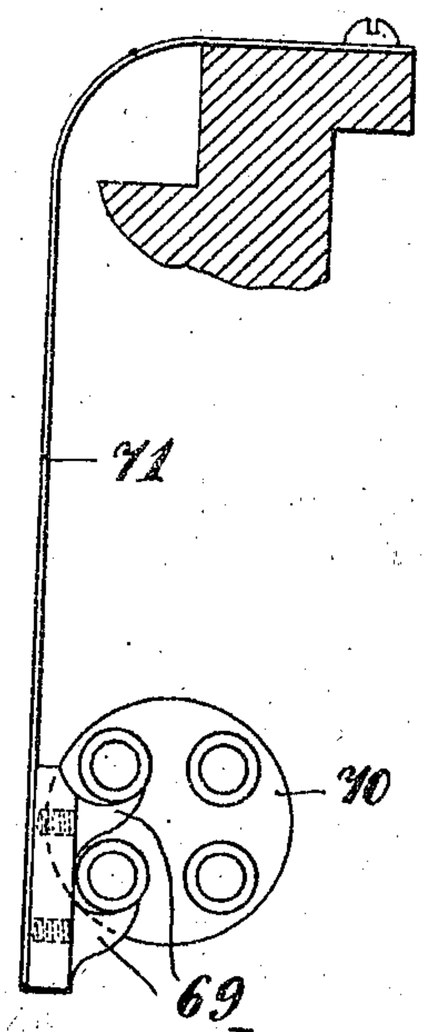


Fig. 9.



Witnesses:
Gustaf Sjöcrantz.
Gerda Lindkvist.

Inventors
Gustaf A. Hagelberg
Lennart Lindelöf
by Dickerson
Their Att'y.

UNITED STATES PATENT OFFICE.

GUSTAF ADOLF HAGELBERG AND LEONARD LINDELÖF, OF HELSINGFORS, RUSSIA.

MACHINE FOR FILLING PAPER CIGARETTE-TUBES.

SPECIFICATION forming part of Letters Patent No. 695,640, dated March 18, 1902.

Application filed November 5, 1898. Serial No. 695,630. (No model.)

To all whom it may concern:

Be it known that we, GUSTAF ADOLF HAGELBERG and LEONARD LINDELÖF, subjects of the Emperor of Russia, and residents of Helsingfors, Finland, Russia, have invented a new and useful Improvement in Machines for Filling the Ready-Made Paper Tubes of Cigarettes with Tobacco, of which the following is a specification, reference being had to the drawings accompanying and forming a part of this specification.

The present invention relates to machines for filling the ready-made paper tubes of cigarettes with tobacco.

In our machine the tobacco is, either by hand or by some mechanical means, fed forward in a string of uniform thickness and of an area of cross-section equal to or somewhat less than that of the cigarette in process of making onto a traveling belt, which transports it to the vicinity of a forming-tube, whereupon a slide moving across the belt by means of a cutter cuts off a piece of the string corresponding to the length of the cigarette, which piece is pushed aside from the belt by the slide, to be subsequently inclosed in the forming-tube by means of the aforesaid slide or by other arrangement, from which forming-tube a plunger in usual manner inserts the tobacco in the paper tube previously fed forward to the forming-tube by means of a feeding arrangement while the paper tube is being held stationary by means of a clamping device.

The invention is illustrated in the accompanying drawings, showing a machine arranged in the manner mentioned.

Figure 1 represents a front elevation of the machine. Fig. 2 is a top view of the machine. Fig. 3 is a sectional view of the same on lines *a b* in Fig. 1 looking to the right; Fig. 4, a section on lines *b c* in Fig. 1 looking to the left. Fig. 5 shows one position of the slides 12 and 13. Fig. 6 shows another detail. Fig. 7 shows a vertical section along the main shaft. Fig. 8 is a side view of a clutch, and Fig. 9 is another detail. In Figs. 1 and 2 the table 88, situated above the machine, is omitted.

The machine is mounted on the base-plate 1, on which are located pedestals 2 and 3 for supporting the main shaft 4 of the machine, said shaft rotating in the direction indicated by the arrow. On this shaft the following parts are mounted—viz., the pinion 5, the coupling or ratchet disk 6, and the sleeve 7, which are rigidly connected to each other and can revolve on the shaft 4, the sleeve 8, which is connected to the said shaft and has a coupling-pawl 9, by means of which the sleeve 7 is periodically coupled to the shaft 4, a grooved cam 10, and a cam 11, which produce the reciprocating motion of a cutting-off slide 12 and the upward motion of a slide 13, a disk 14 with a crank-pin 15 fixed in it for giving motion to a plunger, and, finally, a cam 16 for giving the required motion to clamps or gripping-holders 17. The pinion 5, meshing with the gear 21 on the shaft 18, which is journaled in the boxes 19 and 20 and provided with a belt-pulley 22, turns said gear-wheel 21, shaft 18, and belt-pulley 22 in the direction of the arrow when the pinion 5 is coupled to the shaft 4. The belt 27 is thus given a periodical motion, which by means of the belt-pulley 28, shaft 29, bevel-gears 30 31 and 32 33 and belt-pulleys 34 and 35, is transmitted to the belts 36 and 37, so that the belts 27, 36, and 37 will simultaneously move in the direction of the arrows and at the same rate of speed, the ratio of gearing being suitable for the purpose.

The coupling of the pinion 5 to the shaft 4 and its disconnecting therefrom are accomplished in the following manner: The spiral spring 23 tends to keep the pawl 9 in engagement with the ratchet-disk 6, whereby the said disk 6 and the pinion 5, which is firmly connected therewith, are forced to rotate with the axle 4 as long as the pawl 9 is not, by the arc-shaped pieces 25 and 26 striking against the roller 24, kept away from the ratchet-disk 6. Said roller 24 is placed on the outer end of the pawl 9 and will when it passes the arcs 25 and 26 be pushed back by them. The position of the piece 26 may be adjusted in relation to the piece 25 so that the coupling-off of the pinion 5 at the right time will take place. The said piece 26 can be shifted with relation to piece 25, and by this means the moment of disengagement of pinion 5 from shaft 4 can be regulated.

With the curved groove 38 of the cam 10 engages the lever 40, which is supported by and pivoted on the post 39, so that the slide 12 is given a reciprocating motion. This motion can be accurately adjusted by means of the screw 42. On the cam 11 presses one end of the lever 44, whicl end is provided with a roller 43, said lever being fulcrumed on the shaft 18 and by means of its opposite forked end embracing the pin 45, which is fixed to the slide 13, so that the said slide 13 is moved upward when the swell of the cam 11 is in contact with the roller 43. The slide 13 is given its return motion by means of the spiral spring 47, attached to the arm 46. The slides 12 and 13 are supported and slide on the support 48. The belt 27 passes above the upper surface of the latter piece and beneath the slide 12. The slide 13 is provided with a knife-edge 49, coöperating with the knife 50, which is fixed to the slide 12.

To the slide 13 is attached the piece 51, which has a semicylindrical cavity at the edge and, together with the semicylindrical bottom of the piece 52, forms the tube 53. The continuation of this tube is formed by the tube 54, which is cut off obliquely and in which a plunger 55 reciprocates periodically. The plunger 55 is a prolongation of the rod 56, which is supported in the boxes 57 and 58. The rod 56 and plunger 55 receive their reciprocating motion by means of the connecting-piece 59, which rigidly connects the rod 56 with the rod 62, supported by the boxes 60 and 61 and moving therein, said rod in its turn being rigidly united to the piece 63, in the slot 64 of which the crank-pin 15 of the crank-disk 14 enters, and the piece 63 being given a motion to and fro, which is interrupted during the space of time when the pin 15 passes through the curved part *e f* of the slot 64.

65 is a roller provided with longitudinal grooves 66, said roller periodically rotating and reciprocating longitudinally and having for its function to feed forward the empty paper tubes to the aforesaid forming-tube 54 and to return and deliver them when filled. It can be shifted longitudinally on the shaft 67, but cannot turn on the latter, and it is divided in two parts *a* and *b*, the latter of which can be moved away slightly from the former as the lengths of the paper tubes require. The grooves 66 terminate at a place 68 perpendicular to the shaft 67. The roller 65 is given its rotating motion by means of a spring 71, Fig. 9, attached to the slide 13. Said spring is provided with two teeth 69, which during the upward motion of the slide 13 engage with a wheel 70, fixed to the shaft 67 of the roller 65. Said wheel 70 is provided with four teeth, so that the roller 65 will be turned one-quarter of a revolution each time the slide 13 is moved upward. When the slide 13 moves downward, the shaft 67 is prevented from rotating by means of a pawl engaging with the wheel 70. The teeth 69 in returning slide over the teeth of said wheel. The reciprocating motion of the roller 65 is derived from the rod 62, being produced by the stop-collars 71 and 72 on the latter, which collars in the motion of the rod strike against the piece 73, the other end of which embraces an extension of the roller 65, said extension consisting of a sleeve which can turn, but not be shifted, in the piece 73.

The arrangement for holding the paper tubes fast to the tube 54 while they are being filled with tobacco (which arrangement, as already mentioned, derives its motion from the main shaft 4 by means of the cam 16) consists of two clamps (shown in Fig. 6) or grippers 17, pivoted on the pins 74 and 75 and covered at their ends with rubber, while their opposite ends *k* are connected by means of a spiral spring 76, tending to hold the ends *i* removed from the tube. When the wedge-shaped piece 77 enters into the square aperture 78, formed by a groove in each gripper, these ends of the grippers are separated, and the opposite covered ends *i* are pressed against the tube, and thus retain the paper tube slid over it. When the piece 77 returns, the paper tube is released by the grippers. The piece 77 and grippers 17 derive their motion from the cam 16 on the main shaft 4 by means of the arm 79, attached to the piece 77, and rigidly connected to the shaft 82, which is journaled in the boxes 80 and 81. This shaft is provided at its other end with another arm 83, actuated by the lever 84, rotatably mounted on the shaft 85 and provided at the other end with a roller 86, sliding on the cam 16. The end of the lever 84 is always kept pressed against the cam by means of a spiral spring.

The machine operates as follows: The trough formed by the belts 27, 36, and 37 is filled with tobacco. By the motion of the belts the string of tobacco is fed forward while resting on the belt 27 and finally enters between the edges of the knives 49 and 50 in front of the slide 12. The moment the motion of the belts ceases the slide 12 is set in motion, the string of tobacco is cut off between the edges 49 and 50, and the tobacco thus cut off is pushed by the slide 12 from the belt in under the slide 13. The slides 12 and 13 now occupy the position shown in Fig. 5. When the slide 13 subsequently commences to move downward, the piece 51 depresses the tobacco into the aperture, and by closing the latter forms the tobacco-filler 53, Fig. 3. The slide 12 remains in the position shown in Fig. 5 until the piece 51 has passed the belt 27, when it returns to its former position. As soon as it has reached this position the belts again resume their motion. When the slide 13 has reached its lowermost position, the plunger 55 is set in motion and pushes in front of it the tobacco inclosed in the tube. In the preceding rearward motion of the plunger one of the paper tubes resting in the grooves of the roller 65 has been slid over the tube 54, and it is retained there by the grippers

17, which have been drawn together at the time when the plunger remained stationary in its extreme position to the right. When the tobacco has become inserted sufficiently far into the paper tube, the grippers release the latter, which by the continued motion of the plunger is moved away from the tube 54, accompanying the roller 65 in its motion. Simultaneously with the subsequent receding movement of the plunger the slide 13 moves upward and the roller 65 at the same time, before being shifted longitudinally, rotates a quarter of a revolution, delivers the filled paper tube, and receives a fresh empty tube. The same series of operations is repeated in each revolution of the shaft 4.

Having now described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a machine for filling paper tubes for cigarettes with tobacco, the combination with feeding-belts, the mechanism for periodically moving the same, and knives for cutting off the required length of string of tobacco fed forward by said belts, of a slide movable just above the bottom belt in a plane parallel to the same and at right angles to the direction of said bottom belt, means for moving said slide, and mechanism for compressing the part of the string of tobacco pushed off the bottom belt by said slide and for filling the paper tubes therewith, substantially as and for the purpose set forth.

2. In a machine for filling paper tubes for cigarettes with tobacco, the combination with feeding-belts, the mechanism for periodically moving the same, and knives for cutting off the required length of string of tobacco fed forward by said belts, of a slide movable just above the bottom belt in a plane parallel to the same and at right angles to the direction of said bottom belt, means for moving said slide, a second slide movable at a right angle to the former slide and provided with a semicylindrical cavity at the lower end, a part provided with an aperture the bottom of which is semicylindrical, said second slide moving into said aperture so that the said second slide in its lowest position and the bottom of the aperture constitute a tobacco filler, means for moving said second slide, and means for moving the tobacco from the said tobacco filler into the paper tube to be filled, substantially as and for the purpose set forth.

3. In a machine for filling paper tubes for cigarettes with tobacco, the combination with the bed-plate, the main shaft, belts running on pulleys so as to form a trough, mechanical connections between the main shaft and said pulleys adapted to move the latter intermittently, and knives for cutting off the string of tobacco fed forward by said belts, of a slide movable just above the bottom belt in a plane parallel to the same and at a right angle to the direction of the same, mechanical connection between the said slide and main shaft, a second slide movable at right angles to the former slide at the end of the same and provided with a semicylindrical cavity at its lower end, a part provided with an aperture having a semicylindrical bottom, mechanical connection such as a cam and lever between said second slide and the main shaft, a plunger adapted to move into the tobacco filler, means for actuating said plunger, a tube in line with said tobacco filler, and means for feeding forward and holding the tubes while being filled, substantially as and for the purpose set forth.

4. In a machine for filling empty paper tubes for cigarettes with tobacco, the combination with the bed-plate, the main shaft, belts running on pulleys so as to form a trough, and mechanical connections between the main shaft and said pulleys adapted to move the said pulleys so that the string of tobacco is fed forward intermittently, of a slide movable just above the bottom belt in a plane parallel to the same and at a right angle to the direction of the same, mechanical connection between the said slide and main shaft, a knife on said slide, a fixed knife opposite the former knife, a second slide movable at right angle to the former slide at the end of the same and provided with a semicylindrical cavity at its lower end, a part provided with an aperture having a semicylindrical bottom, mechanical connection such as a cam and lever between said second slide and the main shaft, a plunger adapted to move into the tobacco filler formed by the said semicylindrical bottom and the lower end of the said second slide when it stands in its lowermost position, mechanical connection between the main shaft and said plunger, a tube in line with said tobacco filler, a pair of grippers, a cam on the main shaft, a two-armed lever actuated by said cam, a shaft provided with two arms one of which is actuated by the said two-armed lever, a wedge on the other of said arms, a roller provided with grooves, and mechanical connections between said roller and main shaft for periodically rotating and reciprocating the same, substantially as and for the purpose set forth.

5. In a machine for filling paper tubes for cigarettes with tobacco, the combination with the bed-plate and the main shaft, of three belts running on pulleys so as to form a trough, mechanical connections comprising an intermittently-actuated clutch and gearing between the main shaft and said pulleys, adapted to move the said pulleys so that the string of tobacco is fed forward intermittently, a slide movable just above the bottom belt in a plane parallel to the same and at right angles to the direction of the same, mechanical connection between the said slide and main shaft, a knife on said slide, a fixed knife opposite the first-mentioned knife, a second slide movable at the end of the former slide at right angle to the same and provided with a semicylindrical cavity at its lower end, a part provided with an aperture having a semi-

cylindrical bottom, mechanical connection comprising a cam and lever between said second slide and the main shaft, a plunger adapted to move into the tobacco filler formed by the said semicylindrical bottom and the lower end of the said second slide when it stands in its lowermost position, mechanical connection between the main shaft and said plunger, a tube in line with said tobacco filler, a pair of grippers normally closed, a cam on the main shaft, a two-armed lever actuated by said cam, a shaft provided with two arms one of which is actuated by the said two-armed lever, a wedge on the other of said arms, a roller provided with grooves, and mechanical connections between said roller and main shaft for periodically rotating and reciprocating the same, substantially as and for the purpose set forth.

In witness whereof we have hereunto set our hands in presence of two witnesses.

GUSTAF ADOLF HAGELBERG.
LEONARD LINDELÖF.

Witnesses:
AUGUST TEODOR SÄRNSTRÖM,
GUSTAF TSFALT.