No. 750,254. PATENTED JAN. 26, 1904.

G. M. CALBERLA.

CIGARETTE MACHINE.

APPLICATION FILED NOV. 2, 1901.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1

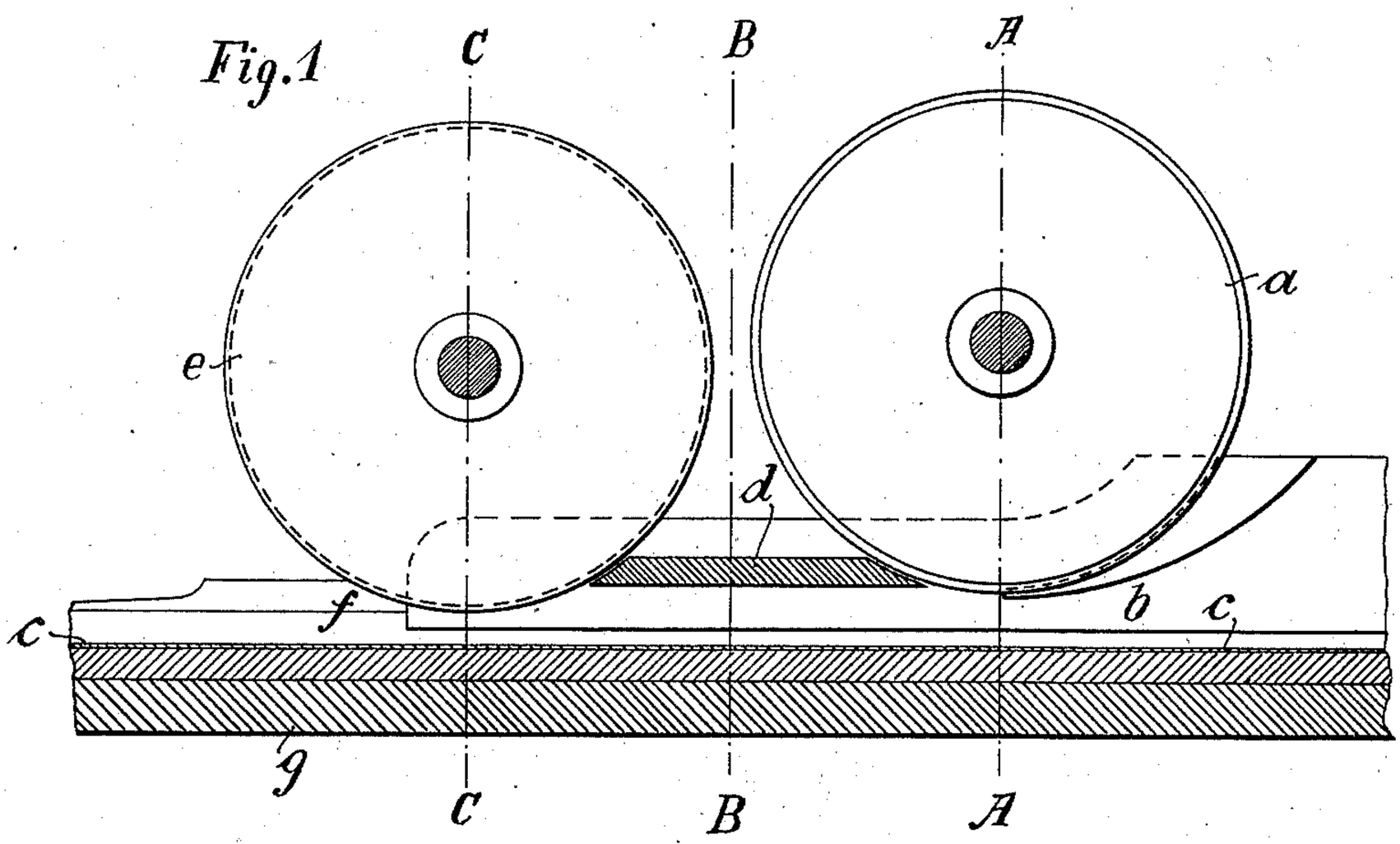


Fig. 3

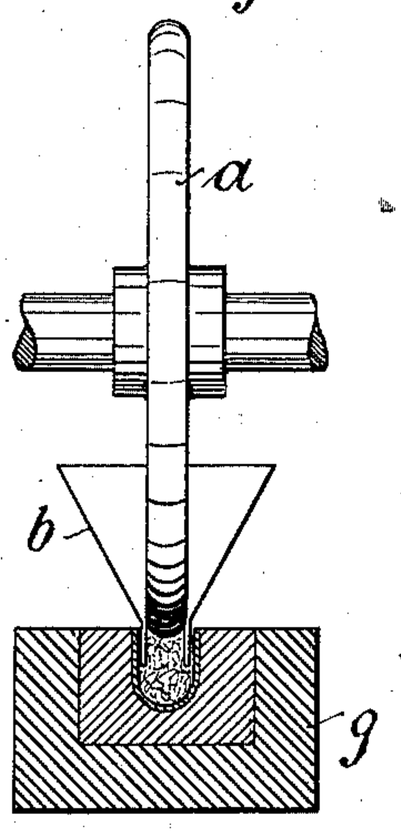


Fig. 4

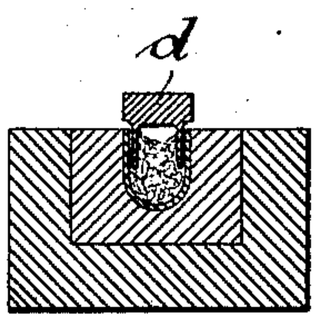
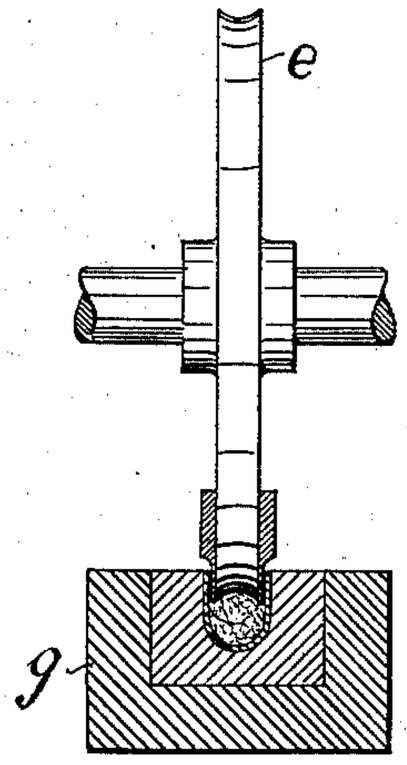


Fig. 5



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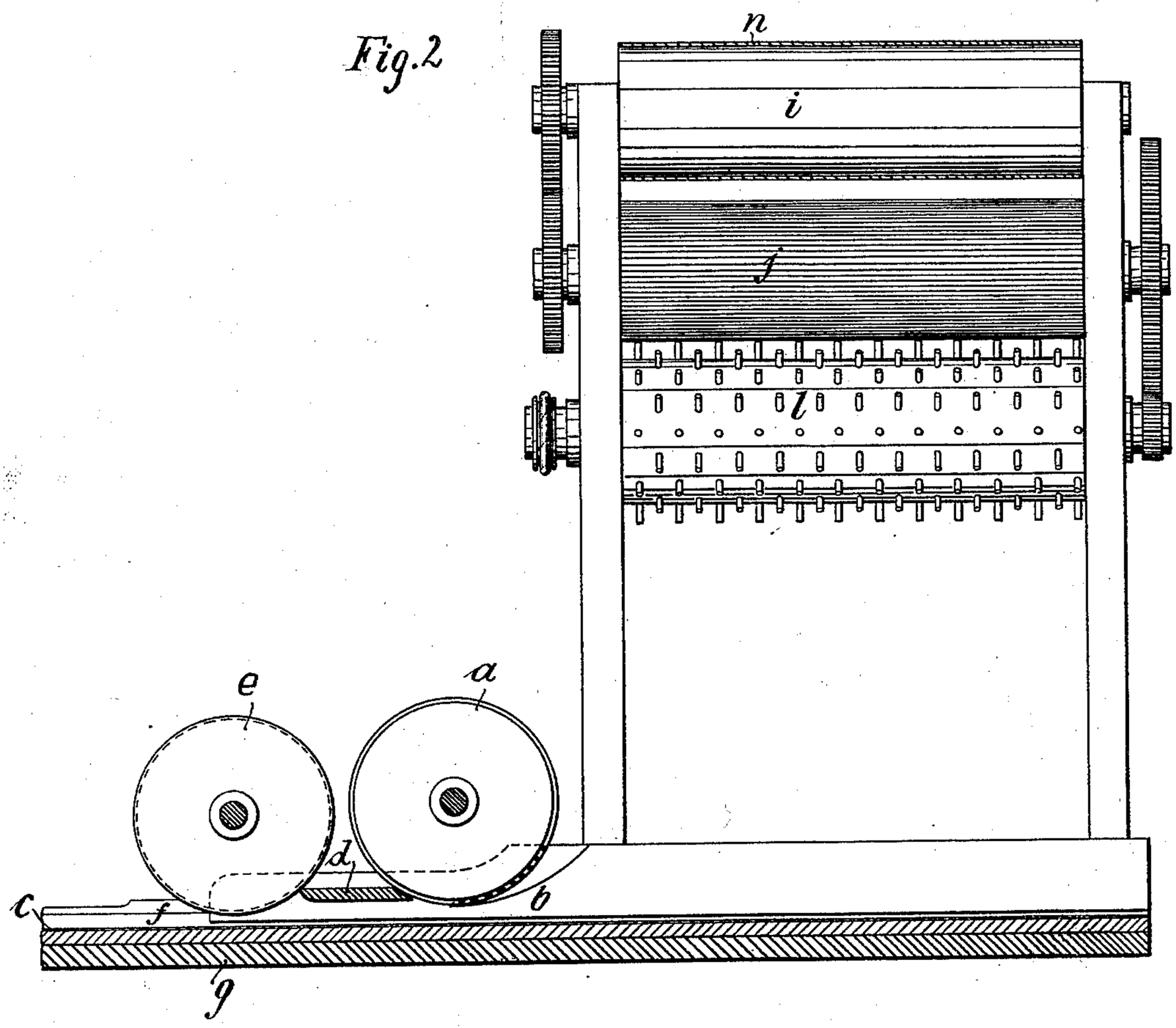
NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2



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CIGARETTE MACHINE.

APPLICATION FILED NOV. 2, 1901.

NO MODEL. 4 SHEETS—SHEET 3.

Fig. 6

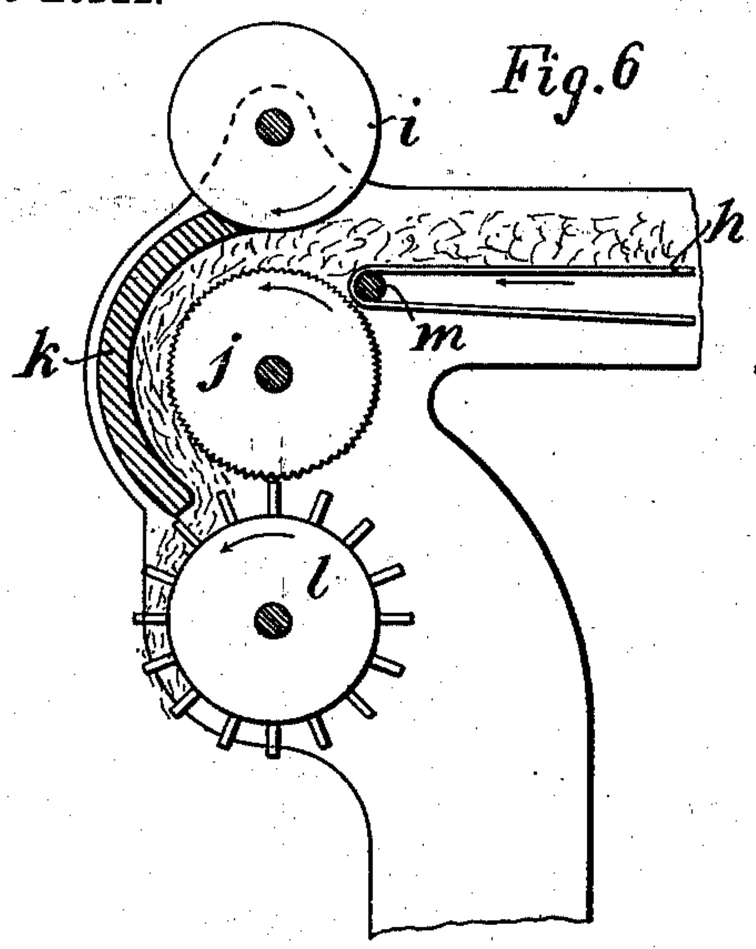


Fig. 7

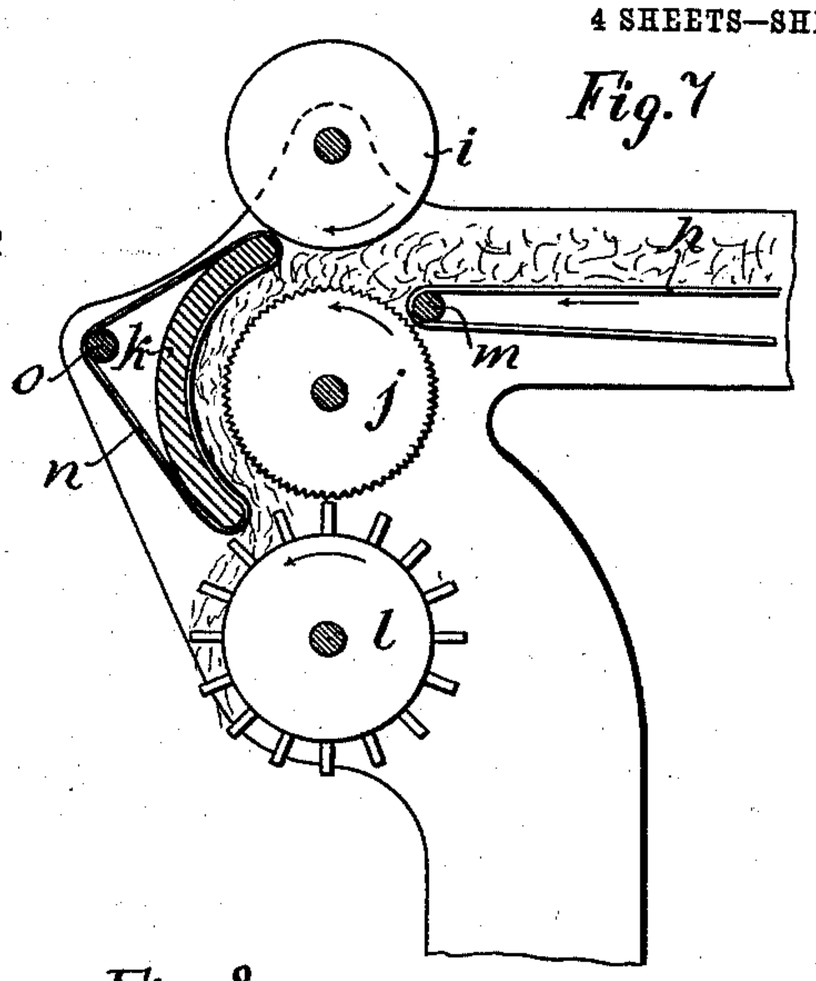
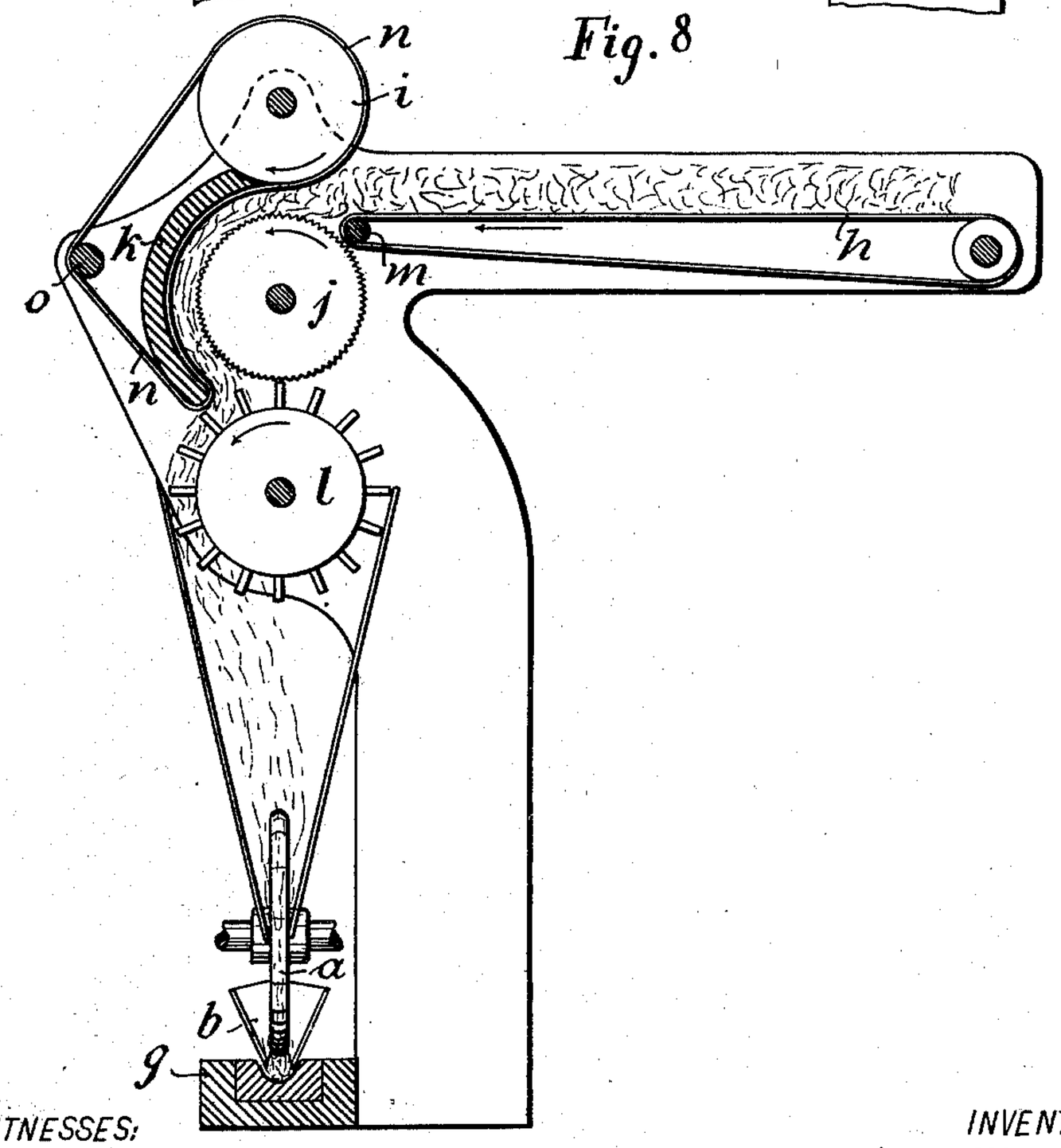


Fig. 8



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CIGARETTE MACHINE.

APPLICATION FILED NOV. 2, 1901.

NO MODEL. 4 SHEETS—SHEET 4.

Fig. 9.

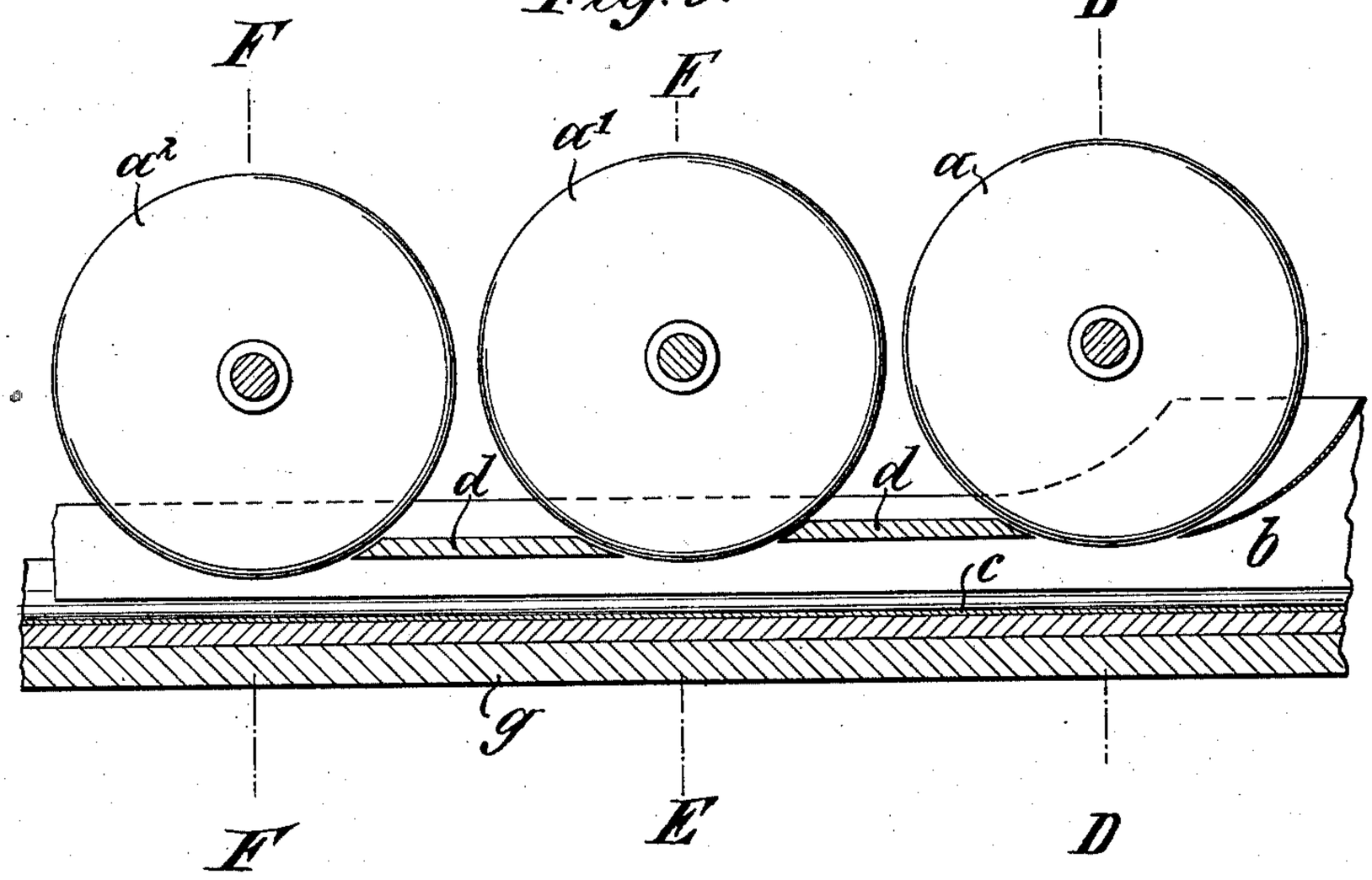


Fig. 12

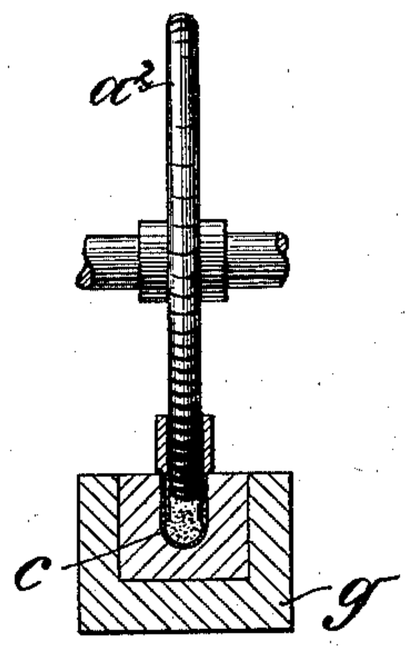


Fig. 11.

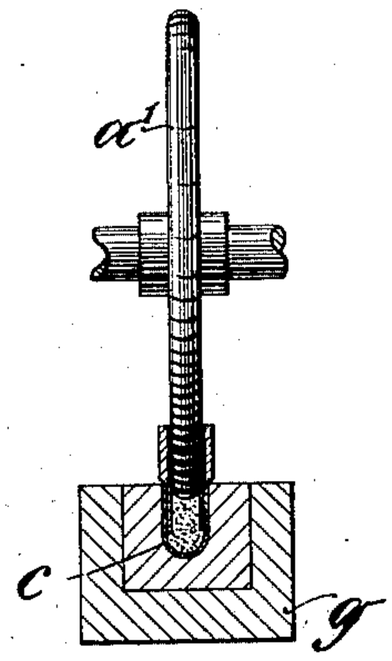
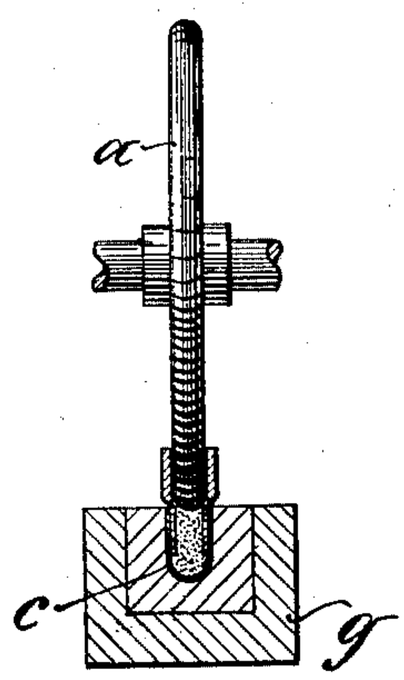


Fig. 10.



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Attys.

No. 750,254. Patented January 26, 1904.

UNITED STATES PATENT OFFICE.

GEORG MORITZ CALBERLA, OF DRESDEN, GERMANY.

CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 750,254, dated January 26, 1904.

Application filed November 2, 1901. Serial No. 80,844. (No model.)

To all whom it may concern:

Be it known that I, GEORG MORITZ CALBERLA, a citizen of the Kingdom of Saxony, residing at Dresden, in the Kingdom of Saxony, German Empire, have invented certain new and useful Improvements in Cigarette-Machines; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to cigarette-machines, and is designed to provide improvements in the device for forming the endless filler-rod and in the device for feeding the tobacco to the rod-forming device.

There are cigarette-machines in use in which the loose tobacco moving on a traveling belt is gathered, compressed, and finally formed by the coöperation of a guiding-chute, an adjacent forming-conduit, and a correspondingly-grooved presser-roller.

Instead of having the collecting, compressing, and final forming effected by the same organs of mechanism and simultaneously these various operations are in the present invention assigned to different organs and executed successively. Thereby the advantage is attained that the organs for gathering and compressing the tobacco do their work with greater ease and perfection than when they have to complete the forming of the endless filling-rod, whereas, again, the organs having the last-named function are better able to work satisfactorily when they are relieved of the duty of collecting and compressing the tobacco and have only to operate on material already compressed, and thereby to a certain extent rendered coherent.

For gathering and compressing the loose tobacco the present invention employs instead of a presser-roller with a concave groove such a one with a curved convex rim, gathering the tobacco more easily and perfectly than the former, but unable to finally form the rod.

In the accompanying drawings a form of construction of such a device is represented in Figures 1 and 2 in elevation, in Figs. 3 to 5 in sections according to lines A A, B B, C C in Fig. 1, respectively. Figs. 6, 7, and 8 show in elevation three forms of construction of the device for feeding the tobacco to the rod-forming device. Fig. 9 is a view, partly in section, of a modified form of the forming mechanism. Figs. 10 to 12 are respectively sections on the lines D D, E E, and F F of Fig. 9.

The convex-rimmed roller *a* extends into a funnel-shaped conduit *b*, in which, by means of an endless traveling belt *c*, loose tobacco is continuously fed onto the roller. In operation the loose and fluffy tobacco is drawn by the collecting-roller *a* from the wide portion of the conduit *b* into the narrower portion of the same, and thereby compressed into a somewhat dense rod, Fig. 3, section A A, Fig. 1, and as such pushed on under a bridge *d*, Fig. 4, section B B, Fig. 1, to the forming-roller *e*. The latter possesses a groove of appropriate shape and now has merely to give the filler-rod, which it receives in the forming-circuit *f*, compressed with a crescent-shaped or similar cross-section, the desired circular or oval cross-section as ensuing from the groove of the roller *e*, the forming-conduit *f*, which is the extension of the feed-conduit *b*, and the traveling belt *c* in the same, Fig. 5, section C C, Fig. 1. From the roller *e* the finally formed endless filler-rod passes on with the belt *c* to be enwrapped.

The feeding-conduit may be formed of one and the same piece of material as the forming-conduit, the whole being attached to the frame *g* and interchangeable or of separate pieces.

Instead of one several convex-rimmed rollers may be disposed before the forming-roller. For instance, in Fig. 9 of the annexed drawings three convex-rimmed rollers a a' a^2 are shown, which are disposed before the forming-roller, each being of the same width as but differing in height of position from the others. Figs. 10 to 12 show sections according to lines D D E E F F of Fig. 9, respectively. These rollers divide among one another the work of drawing in and compress-

ing the loose tobacco fed by the feeding device, now to be described.

The feeding devices for cigarette-machines of known constructions have in the first place the disadvantage that they produce too much tobacco-dust, as much as eighteen per cent., which not only involves a considerable loss, but also danger to the health of persons occupied with or near the machines. A further disadvantage is that the fleece of tobacco oftentimes bending or bulging out on its course in consequence of sudden changes of curvature or of interruptions in its guiding members is affected with inequalities of thickness and density, impairing the evenness of the cigarettes produced. The general opinion was that there were no remedies for these drawbacks, but that they were both inevitable appendices of mechanical feeding devices. The present novel device, however, does away with both of these disadvantages. It was found that the abundant formation of dust was due to the too frequent bending and breaking of the tobacco and great friction of the same against the members guiding and feeding it, to its too excessive treatment with picking-rollers, and its too long course in the feeding device, and that by diminishing these influences it may be reduced to a hardly-noticeable quantity. It was also found that the irregularities in the fleece of tobacco may be avoided by shortening the course of the same, doing away with all sudden changes and interruptions, and making provisions that all parts touching the tobacco move, with few exceptions, at uniform speed with the tobacco, so that so-called "dead points and sufaces" are avoided. In the present device accordingly the friction, bending and breaking, and picking of the tobacco is so reduced that only traces of dust are formed, and by shortening the course of the tobacco and avoiding dead-points great evenness in the feed of the same is attained. Such a device is shown in the accompanying drawings in three forms of construction or modifications—in Fig. 2 in front elevation and in Figs. 6 to 8 in side elevation. In this device an endless traveling belt *h*, on which the tobacco is spread, takes the latter tangentially between a smooth and a corrugated roller *i j*, these rollers at first compressing the tobacco mutually, but the corrugated roller then alone carrying the tobacco on in a passage between the corrugated roller *j* and a curved plate *k*, the curved plate forming the bottom of the passage being rounded at its lower edge, so that no breaking of the tobacco will take place as it is picked off by a roller *l*, provided with a series of pins. The guide-pulley *m* for the belt *h* is given a small diameter to make as nearly as possible an uninterrupted surface where the tobacco moves from the belt onto the corrugated roller *j* or to prevent any considerable descent of the tobacco at this point, which would always be accompanied with an overturning of the same. The corrugated roller moving the tobacco along the curved plate *k* has the advantage that it readily releases the tobacco at the point where it is taken up by the picker-roller *l*, and thereby tends to prevent the tobacco from being excessively broken, torn, or picked. To prevent too much friction of the tobacco as it passes along the curved plate *k*, a belt or rubber or tape band *n* may be spanned over the latter and over a pulley *o*, by which it is driven, Fig. 7. The belt or band might also be passed over the smooth roller *i* and driven by it, Fig. 8. Thereby the further advantage is secured that the space between the smooth roller and the plate *k* is bridged over and the tobacco prevented from receiving any check at this point. The belt *n* would not of its own accord lay itself against the concave surface of the plate *k*, but is compelled to do so by the tobacco.

In the construction shown in Fig. 2 of the drawings the speeds of the three rollers *i*, *j*, and *l* are made dependent upon each other; but in general I prefer to make only the speeds of the belts *h n* and the rollers *i j* dependent upon each other, whereas the speed of the picker-roller is independent of the others and can be regulated at will, so that it is possible at any time to give the picker-roller the speed which is most appropriate to the degree of dampness and fineness of the tobacco.

It will be remarked that the great simplicity of the tobacco-feeding device is in itself an advantage and improvement, for instance, from an economical point of view.

What I claim, and desire to secure by Letters Patent, is—

1. In cigarette-machines, the combination with a funnel-shaped conduit, of a convexed-rimmed tobacco-collecting roller, a continuous traveling endless belt on the bottom of said conduit, a grooved tobacco-forming roller behind the collecting-roller, and a bridge between the rollers, substantially as described.

2. In cigarette-machines, the combination with a feeding-conduit, of a convexed-rimmed tobacco-collecting roller, a continuous traveling endless belt on the bottom of said conduit, a grooved tobacco-forming roller behind the collecting-roller, and bridge between the rollers, said bridge being formed of the same piece of material as the conduit for the collecting-roller, substantially as described.

3. In a cigarette-machine, in combination, a feed-roller having a rough surface, an endless traveling apron or belt carrying the tobacco tangentially to said roller and passing over a small pulley adjacent to the same, a smooth roller on top of the rough roller for pressing the tobacco continuously fed by the belt, a curved bottom plate having a lower rounded end and forming a passage behind the rough feed-roller, and a picker-roller below the pas-

sage taking the tobacco from the lower, rounded end of the curved plate, a chute or trough below the picker-roller from which it receives the tobacco to feed it to the filler-forming device, substantially as described.

4. In a cigarette-machine, in combination, a feed-roller having a rough surface, an endless traveling feeding-belt directed tangentially to the roller in front of the same, a small pulley over which the belt passes, a smooth roller for pressing the tobacco fed continuously by the traveling belt; a curved bottom plate rounded at its lower end forming a passage along which the feed-roller carries the tobacco, a picker-roller taking the tobacco from the lower rounded end of the plate, a chute or trough beneath the picker-roll, receiving the tobacco therefrom to feed it to the filler-forming device, and a band or belt moving over the surface of the curved plate, along which the tobacco passes, to prevent checking of the tobacco but insure a smooth passage of the same, substantially as described.

5. In a cigarette-machine, in combination, a feed-roller having a rough surface, an endless feeding-belt or the like, directed tangentially toward the roller and passing in front of the same, a pulley of small diameter over which the belt passes, a smooth roller for pressing the tobacco continuously fed by the belt, a curved bottom plate rounded at its lower end, forming a passage in which the feed-roller carries on the pressed tobacco, a picker-roller taking the tobacco from the lower rounded end of the curved plate, a chute or trough below the picker-roll receiving the tobacco therefrom to feed it to the filler-forming device, and a band or belt passing over the collecting and pressing roller and the inner surface of the curved plate along which the tobacco moves, to prevent checking of the tobacco and insure a smooth even passage of the tobacco, and also prevent a space or crevice between the pressing-roller and the curved plate and to carry the tobacco with uniform speed onto the picker-roller, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORG MORITZ CALBERLA.

Witnesses:

EMIL REICHELT,

HERNANDO DE SOTO.