

No. 665,241.

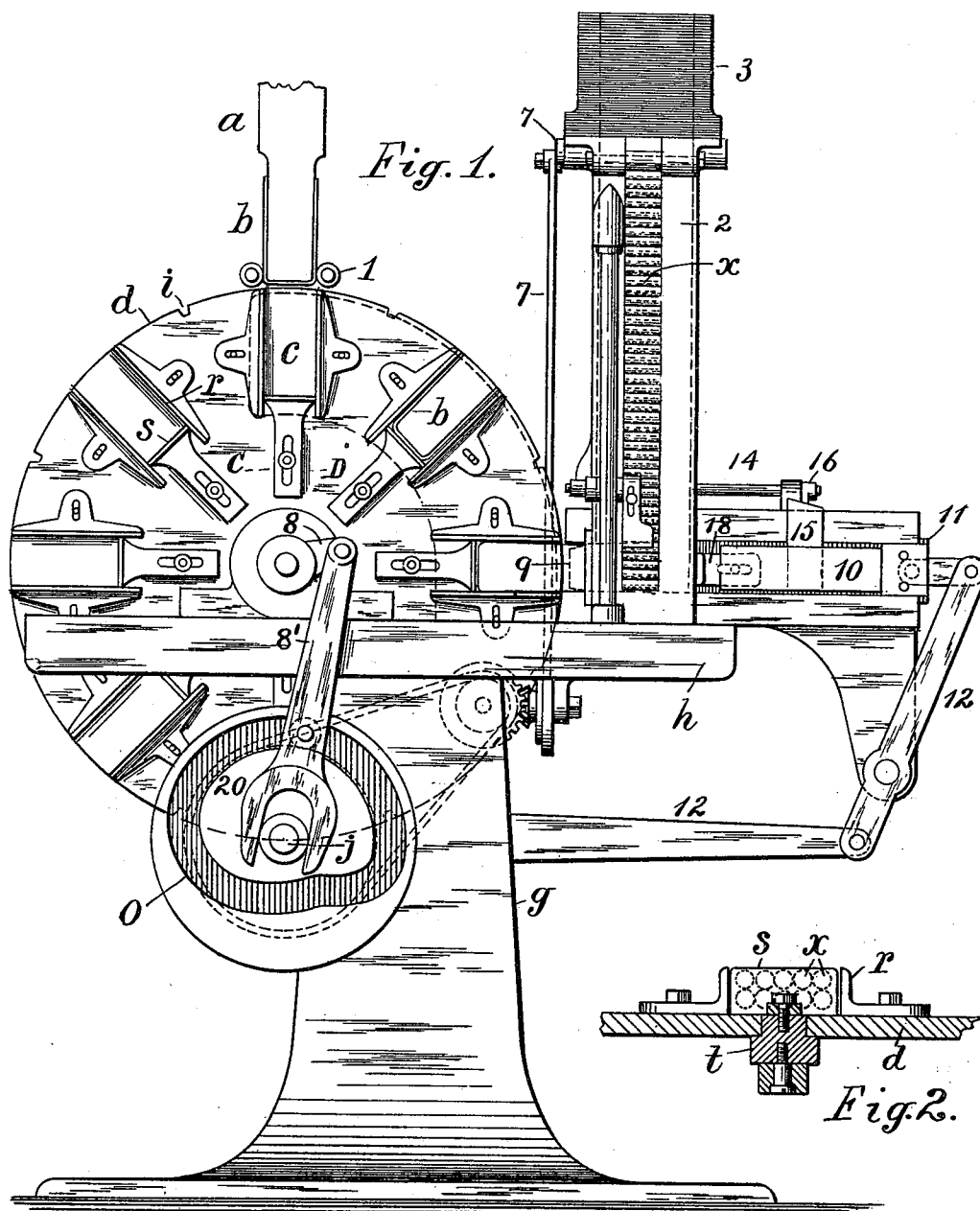
Patented Jan. 1, 1901.

F. J. LUDINGTON,
CIGARETTE PACKET FILLING MACHINE.

(No Model.)

(Application filed Jan. 3, 1900.)

5 Sheets—Sheet 1.



Attest:
L. Lee,
Walter H. Falmagne

Inventor.
Frank J. Ludington, per
Thos. S. Crane, Atty.

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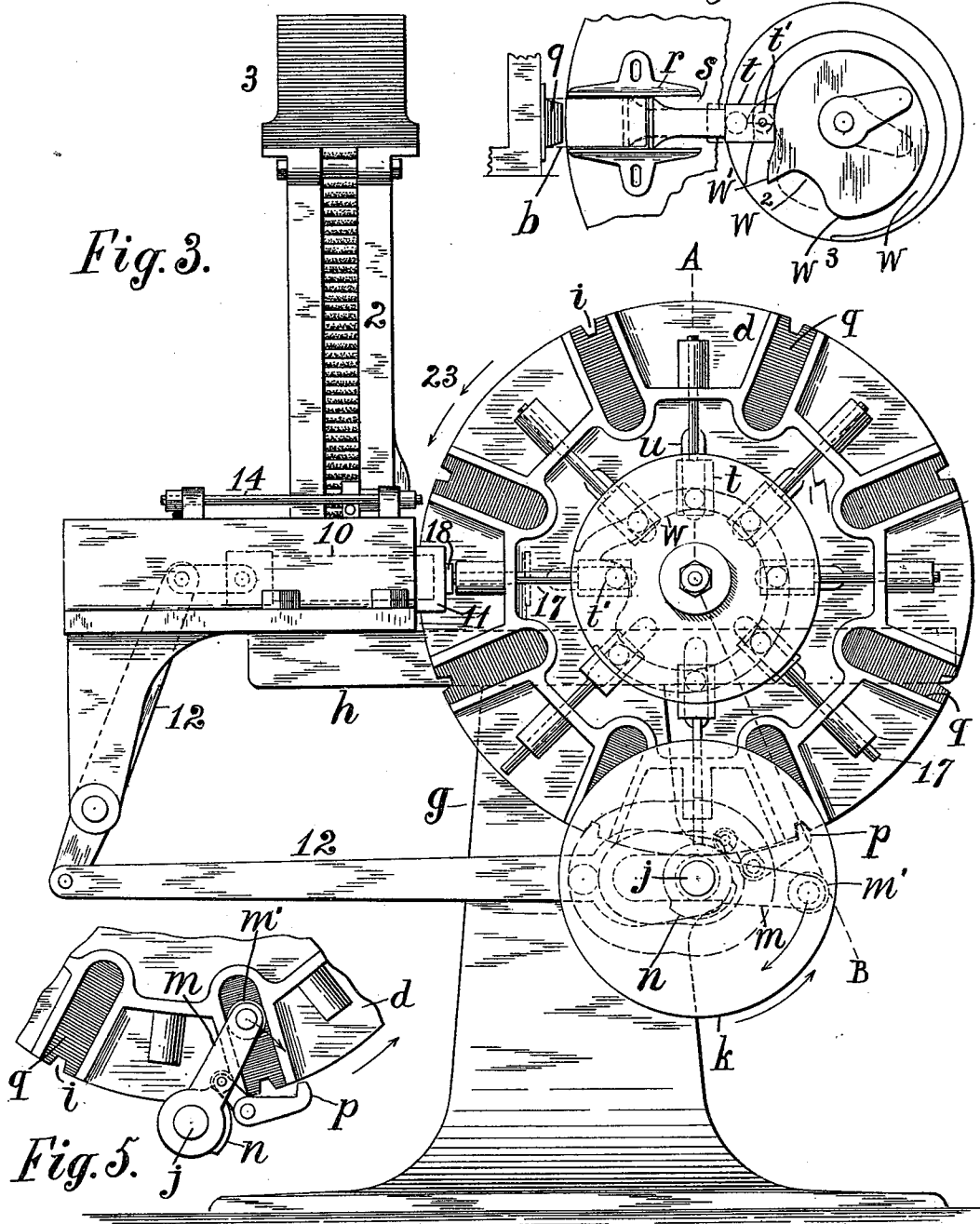
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Fig. 4.

Fig. 3.



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L. Lee.
Walter H. Talbidge.

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Fig. 6.

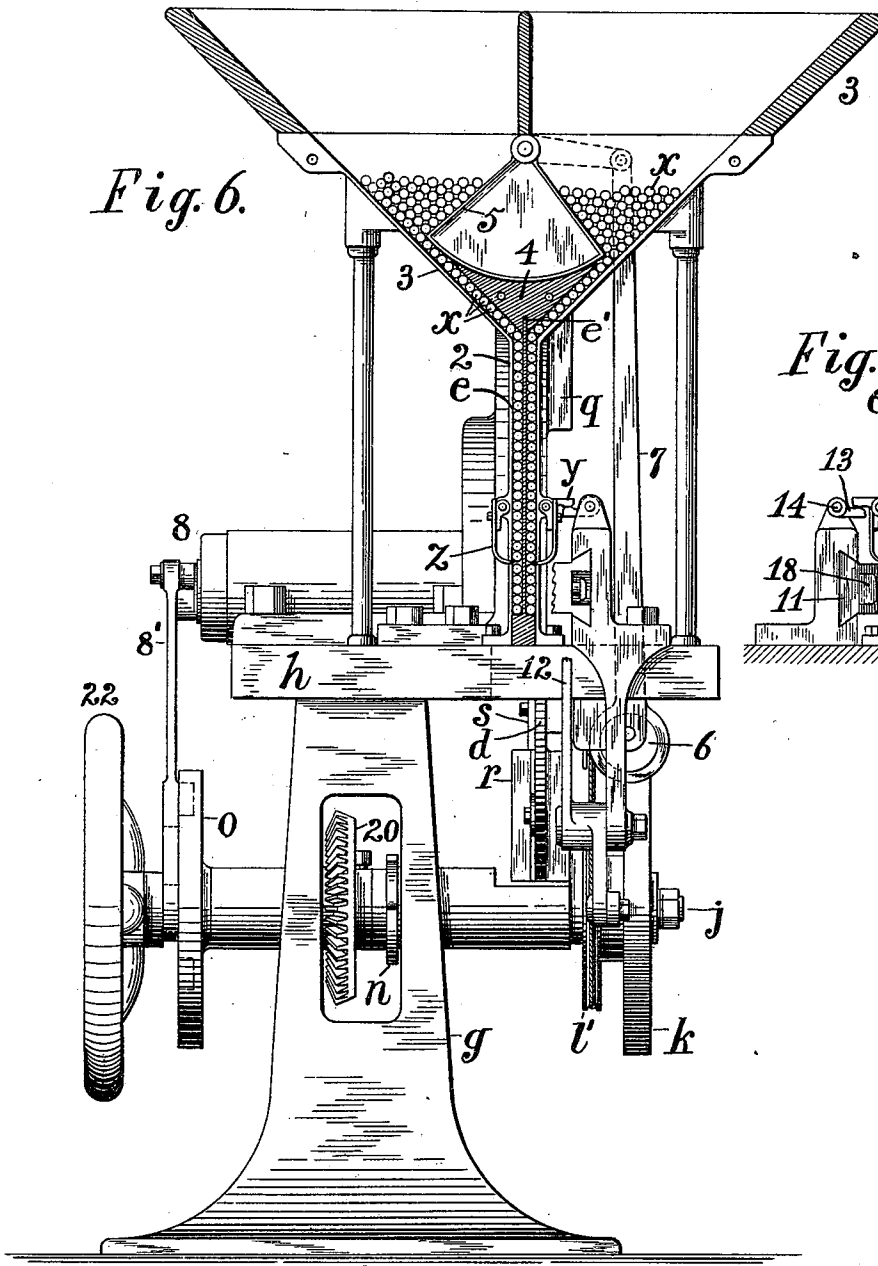
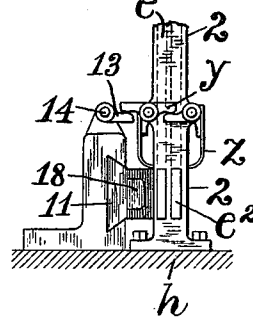


Fig. 7.



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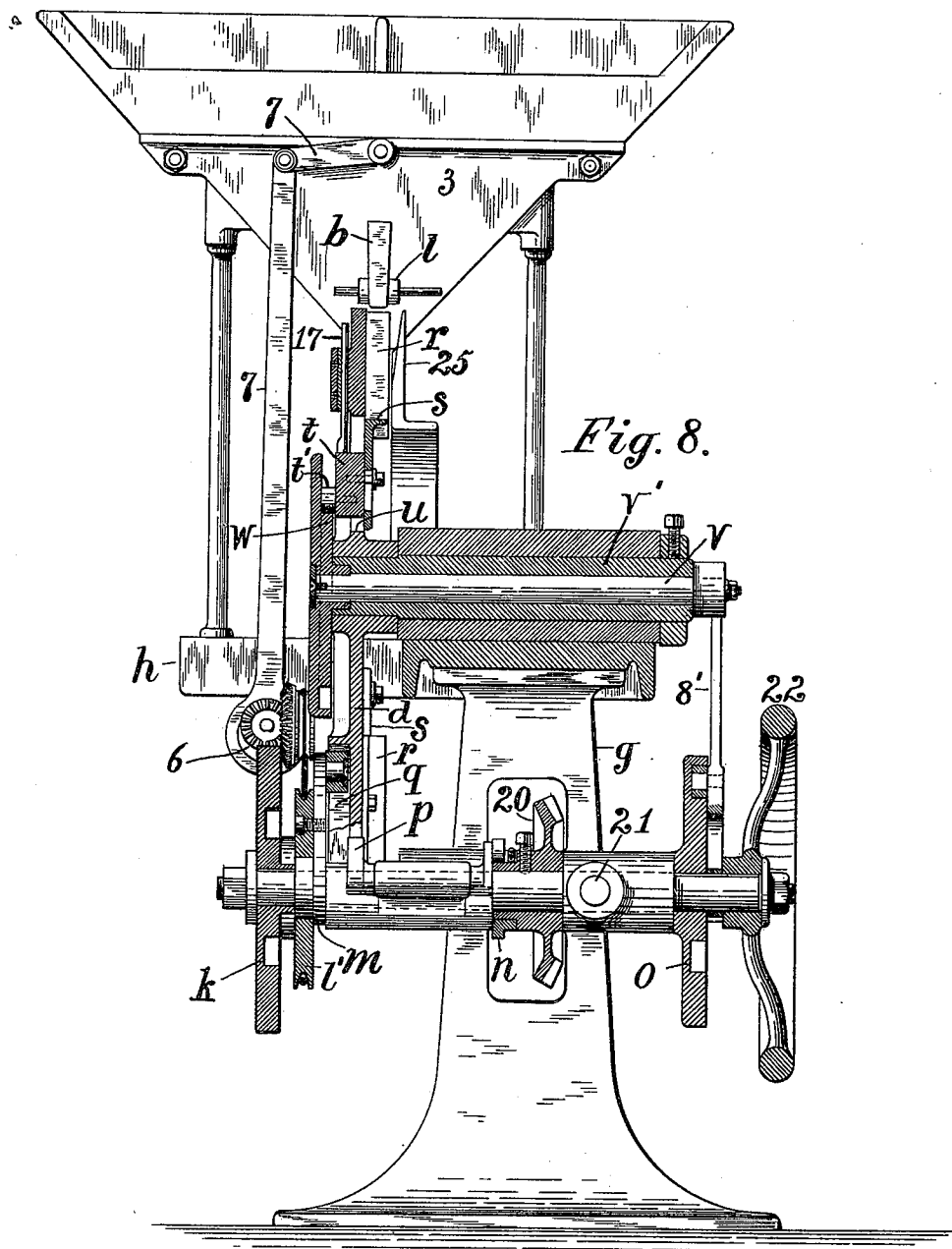


Fig. 8.

Attest:
L. Lee.
Walter H. Talavage

Inventor.
Frank J. Ludington
per Thos. S. Crane, Atty.

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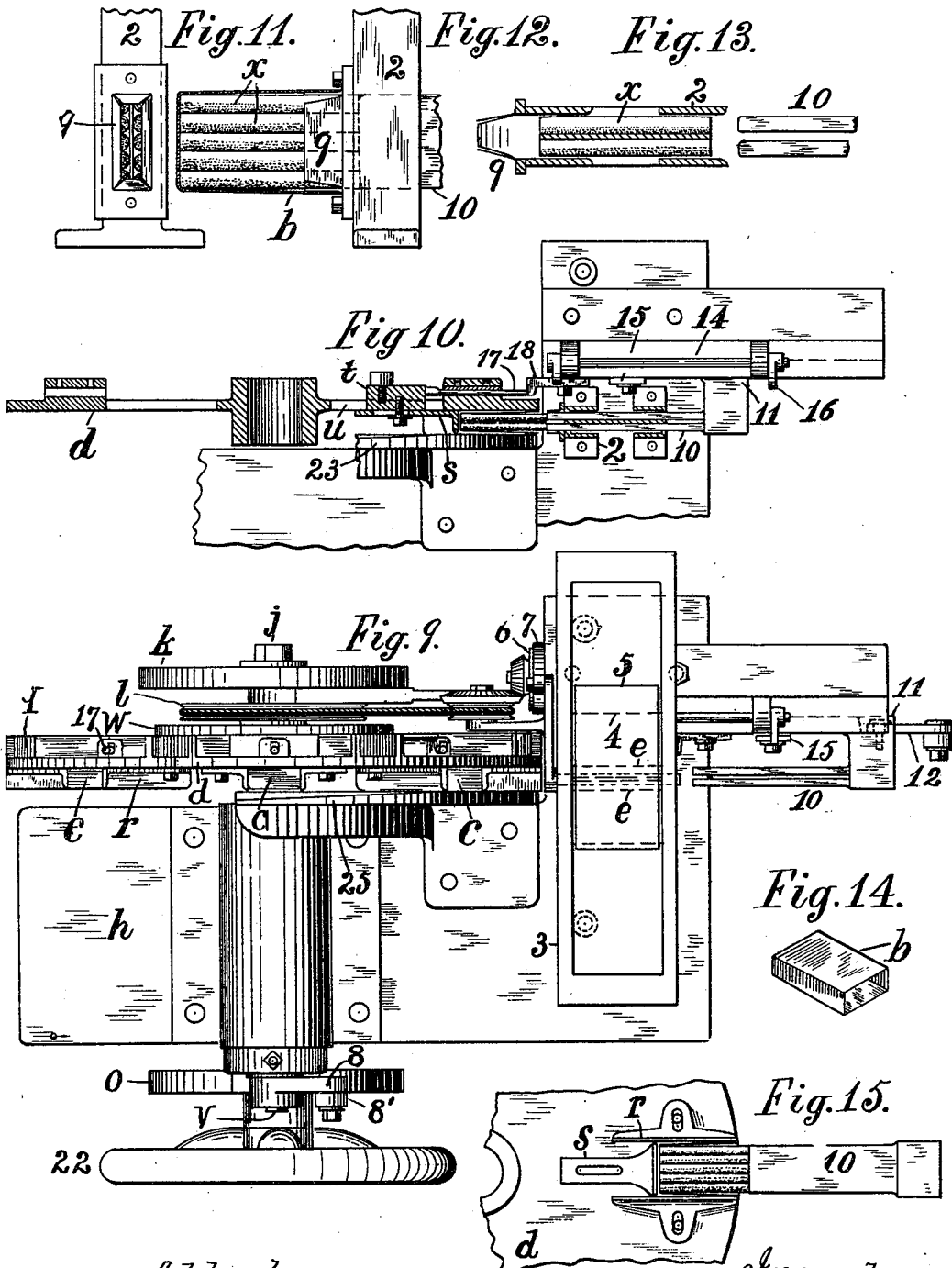
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5 Sheets—Sheet 5.



Attest:
L. Lell,
Walter H. Taluoge.

Inventor.
Frank J. Ludington
per Thos. S. Crane, Atty.

UNITED STATES PATENT OFFICE.

FRANK J. LUDINGTON, OF WATERBURY, CONNECTICUT.

CIGARETTE-PACKET-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 665,241, dated January 1, 1901.

Application filed January 8, 1900. Serial No. 230. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. LUDINGTON, a citizen of the United States, residing at No. 63 Bank street, Waterbury, county of New Haven, State of Connecticut, have invented certain new and useful Improvements in Cigarette-Packet-Filling Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present machine is designed to intermittently receive previously-prepared packets in chambers upon an intermittently-rotating carrier-wheel and to present them successively to a feeding chute through which the cigarettes are transferred to the packet. The packet is then discharged from the chamber in the wheel.

The apparatus is adapted to operate with packets of oblong rectangular form with open mouth at one end for application to a tapering nozzle upon the chute. Such packets are made by automatic machinery, and the present machine may be attached to such packet-making machine to receive the packets directly therefrom as they are produced, and in such case the driving-shaft of the present apparatus would be connected by suitable gearing with the driving-shaft of the packet-making machine to operate in unison therewith. To simplify the illustration, the present apparatus is shown disconnected from the packet-making machine and its driving-shaft provided with a pulley to actuate it independently. The cigarettes are delivered to a hopper, which feeds them into a chute, from which they are forced into the packets, which are presented successively to the nozzle of the chute. The packet is adapted to receive two layers of cigarettes, and the chute is formed with two adjacent vertical channels communicating with channels upon the opposite inclined sides of a hopper, and a segmental agitator is vibrated in the hopper to roll the cigarettes crosswise into such channels. A reciprocating punch is divided vertically and moved transversely through the channels at the bottom of the chute to force two layers of the cigarettes from such channels into the packet, the packet being first forced upon the nozzle of the chute by a mov-

able plunger in the bottom of the packet-chamber. Fingers are arranged upon the sides of the chute, which intermittently support the two layers of cigarettes above the path of the punch, but permit the cigarettes to move downward in the channels after the punch is retracted. The plungers in the packet-chambers are operated by a cam to force the packets forward upon the nozzle of the chute when required and to afterward discharge the filled packet from the chamber when the latter is turned downwardly. The invention includes the various constructions for carrying out these operations and will be understood by reference to the annexed drawings, in which—

Figure 1 is a front elevation of the machine with a diagram of a mandrel *a*, from which each packet *b* is delivered to chambers *c* upon the carrier-wheel *d* by rolls 1 or other suitable means. Fig. 2 is an enlarged cross-section of part of the carrier-wheel and the block for operating the plunger, the view being taken on line C D in Fig. 1 looking toward the cheeks *r* of the chamber *c*. Fig. 3 is a rear elevation of the machine. Fig. 4 is a diagram showing the forcing of the packet *b* upon the nozzle 9 of the chute. Fig. 5 is a diagram of the means for turning the chambered wheel *d*. Fig. 6 shows the right-hand end of the machine with the rear side of the hopper and chute removed, part of the slide 11 and its connection 12 being broken away to expose the chute. Fig. 7 shows the devices for actuating the fingers *z*. Fig. 8 shows the left-hand end of the machine in section, where hatched, upon the line A B in Fig. 3, excepting the cam O and wheel 22, which are shown in section upon their center line. Fig. 9 is a plan of the machine. Fig. 10 is a partial plan in section, where hatched, on the center of the wheel and chute. Fig. 11 is a front view of the nozzle upon the chute. Fig. 12 is a side view of the same parts with a part of the punch 10, cigarettes *x*, and packet *b*. Fig. 13 is a plan showing the bottom of the chute 2 and nozzle 9 in section, with the cigarettes in the chute and the end of the punch 10 adjacent to the ends of the cigarettes. Fig. 14 is a perspective view of the packet; and Fig. 15 is a dia-

gram showing the forcing of the packet backwardly into the chamber *c* (upon the carrier-wheel) by the advance of the punch 10.

The machine is shown with stand *g* supporting a bed-plate *h*, carrying the spindle *v'* of the carrier-wheel *d*, which is formed with eight packet-chambers *c*. A shaft *j*, journaled on the stand, carries a cam *k* for the punch, a pulley *l* for operating the agitator, a crank *m* for intermittingly rotating the wheel, a cam *n* to actuate the locking-pawl *p*, and cam *o* for pushing the plungers *s* (in the bottoms of the chambers) outwardly when required. The cam-shaft *j'* is rotated by gears 20 and a driving-shaft 21 and is also provided with a hand-wheel 22 for adjusting the position of the parts. The carrier-wheel *d* is formed of a thin disk rotated on a horizontal axis with notches *i* in the edge to engage a locking-pawl *p* and has upon one side eight radial grooves *q* to engage a pin or roll upon the end of the crank *m*. (See Fig. 5.) The opposite flat side of the disk is provided with a corresponding number of the packet-chambers *c*, each formed with adjustable cheeks *r* and plunger *s*, which plunger is moved by means of a block *t*, fitted to a radial slot *u* in the plate. A shaft *v* extends through the spindle *v'* of the carrier-wheel, as shown in Fig. 8, and is oscillated by connections 8 8' to cam *o* and operates to intermittingly turn an ejector-cam having a groove (lettered *w* in Figs. 3 and 4) to fit rolls *t'* upon all of the blocks *t*. (See Figs. 3, 4, and 8.)

The body of the cam, inside the groove, is formed with a tooth *w'* and an adjacent notch *w''*, the tooth operating upon the roll, as shown in Fig. 4, to push the block and the plunger forward when it is required to force the mouth of the packet upon the nozzle 9. The notch *w''* is then turned opposite the roll upon the block *t*, so that when the punch forces the cigarettes into the packet the latter may be stripped from the nozzle 9 by the advance of the punch. The cam having groove *w* oscillates to move the tooth past each of the rolls upon the block *t* when the packet-chamber stands before the nozzle 9; but the rolls traverse the entire groove in the cam as they move to and from such position, and the expansion of the groove in the cam serves, in the required position of the disk, to push the plunger forwardly and eject the filled packet from its chamber. The cam-groove *o* and cam-groove *w* thus operate conjointly to actuate the plunger *s* in each of the packet-chambers. The cam *o* is clearly shown in Fig. 1 actuating the crank 8 upon the shaft *b* by means of a link 8', carrying a roll fitted to the cam-groove *o*, such groove being formed to oscillate the crank 8 once in each rotation of the shaft *j* through the angle between the full and dotted positions of the crank, which are shown in Fig. 4.

To arrange the cigarettes *x* for the packet in two layers, as shown in Fig. 1, the chute 2

is divided by a vertical partition *e'* to receive two layers of cigarettes from the hopper. The chute has vertical apertures *e''* upon opposite edges at the bottom, through which the divided punch passes in discharging the cigarettes. The hopper 3 has sloping sides and a triangular block 4 in the bottom, having sides parallel to those of the hopper, forming two opposite discharge-channels *e*, leading into those in the chute. A segmental agitator 5 is pivoted within the hopper to oscillate over such block, which is formed with a corresponding concave surface. (See Fig. 6.) The upper sides of the agitator slope outwardly and serve, with the inwardly-sloping sides of the hopper, to lead the cigarettes into the marginal channels, and the periphery of the agitator is proportioned to roll the cigarettes successively against the sides of the hopper and to thus introduce them crosswise transversely into the channels. The agitator is constantly vibrated by an eccentric 6 and connections 7, the eccentric being rotated by gears and a cord from the pulley *l'*. (See Figs. 1, 6, and 8.) A tapering nozzle 9 is projected from the discharge-apertures *e''* at one edge of the partition *e* nearest the carrier-wheel. The nozzle is thus in line with the lowest five cigarettes in each of the channels (see Figs. 1 and 11) and is situated to receive the open mouth of the packet when presented by its chamber *c* in line with the apertures. The nozzle is formed of four elastic flaps, two of them being longer than the others, in correspondence with the wide and narrow sides of the packet. The longer flaps are extended vertically at the outer sides of the apertures *e''*, and the two shorter flaps are extended, respectively, across the top and bottom ends of the apertures. The outer ends of the flaps form an open passage as wide as one of the apertures, and the outer end of the nozzle is thus sufficiently smaller than the two apertures to be readily introduced within the mouth of the packet when the latter is forced toward the nozzle. The opening of the nozzle is thus made of such a size that the cigarettes may be forced through the nozzle into the packet without bending the flaps very materially or producing any serious resistance to the movement of the cigarettes, which would tend to injure the same. A punch 10 is divided vertically, so that one-half may pass on each side of the partition *e*, and it is reciprocated through the bottom of the chute and the nozzle by means of a slide 11 and connections 12 to the cam *k*. Fingers *z* are hinged upon the sides of the chute above the discharge-apertures and penetrate the channels *e* above the group of ten cigarettes which is to be discharged by the punch, (see Figs. 6 and 7,) and are actuated by toes *y*, through the medium of a crank 13, oscillated by a rock-shaft 14 and by a sloping dog 15, attached to the slide 11. An arm 16 upon the rock-shaft is pushed upwardly by the dog 15 when the slide is retracted, as shown in Fig. 1, which serves

to separate the fingers and permit five cigarettes to drop in each channel before the punch is advanced. Each of the blocks *t*, which actuates the plunger *s*, has a rod 17 projected toward the edge of the carrier-wheel *d*, (see Figs. 3 and 8,) and a dog 18 is provided on the slide 11 to contact with this rod when the punch has forced the cigarettes to the bottom of the packet.

10 The machine operates as follows: The shaft *j* rotates continuously and intermittently turns the carrier-wheel one-eighth of a revolution in the direction of the arrows 23 by means of the pin or roll *m'* upon the crank 15 *m*, which pin enters one of the grooves *q* and shifts it to the position of the preceding groove. The locking-pawl *p* normally engages one of the notches *i* in the rim of the carrier-wheel, but is lifted by the cam *n* acting upon an arm attached to the pawl during the shifting of the wheel, as is shown in Fig. 5. While the wheel stands still a packet 20 *b* is forced into the packet-chamber *c* upon the top of the wheel and is ultimately brought opposite the nozzle 9 to receive the cigarettes. (See Figs. 1 and 4.) The cam *w* is held stationary in the position shown in full lines in Fig. 4 by a concentric curve upon its actuating-cam *o* (see Fig. 1) until each packet-chamber *c* is opposite the nozzle 9, the rolls upon the blocks *t* successively traversing the cam-groove *w*. The cam *o* then turns the projection *w'* past the block *t*, as shown in Fig. 3, the projection (in its movement) forcing the plunger *s* outwardly to press the 35 packet upon the nozzle, as indicated by dotted lines *b* in Fig. 4. The packet *b* is shown thus applied to the nozzle in Fig. 12. The cam *k* then forces the punch 10 through the chute, as shown in Figs. 3 and 11, thus propelling the cigarettes *x* until they reach the bottom of the packet, as shown in Fig. 10. The notch *w²* then stands opposite the roll *t'* upon the block and permits the plunger *s* to 45 be pushed backwardly; but if such movement were effected by pressure upon the cigarettes they would be injured, and the dog 18 upon the slide 11 is so adjusted as to contact with the rod 17 as the cigarettes reach the bottom of the packet, and such rod shifts the block *t* and presses the plunger backwardly into the chamber, so that the continued movement of the punch may force the packet off of the nozzle without any sensible pressure upon the cigarettes. In this movement of the block *t* the roll *t'* passes into the notch *w²*, as shown in Fig. 3, and the succeeding rotation of the carrier-wheel moves the roll from such notch past a projection *w³* 60 into the cam-groove *w*. (See Figs. 3 and 4.) The projection *w³* operates to force the roll outwardly, as shown in Fig. 3, and discharges the filled packet from the chamber, as shown in Fig. 1.

55 It will be readily understood that the cigarettes require a guide to lead them into the mouth of the packet and that the flaps form-

ing a nozzle upon the chute are enabled by their elasticity to retain a tapering form (shown in Figs. 1, 11, and 13) while receiving the mouth of the packet and to then permit the cigarettes to separate the flaps, as shown in Figs. 10 and 12, when they are forced through the nozzle into the packet. Without such a nozzle the cigarettes could 75 not be readily directed into the packet, and unless the nozzle were tapered and formed of elastic flaps the mouth of the packet could not be readily applied to the nozzle and the cigarettes then forced through the same into 80 the packet.

As the partition *e'* divides the chute into two channels all the way to the bottom, it is necessary to split the punch 10, as shown in Fig. 9, so that its two parts may pass through 85 the aperture *e²* at opposite sides of the partition, as shown in Fig. 10, in discharging the cigarettes to the packet. The cigarettes are thus delivered in two layers or groups into the packet, as desired, while the two layers 90 are effectively separated in their passage from the hopper to the discharge-apertures *e²*. (See Figs. 6 and 7.)

The adjustable cheeks *r*, which form in conjunction with the plungers *s* the chambers to 95 receive the packets, are secured adjustably upon the disk of the carrier-wheel, as shown in Fig. 1, and the plungers are also secured adjustably and removably upon the blocks *t*. By this construction the machine may be 100 adapted to operate with packets of various sizes, as the plungers may be supplied of any desired width and the cheeks adjusted adjacent to their edges.

The elasticity of the nozzle upon the hopper 105 adapts it to cooperate with packets of various sizes; but the hopper itself may be changed, if desired, and replaced by one of other dimensions, as the foot of the hopper is merely bolted to the bed-plate *h*, as is clearly shown 110 in Figs. 6, 7, and 10.

Having thus set forth the nature of the invention, what is claimed herein is—

1. A cigarette-packet-filling machine having the wheel *d* intermittently rotated upon 115 a horizontal spindle, and provided upon its flat face with the chambers *c* to carry the packets *b*, a hopper with chute 2 extended downwardly therefrom and provided with vertical partition *e'* forming channels *e* extended into the hopper, an ejector arranged and operated to roll the cigarettes within the hopper transversely into the channels, a nozzle at the bottom of the chute upon the side, at the edge of the partition, means operating 125 in the chambers *c* when moved opposite such nozzle, to force the packets successively upon the nozzle, a punch set edgewise vertically to force two vertical layers of cigarettes from the chute through the nozzle into the packet, 130 and operating to force the packet back into the chamber, and means for ejecting the filled packet from the chamber in the succeeding movement of the wheel.

2. A cigarette-packet-filling machine having a hopper 3 with vertical chute 2 extended downward therefrom, a wheel *d* with chambers *c* to hold the packets *b* adjacent to the bottom of such chute, a slide with punch 10 to force the cigarettes *x* from the chute 2 into the packet *b*, intermittently-vibrating fingers *z* applied to the chute 2 to sustain the cigarettes above the path of the punch, and means operated by the slide carrying the punch for withdrawing the vibrating fingers from the chute to allow the descent of the cigarettes.

3. A cigarette-packet-filling machine having the hopper 3 with sloping sides and triangular block 4 forming opposite discharge-channels, a centrally-divided chute 2 extended from such channels, and the segmental agitator 5 vibrated adjacent to the sides of the hopper next the mouths of such channels.

4. A cigarette-packet-filling machine having the hopper 3 with sloping sides and triangular block 4 set parallel with the sides of the hopper, the vertical chute 2 with partition *e'* forming channels *e* extended into the hopper at the sides of the block, a nozzle at the bottom of the chute upon the side, at the edge of the partition, and the apertures *e*² at the opposite edge of the partitions in line with the nozzle, whereby a punch divided vertically may discharge two separate layers of cigarettes from the opposite sides of the partition through the nozzle.

5. A cigarette-packet-filling machine having a feeding-chute with sectional nozzle 9, a carrier-wheel with chambers to carry the packets adjacent to such nozzle, blocks *l* movable with the plungers *s* in the bottoms of the chambers, a cam having groove *w* to operate upon said blocks successively to force each packet in turn upon the nozzle, a slide 11 and a cam *k* to reciprocate the punch by the side of the chute, a punch 10 reciprocated through the chute by such slide to shift the cigarettes to the packet, means for intermittently rotating the wheel, and a dog 18 connected with the punch, to push the plungers into the chambers, as each packet is forced from the nozzle by the punch.

6. A cigarette-packet-filling machine having a hopper with vertical chute extended downward therefrom, a wheel with chambers to hold the packets adjacent to the bottom of such chute, the slide 11 and cam *k* to reciprocate the slide by the side of the chute, the punch 10 reciprocated through the chute by such slide, fingers pivoted upon the chute above the punch to support the cigarettes, a dog 15 attached to the slide, and suitable connections from the dog to the fingers to separate the fingers and drop the cigarettes within the chute before the punch is advanced.

7. A cigarette-packet-filling machine having a hopper with vertical chute extended downward therefrom and a nozzle to deliver the cigarettes, a carrier-wheel with packet-chambers in its periphery, to be supplied with packets at one point and rotated to hold them

opposite such nozzle, blocks fitted to move radially upon the carrier-wheel and supporting a plunger in the bottom of each chamber, a roll upon each block, and an oscillating cam having groove *w* constructed and operated as described to force the packet upon the nozzle of the chute when receiving the cigarettes, to clear the roll when the plunger is forced backwardly in the chamber, and to then force the plunger outwardly to discharge the filled packet from the wheel.

8. A cigarette-packet-filling machine having a hopper with vertical chute extended downward therefrom, and a nozzle to deliver the cigarettes, a carrier-wheel with packet-chambers in its periphery, to be supplied with packets at one point and rotated to hold them opposite such nozzle, blocks fitted to move radially upon the carrier-wheel and supporting a plunger in the bottom of each chamber, a roll upon each block, the oscillating cam provided with groove *w* and projections *w'* and *w*³ and intervening notch *w*², the shaft *v* supporting such cam upon the center of the carrier-wheel, and the cam *o* with connections 8, 8', to the shaft *v*, to oscillate the cam *w* as required.

9. A cigarette-packet-filling machine having the hopper 3 with sloping sides and triangular block 4 set parallel with the sides of the hopper, the vertical chute 2 with partition *e'* forming channels *e* extended into the hopper at the sides of the block, discharge-apertures *e*² at the bottom of the chute upon two sides at the edges of the partition, and the nozzle 9 attached to the chute over the apertures at one edge of the partition, with two long flaps projected from the outer sides of the vertical apertures, and two short flaps projected respectively across the top and bottom of the apertures, and the ends of the flaps forming an open channel as wide as one of the apertures, whereby a packet may be fitted over the nozzle, and the cigarettes forced through the nozzle without excessive expansion of the latter.

10. A cigarette-packet-filling machine having the hopper 3 with sloping sides, the chute 2 extended downward therefrom, the partition *e'* forming two channels *e* therein, the triangular block 4 at the top of such partition forming extensions of the channels *e* within the hopper, the segmental agitator 5 pivoted in the hopper to vibrate adjacent to the sides of the same and fitted to the upper surface of the block 4, and means for oscillating the agitator, whereby the cigarettes are rolled against the sides of the hopper and delivered transversely into the channels, as and for the purpose set forth.

11. In a cigarette-packet-filling machine, the combination, with the hopper 3 having the chute 2 extended downward therefrom with discharge-apertures *e*² at the bottom of the chute upon two sides, the partition *e'* extended downward in the chute to the bottom of the apertures forming two channels *e* therein

extending from the hopper downward and forming vertical layers of cigarettes opposite the two apertures, the wheel *d* mounted upon a horizontal spindle and provided upon its
5 flat face with chambers *c* to hold open-mouthed packets adjacent to the discharge-apertures, and a punch split vertically and provided with means for reciprocating it through the apertures at opposite sides of the
10 partition to discharge two vertical groups of the cigarettes simultaneously into the packet.

12. A cigarette-packet-filling machine having a hopper with vertical chute extended downward therefrom and a nozzle to deliver
15 the cigarettes, a carrier-wheel formed of the disk-plate *d* having the blocks *t* fitted to radial slots *u* in the plate, the plungers *s* secured detachably one upon each block, the

cheeks *r* secured adjustably upon the plate *d* at the sides of the plunger to form packet- 20 chambers movable into line with the nozzle, a roll upon each block, and the cam having groove *w* operating successively upon the rolls, as described, to force the packet upon the nozzle of the chute when receiving the 25 cigarettes, to clear the roll when the plunger is forced back in the chamber, and to then force the plunger outwardly to discharge the filled packet from the wheel.

In testimony whereof I have hereunto set 30 my hand in the presence of two subscribing witnesses.

FRANK J. LUDINGTON.

Witnesses:

WILSON H. PIERCE,
CHARLOTTE J. MERCHANT.