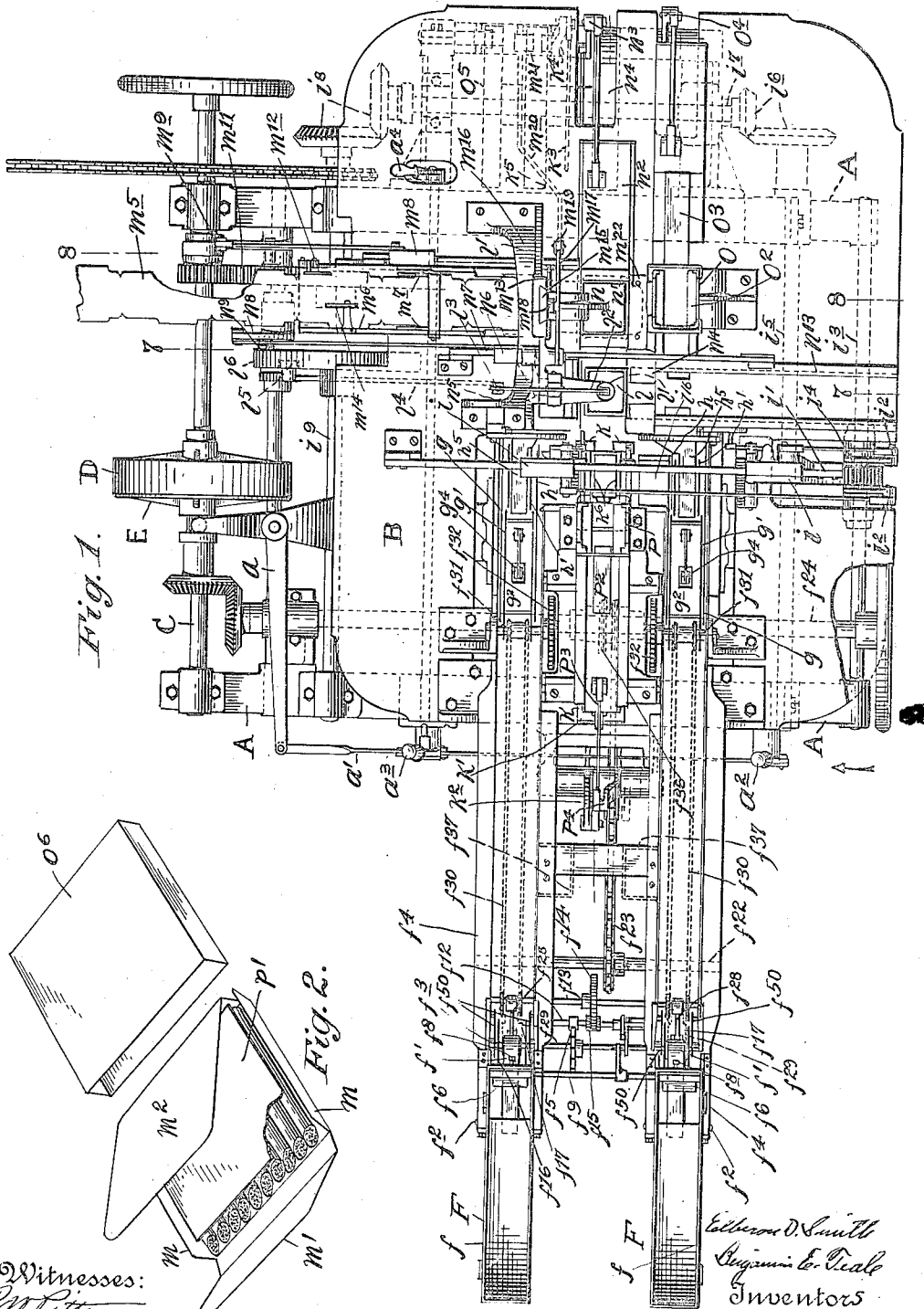


1,122,641.

Patented Dec. 29, 1914.

14 SHEETS—SHEET 1.



Witnesses:
M. Littman
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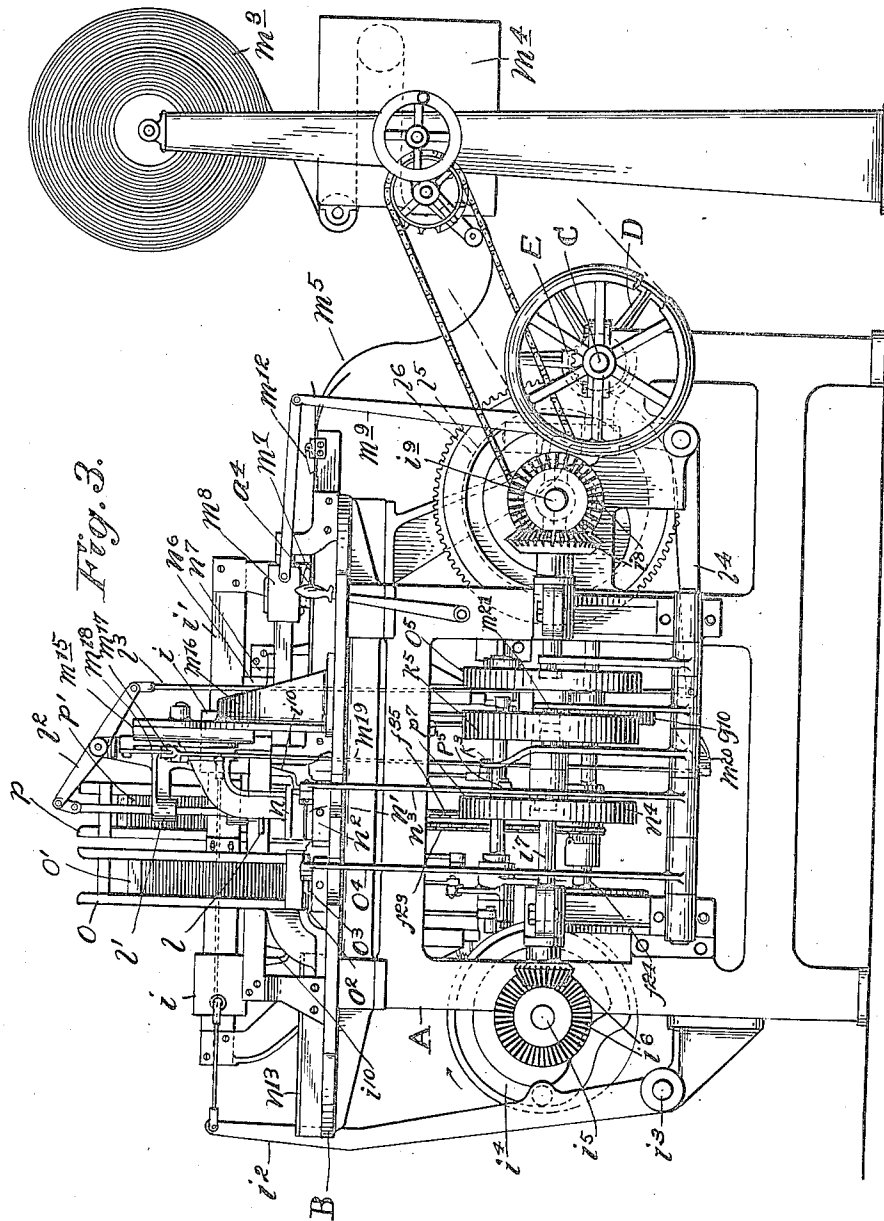
By the Attorneys
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E. D. SMITH & B. E. TEALE.
CIGARETTE PACKING MACHINE.
APPLICATION FILED APR. 17, 1912.

1,122,641.

Patented Dec. 29, 1914.

14 SHEETS—SHEET 2.



Witnesses:
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APPLICATION FILED APR. 17, 1912.

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14 SHEETS—SHEET 3.

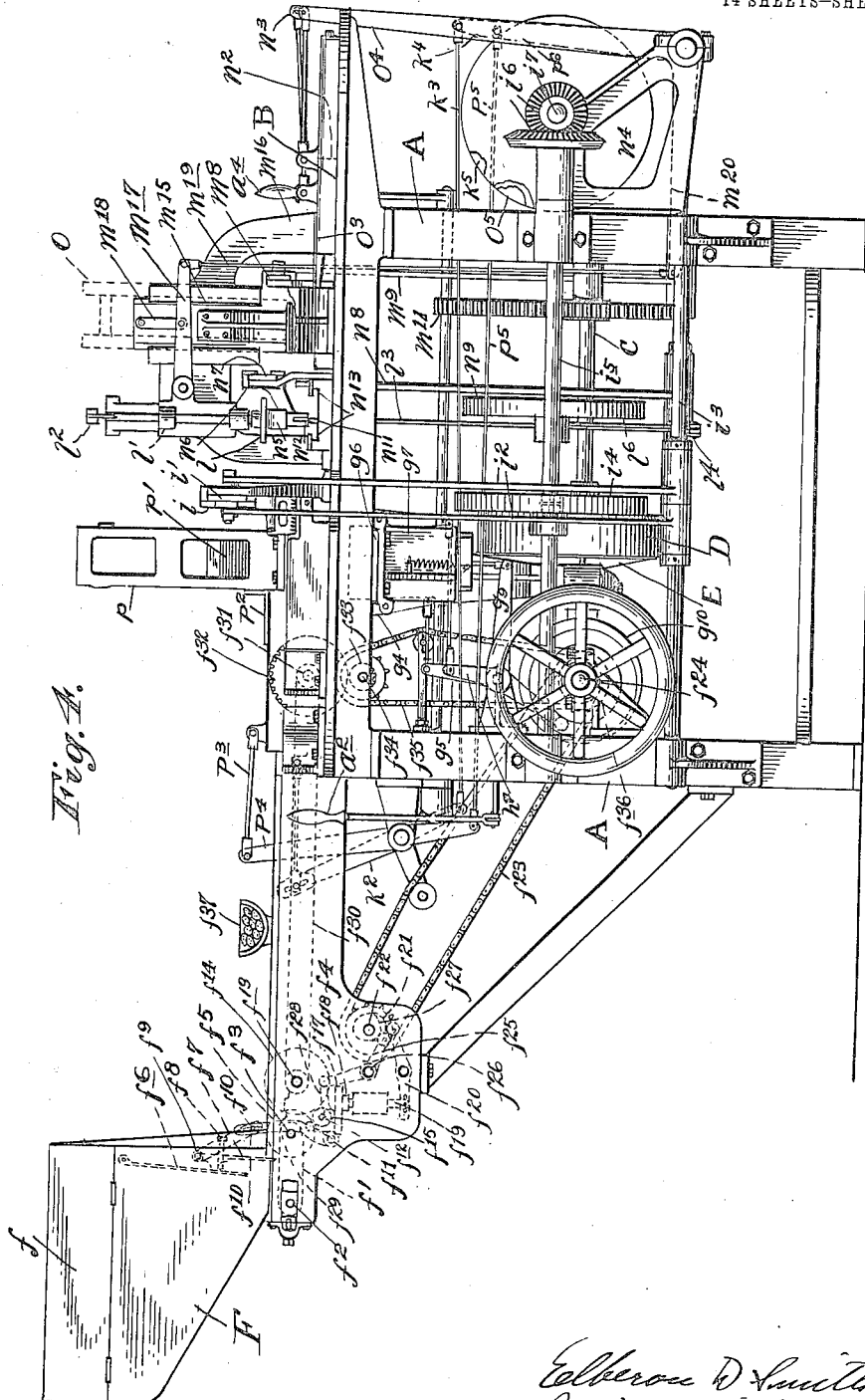


Fig. A.

Witnesses:
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14 SHEETS—SHEET 4.

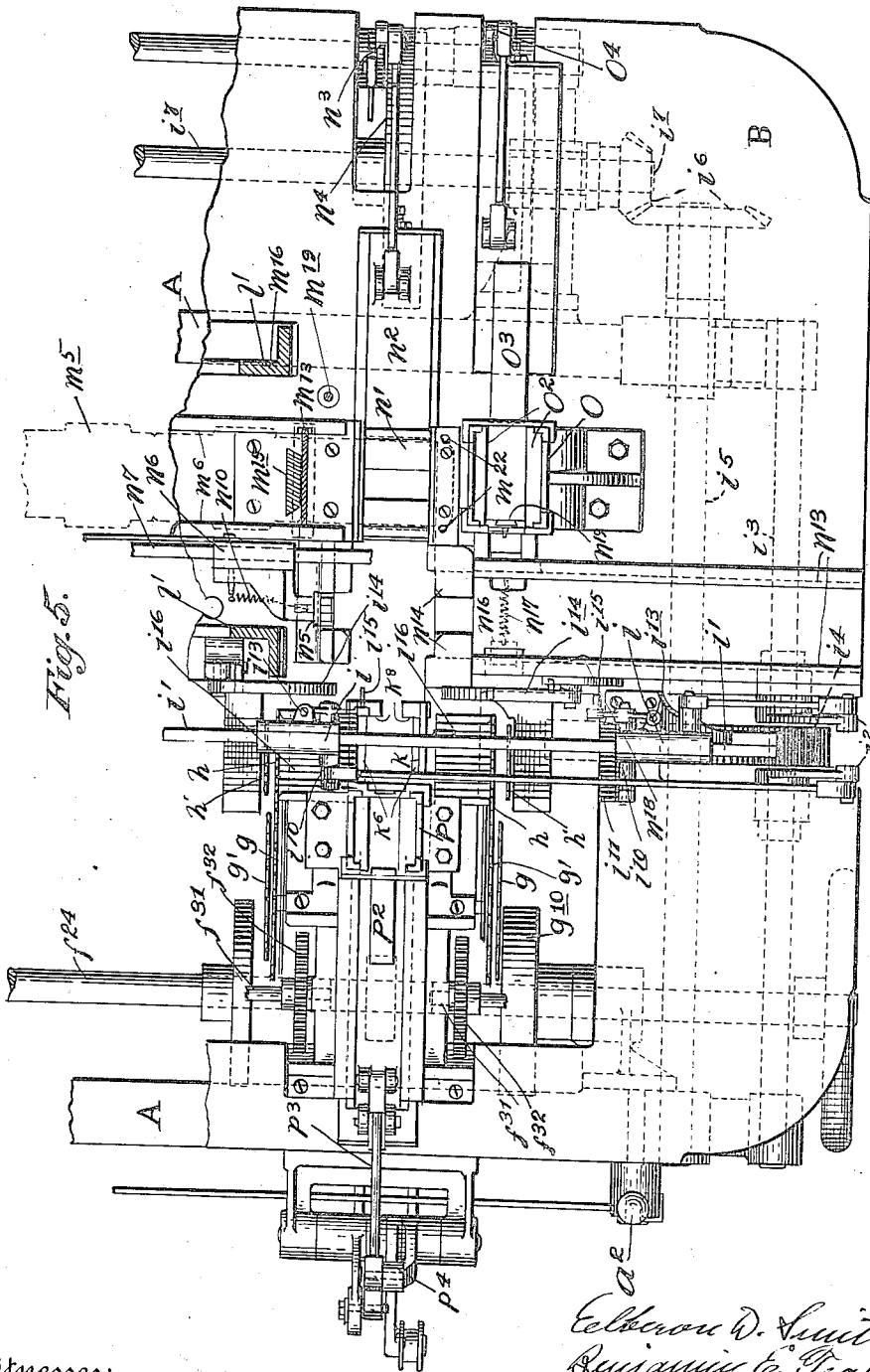


Fig. 5.

Witnesses:
R. W. Pittman
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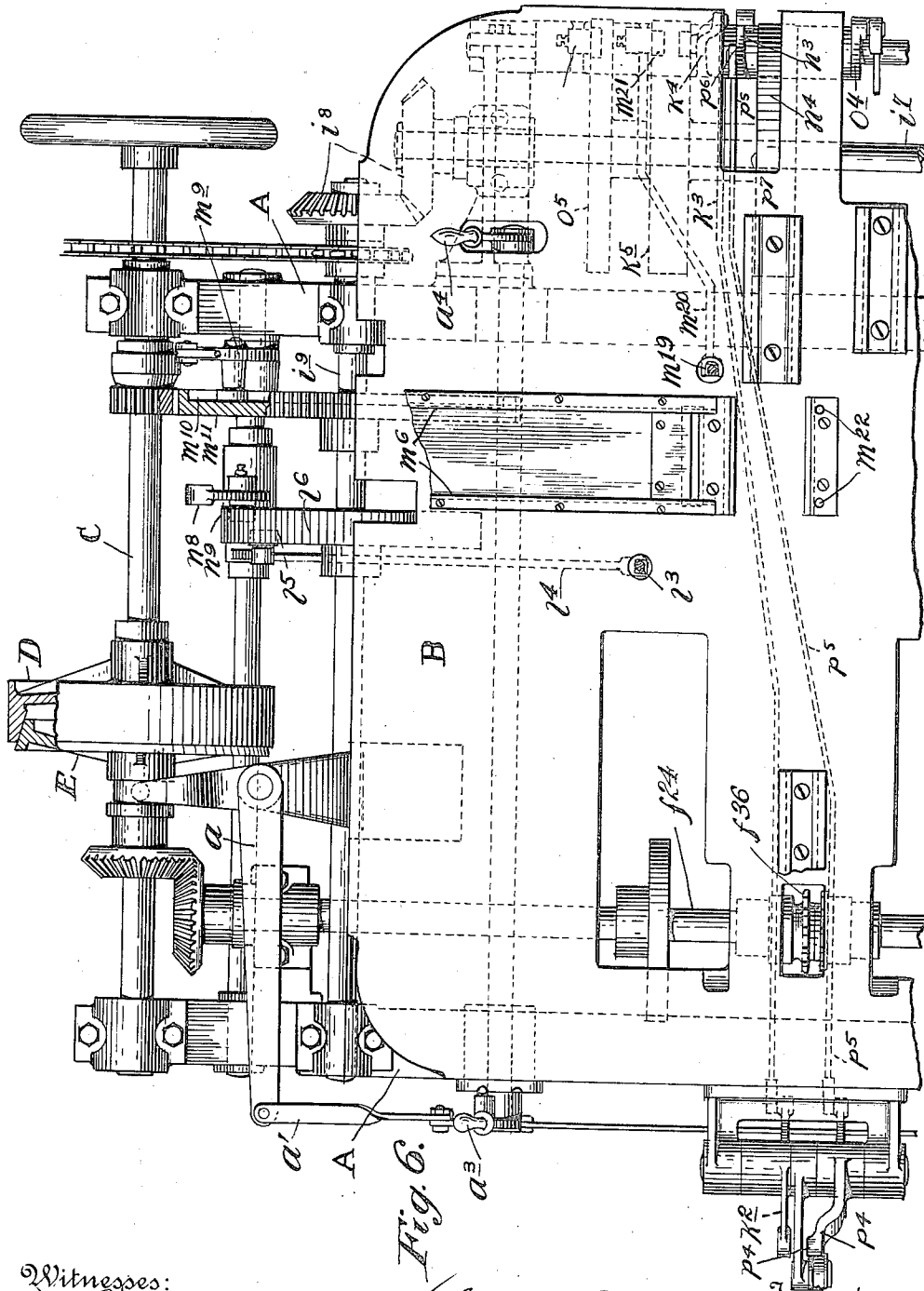
By their Attorneys
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CIGARETTE PACKING MACHINE.
APPLICATION FILED APR. 17, 1912.

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14 SHEETS-SHEET 5.

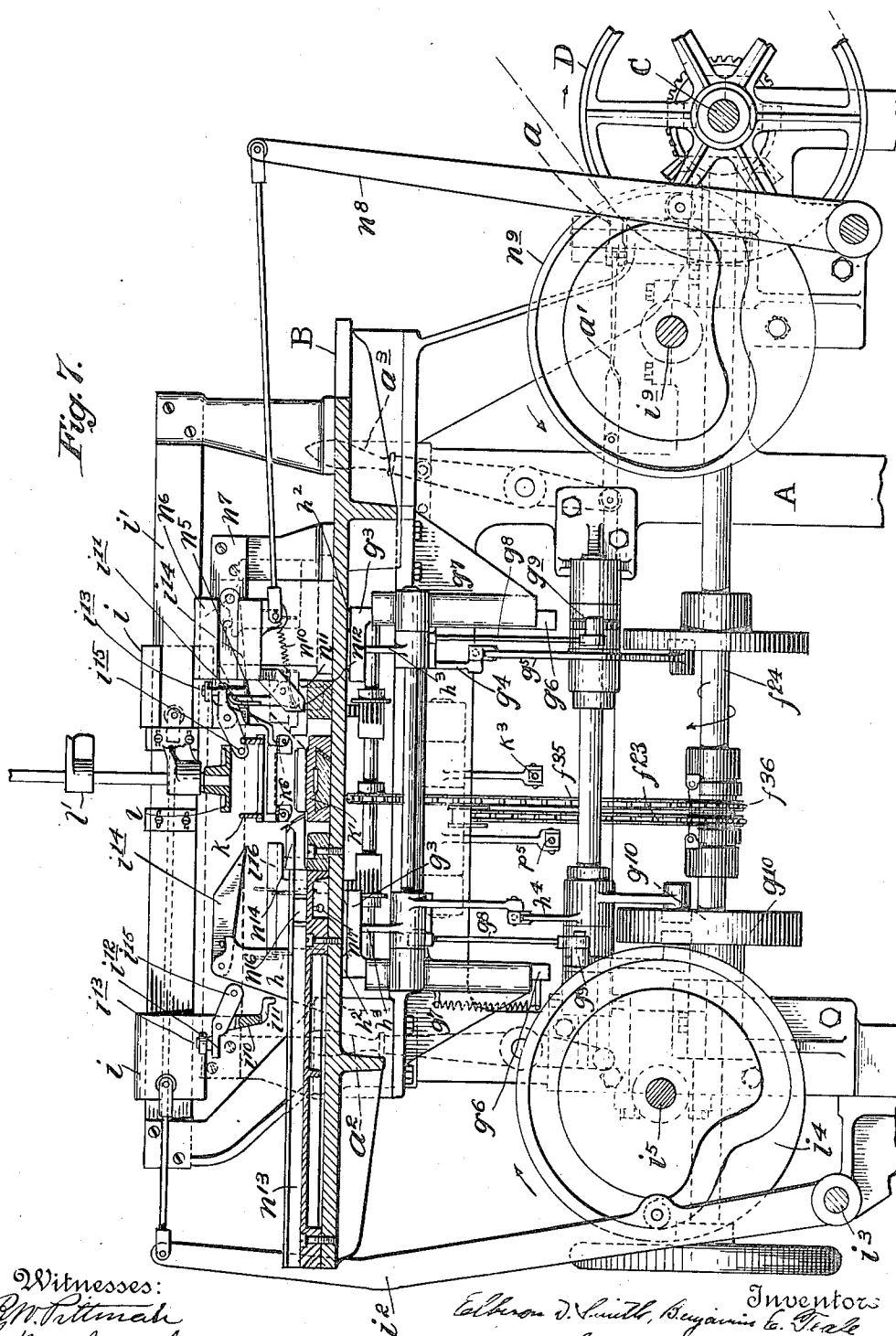


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1,122,641.

14 SHEETS--SHEET 6.



Witnesses:
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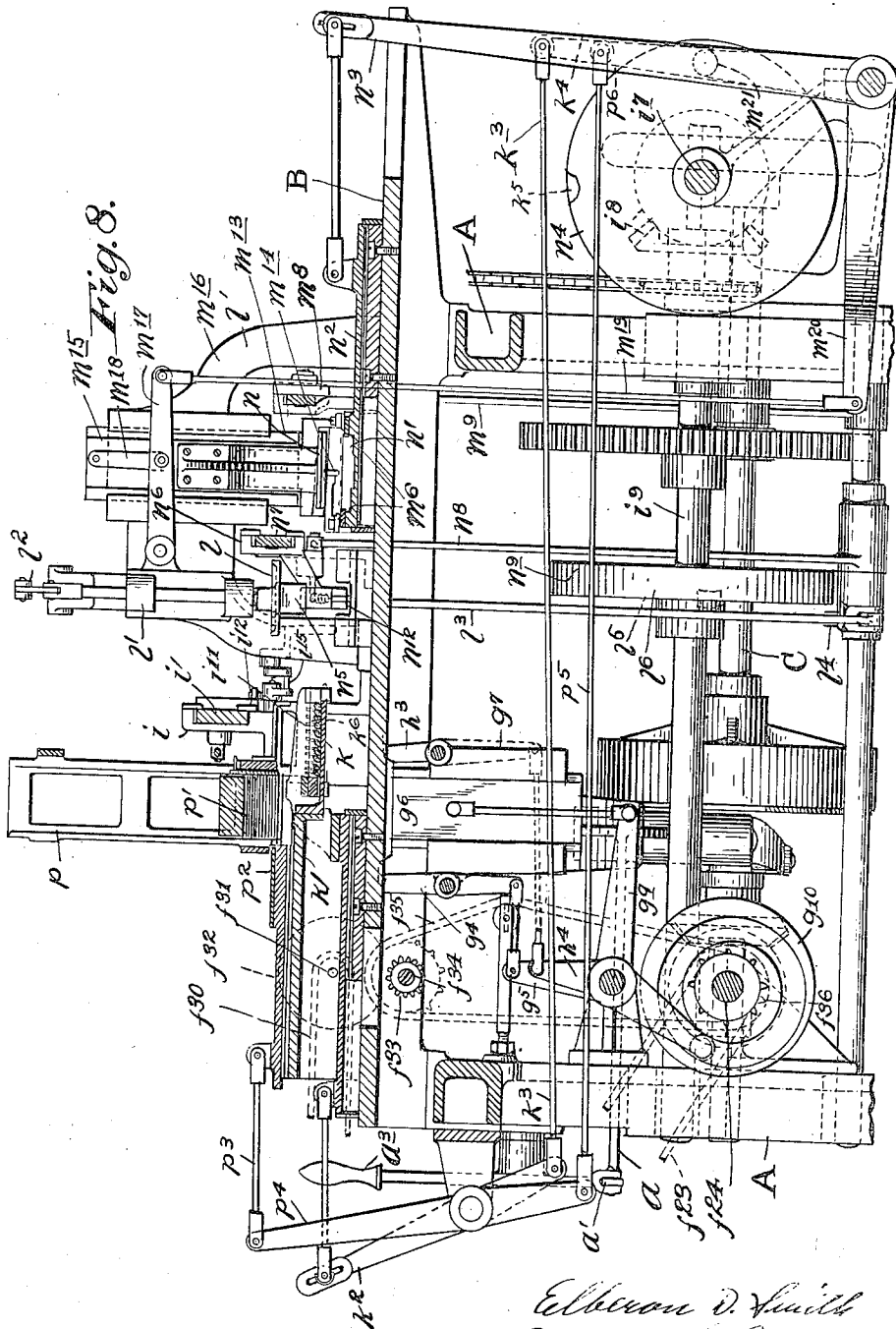
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1,122,641.

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14 SHEETS—SHEET 7.



Witnesses:
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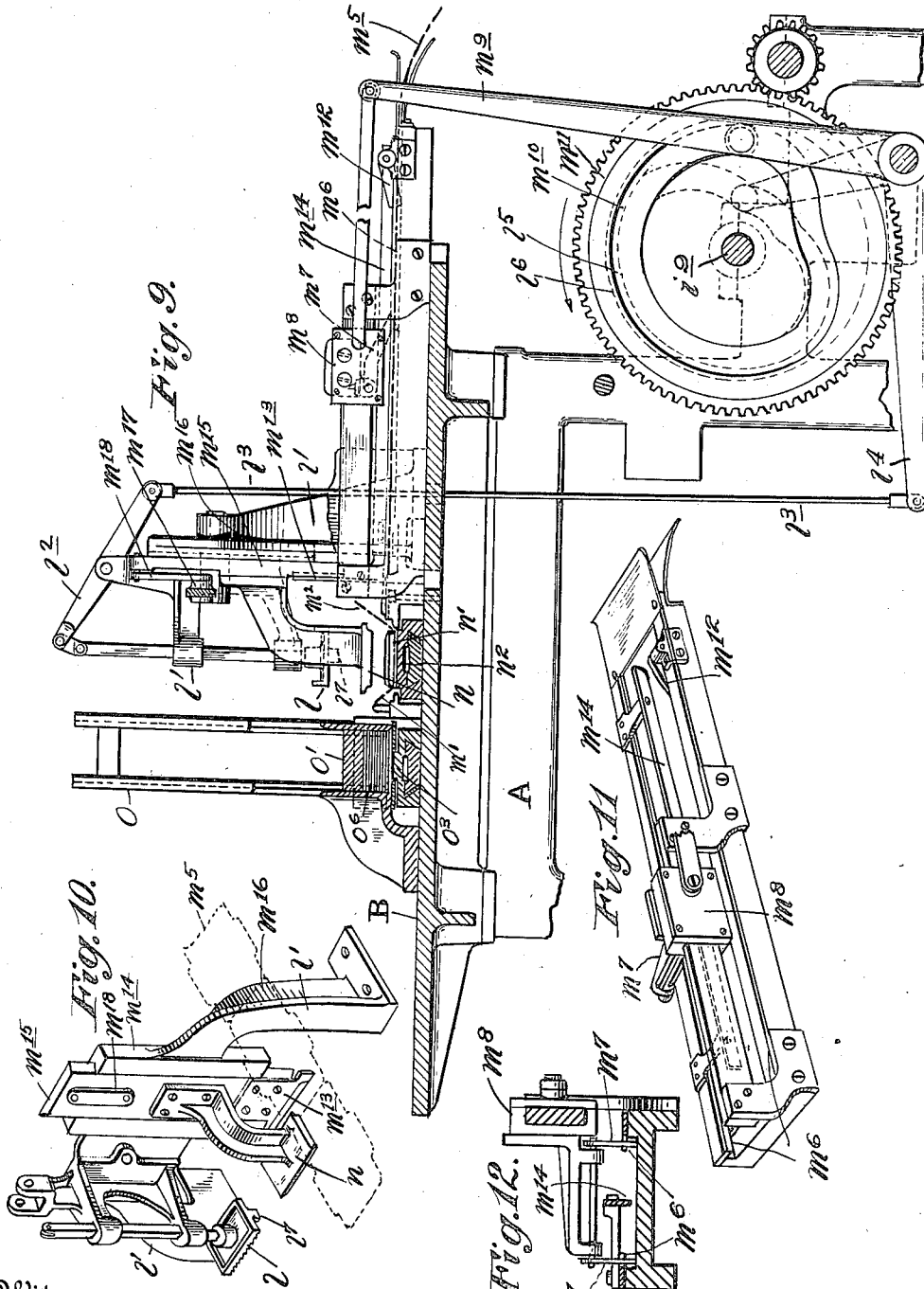
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CIGARETTE PACKING MACHINE.
APPLICATION FILED APR. 17, 1912.

1,122,641.

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14 SHEETS-SHEET 8.



Witnesses:
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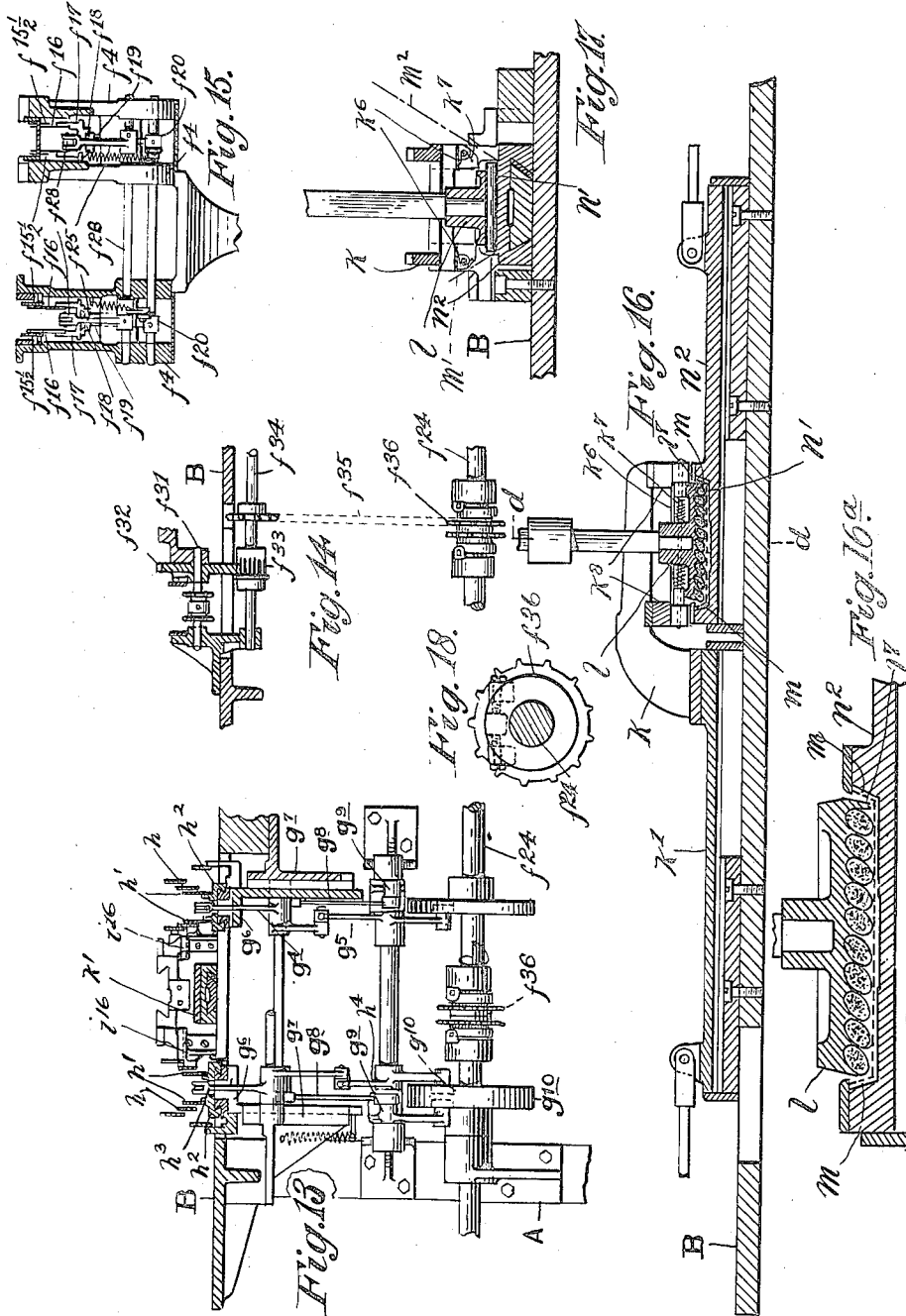
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14 SHEETS—SHEET 9.



Witnesses:
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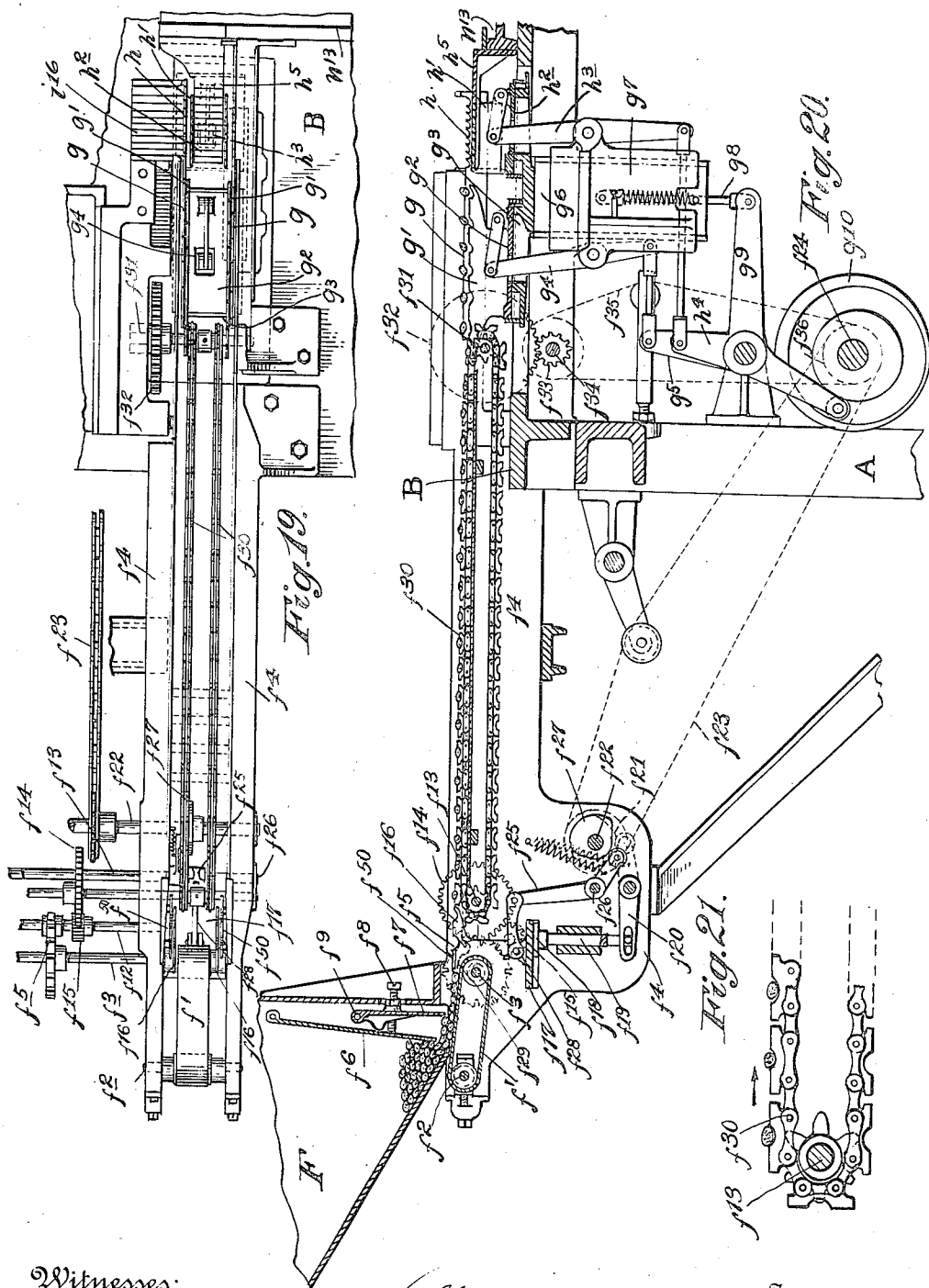
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APPLICATION FILED APR. 17, 1912.

1,122,641.

Patented Dec. 29, 1914.

14 SHEETS- SHEET 10.



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14 SHEETS—SHEET 11.



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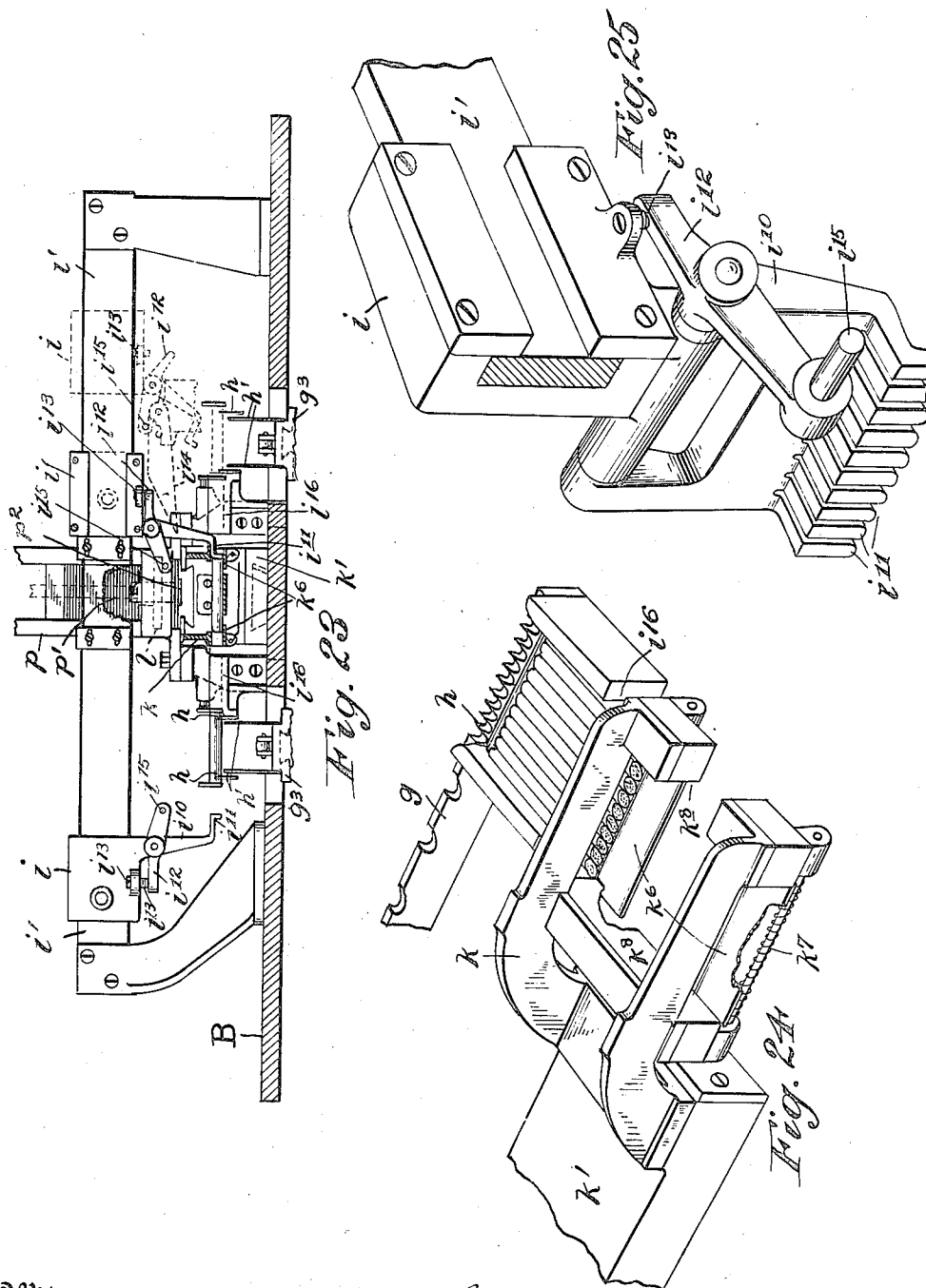
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CIGARETTE PACKING MACHINE.
APPLICATION FILED APR. 17, 1912.

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Patented Dec. 29, 1914.

14 SHEETS—SHEET 12.

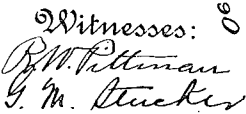


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14 SHEETS--SHEET 13.



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CIGARETTE PACKING MACHINE.
APPLICATION FILED APR. 17, 1912.

1,122,641.

Patented Dec. 29, 1914.

14 SHEETS—SHEET 14.

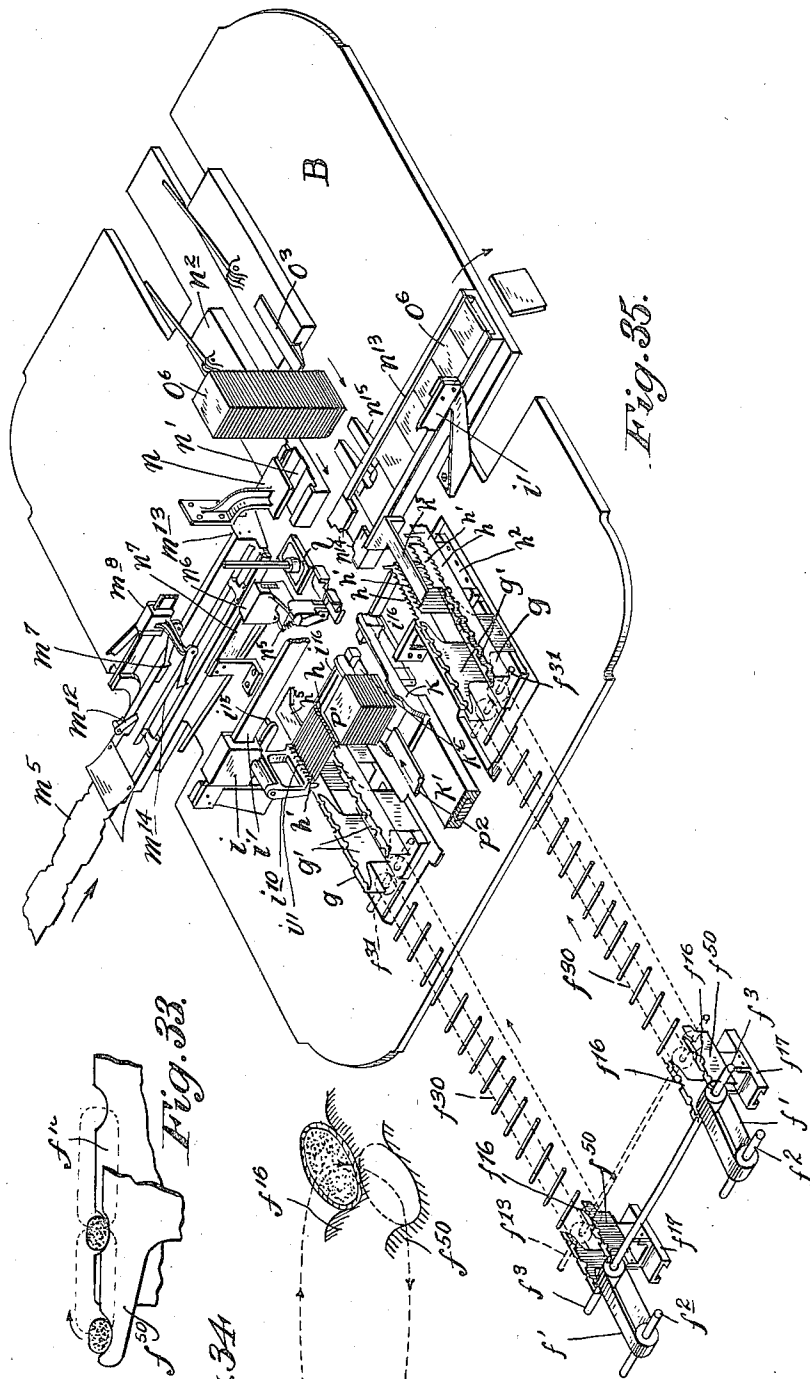


Fig. 35.

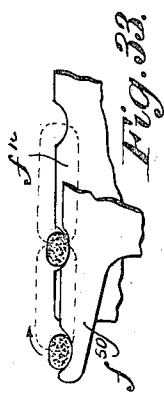


Fig. 33.

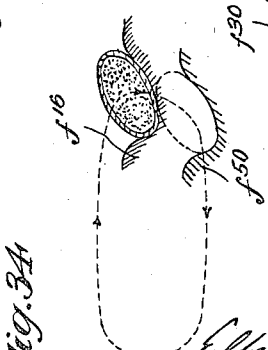


Fig. 34.

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UNITED STATES PATENT OFFICE.

ELBERON D. SMITH AND BENJAMIN E. TEALE, OF BROOKLYN, NEW YORK, ASSIGNORS
TO AMERICAN TOBACCO COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW
JERSEY.

CIGARETTE-PACKING MACHINE.

1,122,641.

Specification of Letters Patent.

Patented Dec. 29, 1914.

Application filed April 17, 1912. Serial No. 691,393.

To all whom it may concern:

Be it known that we, ELBERON D. SMITH and BENJAMIN E. TEALE, citizens of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Cigarette-Packing Machines, of which the following is a specification.

The present invention relates to machines for packing cigarettes, and is designed more particularly for packing oval cigarettes, its object being to provide mechanical means for taking oval cigarettes from the hopper where the bulk to be packed is stored; assembling such cigarettes in proper groups (for example in groups of ten); delivering such groups to the slide or wrapper portion of the box in which the cigarettes are to be packed; and finally inserting such packed slide with its flaps properly infolded into the shell of the package, which is then delivered in condition for marketing, subject, of course, to the attachment of such revenue stamps as may under the law be required. This, broadly considered, is the purpose of our invention, and its predominating purpose is to provide such mechanisms as that oval cigarettes may be placed in the box or container in an inclined position, that is with the major axis of each cigarette inclined to the horizontal, it being desirable, for economy of space in packing, that cigarettes of oval form be laid with their major axes angled or inclined to the horizontal rather than with this axis parallel or vertical to the horizontal, which in the one case increases the width of the box, and in the other case increases the depth beyond a desirable degree.

In order that the invention may be clear to those skilled in the art, we have shown in the drawings one embodiment of our invention, but as these drawings are merely illustrative and not restrictive, we do not limit ourselves to the exact details or particular mechanical expedients therein shown, for obviously they may be varied widely without departing from the inventive idea involved in the construction which we have devised.

In said drawings: Figure 1 is a plan view of the machine embodying our invention. Fig. 2 is a perspective view of a package of cigarettes assembled by our machine, the slide and shell being separated, for clearness

of illustration, with the flaps of the slide opened to show the interior disposition of the cigarettes. Fig. 3 is a view in elevation of the machine shown in Fig. 1, looking from the right hand, Fig. 1. Fig. 4 is a view of the machine in elevation looking from the front of the machine, that is in the direction of the arrow, Fig. 1. Fig. 5 is a plan view, on a somewhat larger scale, of the front portion of the machine, being an enlarged detail of the main table generally illustrated in Fig. 1. Fig. 6 is a plan view of the rear portion of the machine, being an enlarged view of the rear portion of the main table generally illustrated in Fig. 1. Fig. 7 is a sectional view of the machine on substantially line 7—7 of Fig. 1. Fig. 8 is a sectional view of the machine on substantially the line 8—8 of Fig. 1. Fig. 9 is an enlarged detail of so much of the machine as will illustrate the feed mechanism for the slide strip and slide folder, the shell tower being shown in its proper relation to the other parts of the machine. Figs. 10, 11 and 12 are detail views of the slide strip cutter, the slide folding head and the slide strip feed. Figs. 13, 14 and 15 inclusive are sectional views of the operating mechanism for the feeding racks which bring the cigarettes from the hopper to the other mechanisms. Figs. 16, 16^a and 17 are detail views in section of the group handling plunger for delivering an assembled and angled group of cigarettes. Fig. 18 is a detail of the adjustable sprocket for transmitting motion to the carrier racks. Fig. 19 is a detail plan view of one of the carrier chains and angling racks which take the cigarettes from the hopper and deliver them in properly angled position to the other mechanisms. Fig. 20 is a detail side elevation of the carrying and assembling mechanism shown in Fig. 19. Fig. 21 is a detail view to illustrate the carrier chain construction. Fig. 22 is a perspective view of the feed belt for the hopper, the mechanism for transferring the cigarettes from the hopper to the carrier chain, and the angling racks which take the cigarettes from the carrier chain and assemble them in properly angled groups. Figs. 23, 24 and 25 inclusive are detail views to illustrate the mechanism for transferring an angled and assembled group of cigarettes to the slide loading mechanism. Figs. 26, 27 and 28 are

sectional views to show the operation of ejecting from the shell tower a slide receiving shell, and for opening the same. Fig. 29 is a detail view in section to show the mechanisms for infolding the flaps of a packed slide, and inserting said slide and its contents in a shell. Fig. 30 is a perspective view of the mechanism shown in Fig. 29 to show the slide and shell handling and assembling mechanisms. Fig. 31 is a perspective view of the shell opening means, and the delivery ways for the loaded shell. Fig. 32 is a detail perspective view of the adjustable outlet gate for the shell tower. Fig. 33 is a detail, somewhat in diagram, to show substantially the path of movement of the cigarette as it moves from the hopper to the carrier chain. Fig. 34 is a detail, somewhat in diagram, to show substantially the path of movement of the cigarette during the angling or inclining of the cigarettes as they are assembled for transfer to the packages. Fig. 35 is a diagrammatic view designed to illustrate graphically the general relations of the several mechanisms going to make up the machine.

In the detailed description of the specification which will follow, we shall set forth the several mechanisms under their appropriate headings, following the sequence of operations so far as possible.

Frame structure.—The machine frame may be of any suitable type or design, that shown in the present disclosure comprising side frames A and the bed or table B carried by these side frames, and which assembled, as shown, forms the main supporting frame for the operating mechanisms and driving instrumentalities. Mounted in the side frames A in suitable bearings is the main drive shaft C having any suitable drive pulley, as D, loosely mounted thereon and adapted to be coupled to the shaft C to drive it and the several mechanisms operated by said drive shaft C through a suitable clutch mechanism E, which clutch may be thrown in and out by any suitable shipper mechanisms, as lever a , operating rod a' , and shipper handles a^2 , all conveniently arranged and interconnected so that the operator may throw the power on and off from any suitable point in the machine, the present embodiment showing three shipper levers a^2 , a^3 , and a^4 , as best shown in Fig. 1.

Hopper and hopper feed.—This being the general machine structure we will now take up the cigarette handling mechanisms, and first the hopper and hopper feed by which the cigarettes are brought from the bulk singly and in rapid succession ready for angling or inclining; assembling in groups in such inclined position; packing in such groups into the slides; and finally inserting into the shells. At one side of the main table, the left in Fig. 1, are the hoppers F,

and since these hoppers and their associated mechanisms are in duplicate, the parts being identical, description of one will suffice.

The hopper F is of any suitable or desired shape, preferably being an open topped box with a side door f for convenience in filling, and provided with an inclined bottom, as shown in Figs. 4, 20 and 22, this inclined bottom sloping to an opening at the delivery end of the hopper beneath which lies a feed belt f' (Fig. 20) mounted in an inclined position on the shafts f^2 , f^3 , the shaft f^2 being carried by bearing blocks adjustably mounted in the laterally extended frames f^4 of the machine, which shaft f^3 is, through the Geneva mechanism f^5 , given an intermittent rotation so as to periodically drive the belt f' and bring the cigarettes forward from the hopper, the cigarettes naturally falling from the hopper crosswise of the belt, as best shown in Fig. 20 of the drawings.

In order to insure a proper feeding of the cigarettes from the hopper and to prevent bridging and cessation of feed, we preferably provide the hopper with agitators, which in the present instance comprise agitator blades f^6 , f^7 , the blade f^6 being pivoted at its top and swinging freely within the hopper against the mass of cigarettes, while the blade f^7 is pivoted adjacent the first named agitator f^6 , and provided with an adjustable screw f^8 so positioned as to impart swinging movement of the agitator blade f^7 to the blade f^6 . The blade f^7 is given a regular swinging movement through the medium of the rock shaft f^9 , which, as shown in Fig. 1, takes care of the duplicate agitator blades, said rock shaft having the knocker arm f^{10} which is periodically struck by a pin f^{11} carried by the shaft f^{12} , which in turn is driven from the sprocket shaft f^{13} through the medium of the gear f^{14} and pinion f^{15} , (see Figs. 1 and 19). From this it will be seen that regular agitating movements are given the blades f^6 , f^7 , the blade f^6 sweeping the bulk of cigarettes back to keep the mass active, and in proper feeding condition, while the blade f^7 lays the cigarettes in, uniform line of single thickness upon the feeding belt f' , the cigarettes normally taking the position shown in Fig. 20 with their long axes parallel to the belt.

The cigarettes coming down on the carrier belt, as best shown in Figs. 19, 20 and 22, are lifted singly and in succession from that belt by means of shifting racks arranged in duplicate on each side of the belt, and of such length as to lap the forward or delivery end of the belt, as shown in Fig. 22. These shifting racks comprise two stationary members f^{16} , and two movable members f^{17} , the stationary racks having, in the present embodiment, two grooves, as shown,

while the shifting racks f^{16} have three grooves. The stationary racks f^{50} are secured in any suitable manner to the fixed side frames f^4 , while the shifting racks are carried (see Fig. 22) by a four motion plate f^{17} , said plate f^{17} being mounted in a slide f^{18} carried by a vertically reciprocating post f^{19} , said post f^{19} being connected to a lever f^{20} pivoted on the machine frame, and actuated by a cam f^{21} on the shaft f^{22} , which shaft in turn is driven by the chain f^{23} from a cam shaft f^{24} , as shown in Fig. 20. Through this mechanism the post f^{19} , slide f^{18} , and plate f^{17} , which carry the shifting racks f^{16} are given a vertical movement periodically so that the racks f^{16} will rise and fall relative to the fixed racks f^{50} . In addition to this rising and falling movement the shifting racks f^{16} are given forward and backward motion through the lever f^{25} carried by the shaft f^{26} , said lever f^{25} being operated by the cam f^{27} (see Fig. 20) said lever f^{25} being connected by link f^{28} with the plate f^{17} , so that the plate f^{17} with its supported racks f^{16} will be given a backward and forward movement on the slide f^{18} , this resulting in a four motion feed of the shifting racks f^{16} .

As stated, the fixed racks f^{50} and the shifting racks f^{16} have grooves therein, there being one more groove in the shifting racks than in the fixed racks, so that the shifting racks f^{16} will pick off a cigarette, as they make their lift and forward movement, from the feeding belt f' , and deposit the cigarette in the first groove or notch of the fixed racks f^{50} as they make their downward and rearward movement, the grooves or notches being so correlated, and the movements of the shifting racks being so timed as to cause the notches to register at the extremes of the feed movement of the shifting racks. This results in the picking off of the cigarettes singly and successively from the feed belt and stepping them forward along the stationary racks one at a time, and in properly separated condition. Preferably, in order to preserve the position of the cigarettes in the racks we provide a grooved apron f^{29} between the shifting racks f^{16} , which not only insures the cigarettes being fed forward, maintaining their proper position, but guards against their falling through between the racks if, as they come from the belt, they are skewed or misplaced.

As the shifting racks f^{16} pick the cigarettes from the last notch or groove in the fixed racks f^{50} they deposit them on the notched links of the carrier chains f^{30} , (see Figs. 20, 21 and 22), which carrier chains are mounted on suitable sprocket wheels carried by the supporting shafts mounted in the machine frame, the sprocket wheel shaft f^{31} being driven by gear f^{32} actuated in turn from a pinion f^{33} on a shaft f^{34} driven by a

sprocket chain f^{35} , which sprocket chain receives its motion from a sprocket f^{36} on the cam shaft f^{24} , heretofore referred to, this sprocket f^{36} being adjustable relative to its shaft so as to permit the proper timing of the carrier chain, the travel of which must of course be so adjusted as to insure a notched or grooved link being in proper position to receive a cigarette each time the shifting racks f^{16} step forward and make delivery.

The carrier chains f^{30} may be of any suitable length, it being desirable that they be of such length as that the attendant will have ample time to position the cigarettes as they pass along, with the monogram or trade mark facing upwardly and side by side, as well as to remove any imperfect cigarettes or any excess number before the cigarettes pass to the angling and packing mechanisms, it being our purpose to provide adjacent the point where the attendant sits, and convenient to the carrier chains, a box or cup f^{37} containing a sufficient number of cigarettes to supply the carrier chain in event of there being any skipping, or in event of imperfect cigarettes.

This constitutes the hopper and feed mechanism, and next in order is the angling mechanism which brings the cigarettes into proper inclined position ready for grouping.

Mechanism for angling or inclining the cigarettes.—At the delivery end of the carrier chains f^{30} are arranged a series of angling racks somewhat similar to the shifting racks just described, and comprising fixed racks g and shifting racks g' , these racks being what we term "coarse toothed" racks as distinguished from the finer toothed grouping racks which will presently be described. The shifting racks g' have a four motion feed, being mounted, as best shown in Fig. 22, on a sliding plate g^2 which has a to and fro traverse on a bed g^3 , (see Fig. 20) said plate g^2 being linked to a lever g^4 which is connected with a cam lever g^5 operated from a cam on the cam shaft f^{24} , this cam being so timed as to give a relatively long stroke to the shifting rack g' .

The vertical movements of the shifting racks g' are secured through the medium of a rising and falling slide g^6 carried by a bracket g^7 on the machine frame and connected by a link g^8 with a cam lever g^9 which has a cam roll engaging a groove in a cam disk g^{10} on the shaft f^{24} , as best shown in Fig. 20, the said slide g^6 carrying the plate g^2 which supports the slide g^2 heretofore referred to.

The shifting racks g' embrace the carrier chains, as shown in Fig. 22, so as to lift the cigarettes off the notched links, singly and in succession, and deposit them in the notches of the fixed racks g . It will be observed that as the cigarettes come forward

on the carrier chain they lie with their major axes parallel to the line of travel of the carrier chain, and in order to give the proper inclination to these cigarettes and bring them to the angle at which they are to be grouped and inserted in the slides and shell of the packages, we change the contour of the notches progressively from the front end of the stationary racks g and shifting racks g' , as clearly shown in Figs. 20 and 22, so that a cigarette picked off the carrier chain by the first notch of the shifting racks g' in horizontal position (that is with its major axis parallel to its line of movement) will be gradually tilted as it steps along the racks, owing to the gradual change in contour of the successive notches until it is finally brought to the inclined position shown in Fig. 20, in which it will be observed that the last cigarette on the stationary racks stands at an inclination of about 48° to the horizontal. Of course the degree of inclination is entirely immaterial, for the notches may be so shaped as to give any desired angle. This angling or inclining of the cigarettes is accomplished both by the notches in the fixed racks g and the movable racks g' , for the notches in the shifting racks are not identical in contour with the notches in the stationary racks with which they coöperate, and the cigarettes as they are lifted by the shifting racks off of the stationary racks will settle into the notches of the shifting racks at an angle of greater degree, and then, as they are stepped forward and deposited in the next notch of the stationary racks, such notches being at a greater angle, give a further inclination, so that the angling of the cigarette and the bringing of it to the proper degree of inclination may be accomplished in half the time that would be necessary if we depended on one set, either of stationary or shifting racks, to angle the cigarette.

Grouping mechanism.—It will be observed that the cigarettes on the inclining racks just described are in separated condition; that is, they do not lie closely adjacent each other, and in order that they may be brought into a compact group of the desired number we provide grouping racks, these grouping racks being in duplicate on each side of the machine, and comprising the fixed racks h which, in the present embodiment, are formed in a continuation of the plate in which the racks g are formed, and shifting racks h' arranged in the same general manner as the angling racks heretofore described. These grouping racks h and h' are provided with closely adjacent notches which preferably coincide in contour to the last notch in the angling racks g' , so that as the cigarette is delivered in its final inclined position by the shifting racks g' , it will be deposited in the first notch of

the stationary grouping racks h at its forward and final angle.

The notches in the shifting grouping racks h' are identical with those in the stationary grouping racks h so that as the cigarettes feed along they are stepped forward in a gradually augmented group until the requisite number of cigarettes has been supplied, each cigarette of the group being maintained in that inclined position to which it was brought by the action of the angling racks.

The shifting grouping racks h' have a four motion movement similar to the angling racks just described, except that it is a shorter stroke, and this fourmotion movement is accomplished in very much the same manner as the fourmotion movement of the angling racks, the grouping racks h' being carried by a slide h^2 which is mounted on the vertical slide g^0 heretofore referred to, so that so far as the vertical movements of the grouping racks are concerned they are secured in the same manner as the vertical movement of the angling racks. The slide h^2 is linked to a lever h^3 pivoted on the machine frame, which in turn is connected by a suitable rod with a cam lever h^4 actuated by a groove in the cam disk g^{10} on the shaft f^{24} , as best shown in Figs. 7, 8 and 20.

In order to properly support the cigarettes in the grouping racks we preferably provide a supporting plate h^5 mounted on any suitable part of the machine so that it will stand in fixed position between the shifting racks h' , as shown in Figs. 20, 22 and in the diagrammatic view Fig. 34. While this support h^5 may be a flat plate, as shown in these views, we preferably groove it, as shown in Fig. 22, to correspond with the contour of the notches in the racks in order that there may be no danger of the cigarettes rolling or shifting from the inclined position to which they have been brought. The cigarettes thus grouped in bunches of ten, or such number as the machine may be designed to handle, are ready to be delivered to the group transfer mechanism, or what I term "group shifting devices".

Group shifting device.—The group shifting devices are in duplicate, but their operation is alternate, that is, after the group shifting mechanism on one side has transferred its group of cigarettes from the grouping racks it remains in that position until, in the operation of the machine, the cigarettes grouped by the mechanism on either side of the machine is ready to be shifted, whereupon the group shifting fingers which have advanced their group are retracted to their original position.

The group shifting devices and their operating mechanism are best shown in Figs. 1, 3, 7, 23 and 25, the general relation of

these group shifting devices being diagrammatically shown in Fig. 34.

Each group shifter comprises a slide block i mounted on a fixed slide supporting bar i' , the slide blocks being connected by suitable connecting rods with the actuating levers i^2 mounted on a shaft i^3 on the machine frame, and having each a cam roll which engage cam grooves on opposite sides of the cam disk i^4 mounted on the shaft i^5 , and driven through the medium of gears i^6 , shaft i^7 , gears i^8 , and shaft i^9 , which shaft gears back to the main drive shaft C in any suitable manner, for example as shown in Fig. 6.

Each of the slides i has pivoted thereto a swinging frame i^{10} carrying at its lower end a series of cigarette engaging and shifting fingers i^{11} which are slightly separated in order that they may enter the notches in the grouping racks and beds heretofore described. the said frame i^{10} being held against movement in one direction by means of the stop lever i^{12} which bears against an adjustable stop screw i^{13} on the slide, as shown in Fig. 5. The said fingers are so disposed relative to the grouping racks that as the slide i moves forward to the full line position shown in Fig. 23, each of the fingers i^{11} will engage a cigarette lying in the grouping racks, and the entire group or block of cigarettes will be shifted from the racks to what is known as the group transfer mechanism, which will be presently described. The group will be transferred without disturbing its arrangement, the movement being lengthwise through the grooves and notches of the grouping racks and group supporting bed, and this group with each cigarette properly inclined deposited on the transfer bed ready to go forward to the slide. As stated the movements of these slides i are so timed as that one, after having delivered its group of cigarettes to the transfer mechanism, will have a dwell at that delivery position, receding slightly to clear the transfer mechanism as it moves forward with the delivered group, and then advancing to a point where it will serve as a stop or alining gage for the group of cigarettes brought forward from the opposite side of the machine, it having been found desirable to insure accurate alining of the cigarettes that some means for gaging them as they are delivered to the transfer mechanism be provided, and this is best shown in Fig. 23 where the right hand slide i has just delivered its group of cigarettes, the left hand slide being ready to advance and bring its group forward. The frame i^{10} of the right hand slide in Fig. 3 is shown in its extreme position from which it recedes slightly to give clearance to the forward thrust of the transfer, and then returns to that position so that the cigarettes

coming from the other side, and being delivered to the transfer mechanisms, will be alined by the vertical faces of the group fingers i^{11} , and therefore accurate alining of the group of cigarettes which have been brought across from the grouping racks in properly inclined condition is insured.

In order that on the return movement of the group shifting fingers there may be no disturbance of the incoming cigarettes which are being grouped on the grouping racks, we provide a cam lift for the pivoted frame i^{10} , which cam lift comprises the cam plate i^{14} , the upper edge of which is inclined to lift the pivoted frame i^{10} to the position shown in dotted lines at the right in Fig. 23 by means of the pin i^{15} which travels over the edge of the cam plate i^{14} on its return movement, and swings the fingers clear of the grouping racks and cigarettes, said cam plate i^{14} being pivoted so that on the forward movement of the group shifting slide the pin i^{15} rides idly beneath it. Between the grouping racks above described, and the transfer mechanism which is about to be taken up, we provide a guide plate or support i^{16} over which the cigarettes travel as the fingers of the group shifter ejects them from the racks, the said plate i^{16} having grooves corresponding and registering with the grooves in the fixed rack plates h , so that the inclined position of the cigarettes will be preserved as they move from their grouped position in the racks to the transfer mechanism.

Group transfer mechanism.—The cigarettes thus assembled and moved forward by the group shifters from the grouping racks, are moved bodily into a transfer frame k , best shown in Figs. 1, 7, 16, 17, 24 and the diagrammatic view Fig 35, the said frame k being mounted on a slide k' which, by a suitable connecting rod, is joined to a lever k^2 , which by the long connecting rod k^3 (see Fig. 8) couples with the lever k^4 pivoted on the machine frame, and actuated by the cam k^5 on the shaft i^7 heretofore referred to.

The transfer frame k comprises two forwardly projecting limbs having depending gate supporting lugs, on which lugs are pivoted inwardly projecting and downwardly turning gates k^6 , these gates being normally held in the horizontal position shown, by means of light springs k^7 on the pivot rods, these springs being of ample strength to support a group of cigarettes, but light enough to yield readily under impact of the plunger, presently to be described, which deposits the grouped cigarettes on the shuck or slide. The group of cigarettes is shifted to this transfer mechanism in the manner heretofore described; when the transfer slide or carrier stands in the position shown in Fig. 24 with the mouth of the transfer car-

rier coincident with the grouping racks, and the entire group of cigarettes is shifted from the grooved racks, where they lie in inclined position, bodily onto the transfer, the group being held between the end walls k^s of the transfer frame, so that no derangement of the inclination of the cigarettes occurs, the size of the transfer frame being such as to take a group of cigarettes snugly and prevent their rolling or falling flat again from the inclined position in which they are delivered. It will be seen that the cigarettes will lie then with their ends supported on the spring gates k^s , in which condition the transfer slide moves forward with the transfer to a point beneath the group feeding plunger, which will now be described.

Mechanism for delivering the group to the slide.—The transfer just described brings the group forward to a point beneath a plunger l , best shown in Figs. 1, 4, 7, 9, and 16, said plunger being mounted in up-rights l' on the machine frame, so that its stem slides freely therein, the plunger stem being linked to a lever l^2 coupled by the connecting rod l^3 with a cam lever l^4 , said cam lever being actuated by the cam groove l^5 on the disk l^6 carried by the rear cam shaft i^9 , so that the plunger l will have a properly timed rise and fall, and preferably the cam which operates this plunger is so plotted that the plunger will descend to the point where it engages the group of cigarettes relatively slow, and then with a quickened movement, carrying the group downwardly out of the transfer mechanism into the slide beneath it.

The plunger l is preferably grooved on its under side with a series of cigarette engaging grooves inclined in such a manner as to coincide with the inclination of the grouped cigarettes so that engagement of the grooves with the cigarettes will tend to preserve the inclined grouping, and furthermore, in order that there may be no disposition of the end cigarette of the group to roll, we provide the plunger with the depending lug or wing l' against which the end cigarette of the series lies.

The plunger l forces the group of cigarettes through the transfer carrier, the gates k^s yielding to permit this, and quickly carries the group into the slide which has been brought forward beneath the plunger by mechanism presently to be described, and immediately the plunger carries the group of cigarettes out of the transfer carrier, said transfer makes its rear movement, the forward limb of the carrier, being cutaway, as shown in Fig. 24, to provide a passage for the stem of the plunger as the transfer mechanism is retracted.

The group of cigarettes is deposited upon a slide, shown in Fig. 2, and which is of not uncommon type, having side flaps m and

front and rear flaps m' , m^2 , the latter of which is longer than the flap m' , and this slide, when positioned beneath the plunger and the descending group of cigarettes, is so set up or bent as that it will receive and hold the group in inclined position as they are deposited by the plunger.

The mechanisms for supplying the slide, its inclosing shell, and for inserting the filled and folded slide into such shell ready for delivery from the machine will now be described.

Slide supplying and assembling mechanism.—The mechanism for supplying the slide strip will not be described in detail, for this strip handling mechanism may be of any suitable or desired type capable of feeding, cutting and printing a strip of cardboard from which the slides are made, and we have illustrated it generally in these drawings, it being conventionally shown in Fig. 3, in which m^3 indicates a roll of cardboard strip, and m^4 the cutting and printing chamber through which this strip passes and by which it is cut, scored for bending, and printed with such devices or legends as may be desired. The strip m^5 after passing through the cutting and printing devices issues in the form shown in plan view in Fig. 1, where it will be seen that the cardboard has been cut along its edges and notched so as to form a succession of connected slide blanks. The strip thus formed passes forward through suitable slide ways m^6 to the severing device for cutting off individual slide blanks, the strip being fed forward by means of the feeding dogs or hooks m^7 pivoted to a sliding block m^8 , the dogs m^7 being adapted to engage the outstanding side flaps m of the blank, and then as the slide m^8 moves forward drag the strip through the ways step by step, the slide m^8 being connected with a cam lever m^9 , as best shown in Fig. 9, which in turn is driven by the cam groove m^{10} on the cam disk m^{11} carried by the rear cam shaft i^9 , and driven by a suitable gearing from the drive shaft C, the cam groove m^{10} being so plotted as to give the proper feed and dwell to the strip feeding dogs. Preferably, to guard against any backward movement of the strip when the feeding dogs m^7 make their return stroke, we provide a stop pawl m^{12} which is so placed as to engage the side flap of the strip and prevent any backward movement.

The end of the strip m^5 feeds along the walls m^6 to a point beneath a knife m^{13} , and preferably to prevent any buckling of the strip as it is fed along, we provide a hold-down bar m^{14} approximately centrally placed over the strip bed, which bar m^{14} will effectually prevent the strip from being distorted and insure accuracy of the timed feed. The knife m^{13} is carried by a

slide m^{15} supported in a yoke m^{16} upon the machine frame, said knife slide and knife being operated by means of a lever m^{17} connected by a link m^{18} with the top of the knife slide, said lever having a rod m^{19} , the lower end of which connects with a bell crank cam lever m^{20} , having a cam roll m^{21} which engages a groove in the cam disk k^5 heretofore referred to, and this knife and its operating mechanism is so timed that the cutting stroke is made each time the slide strip is fed forward the length of one shuck, stop pins m^{22} being preferably provided against which the end of the strip strikes so as to properly gage the length of the strip to be cut off. The knife m^{13} is preferably of the guillotine type, making a shearing cut, and passing through a knife receiving opening in the cigarette belt which form a suitable ledge wall against which the knife operates. Immediately the blank slide is severed it is caught by a folding plunger n , which, as shown in Fig. 10, is carried by the knife slide, being so positioned that it does not act on the blank until after the knife has severed the blank, but immediately this severing operation is complete the plunger n will force the blank into a forming die n' in a slide n^2 so as to shape up the side folds m of the slide blank, and partially bend the flaps m' , m^2 , as shown in Fig. 9, where the position of the blank is illustrated in dotted lines. The slide n^2 with the partially shaped blank is operated by a cam lever n^3 connected therewith by suitable connecting rod, said lever n^3 being operated by a suitable cam roll engaging the cam n^4 on the cam shaft i^7 , the shaped up slide through this mechanism being moved forward at the proper time beneath the group plunger, which as hereinbefore described, then descends and delivers the group of cigarettes to the slide. The loaded slide with the group of cigarettes positioned therein, with each cigarette properly inclined, is then closed ready for insertion in the shell of the package by means of mechanism best shown in Figs. 7, 29 and 30, said mechanism comprising a flap holder n^5 carried by a slide n^6 mounted on a supporting bar n^7 and operated through the medium of a cam lever n^8 pivoted to the machine frame, and having a cam roll engaging a cam groove n^9 in the disk l^6 mounted on the shaft i^9 heretofore referred to, the lever n^8 , as shown in Fig. 7, being joined by a suitable connecting rod with the slide n^6 .

The flap folder n^5 is a spring folder, which by means of the spring n^{10} (see Fig. 29) is normally forced to the horizontal position shown in Fig. 29, the spring being of sufficient tension to fold the long flap m^2 of the slide over upon the package when released, and for the purpose of throwing the

flap folder n^5 from its active to inactive position, as best shown in Figs. 29 and 30, we provide a cam lug n^{11} on the machine frame against which the tail of the folder strikes as the slide n^6 reaches its extreme backward position so as to elevate the flap folder to the vertical position shown in full lines in Figs. 29 and 30. Immediately the slide starts forward for the folding operation, and the folder is released from the camming action of the lug n^{11} , the spring throws it forward to the dotted line position shown in Fig. 29, laying the long flap m^2 of the slide over the group of cigarettes which have been deposited in the slide. The slide n^6 continues its movement, and by means of the projecting arm n^{12} , to which the flap folder n^5 is pivoted, pushes the slide and its contained cigarettes forward to the delivery ways n^{13} , said ways being provided at their mouth with folding abutments n^{14} , the receiving edges of which are inclined as to fold down the short flap m of the slide, as best shown in Figs. 29 and 30. The slide in this folded condition then passes to a position within the ways ready to receive the inclosing shell or outer covering which is supplied to the folded slide by mechanism which will now be described.

Shell supplying mechanism.—The mechanism for supplying the shell or outer covering for the filled slide is best shown in Figs. 1, 3, 5 and 26 to 32 inclusive. It comprises a shell tower o of not unusual form, in which the flattened shells are stacked with a suitable weight o' to maintain the proper pressure, the stack of shells being supported on ledges o^2 at the bottom of the tower. A slide o^3 mounted on the machine table and operated by the cam lever o^4 engaging a cam disk o^5 mounted on the cam shaft i^7 is provided, which reciprocates beneath the shell tower o , said slide, as best shown in Figs. 26 to 28 and 30, being so placed as to engage and pick off at each forward thrust a shell from the bottom of the stack, feeding the shell forward over the ledges o^2 into the delivery ways n^{13} in the position shown in dotted lines in Fig. 30.

The shells o^6 are stacked in flattened condition, and it is essential, of course, that when they are positioned within the delivery ways n^{13} they be open to receive the loaded and folded slide as it comes from the slide folding mechanism heretofore described, and in order to deliver these shells as they are picked off from the shell tower in the machine just described in fully opened receiving position, we provide the ways n^{13} at their forward end, as best shown in Figs. 30 and 31, with an entrance through which the shell may be thrust by the slide o^3 , suitable supporting ledges n^{15} being provided at the mouth of this entrance to the ways n^{13} to support the shell in its passage from

the shell tower to the ways. The flattened shell, which is of the form shown in Fig. 2 where it is exhibited in opened position on being thrust into the ways n^{13} , strikes a lightly tensioned yielding abutment n^{16} pivoted as shown, and held normally in the position shown in Fig. 26 by the spring n^{17} , and as the shell comes forward it strikes this yielding abutment, is thrown upwardly to the position shown in Fig. 27, and then on continued movement of the slide o^3 the yielding abutment n^{16} opens, and the shell in response to the opening pressure on both sides will be brought from its flattened position to the fully opened position shown in Fig. 28, being held within the ways properly expanded to receive the loaded and folded slide which is then thrust forward in the manner described, and inserted in the opened shell.

The ways n^{13} are of sufficient length to contain a number of packages of cigarettes, as shown in Fig. 1, and as the shells are successively fed in, opened, and loaded with the filled shells, they are gradually fed forward down the ways or along the ways to the point of delivery. In order that the unfilled shell which is brought to the expanded position just described may be held within the ways with sufficient resistance to maintain its position while the loaded shell is being inserted, we preferably provide spring clamping means, as leaf springs n^{18} (see Figs. 30 and 31), which springs will clamp the expanded shell sufficiently tight to prevent movement of that shell during the operation of inserting the loaded slide, but will not retard the feeding of the completed package down the ways as the shells are expanded and loaded and the package completed. In order that the feed from the shell tower may be adjusted we provide a spring held slide n^{19} (see Fig. 32) having a pin which rests on an adjustable cam block n^{20} , a spring n^{21} bearing upon the slide pin so as to hold it in position.

Card inserting mechanism.—It is sometimes desirable to insert in these packages a picture or souvenir card of some description, as conventionally shown in Fig. 2, and the present machine is adapted to supply such card, although it will be understood that the card supply mechanism may or may not be used, it being in a way additional and supplemental to the general operation of angling and packing the cigarettes which has just been described.

The card supplying mechanism is best shown in Figs. 1, 4, 5 and the diagrammatic view 35, and comprises a card tower p in which the cards p^1 are stacked and weighed after the manner just described in connection with the shells. The card tower is positioned, as best shown in Fig. 1, adjacent the transfer mechanism which has been heretofore described, and by means of a pick off

slide p^2 actuated through the medium of a connecting rod p^3 and lever p^4 , the lowest card in the stack is picked off and thrust forward. The lever p^4 through the rod p^5 is connected with and actuated by the cam lever p^6 , which latter element engages a cam groove in cam disk n^4 mounted on the cam shaft i^7 . The operating cam and connections are so timed that the card supplying slide p^2 will make its stroke just at the moment a group of cigarettes has been deposited by the group shifting mechanism on the transfer mechanism, so that the card will be delivered on top of the grouped cigarettes in the transfer mechanism just before said transfer mechanism starts forward to deliver the group of cigarettes to the group delivering plunger heretofore described.

The operations of the other mechanisms which we have heretofore described are, of course, the same whether the card supplying mechanism be used or not, and with the present construction it is entirely optional with the user whether the card mechanisms be thrown into operation or cut out.

While we have shown a specific embodiment of our invention, it is obvious that the construction may be widely varied within the limits of mechanical skill without departing from the invention which we have herein described, and all such changes as lie within the skill of the mechanic, and all equivalent expedients, we regard as within the purview of our invention.

What we claim is:—

1. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means for positioning cigarettes having unequal axes in cross section with their major axes inclined to the horizontal and delivering them in such inclined position.

2. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means for shifting cigarettes having unequal axes in cross section from a position with their major axes horizontal to a position with their major axes inclined to the horizontal and delivering them in such inclined position.

3. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means for simultaneously positioning by intermittent movements a plurality of cigarettes having unequal axes in cross section with their major axes inclined to the horizontal.

4. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means for shifting simultaneously by intermittent movements a plurality of cigarettes having unequal axes in cross section from a position with their major axes horizontal to a position with their major axes inclined to the horizontal.

5. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means for simultaneously shifting by intermittent movements a plurality of cigarettes having unequal axes in cross section so as to incline them from a position with their major axes horizontal to a predetermined angular position with their major axes inclined to the horizontal.

6. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means to engage cigarettes having unequal axes in cross section and bring them progressively to a position with their major axes inclined to the horizontal and deliver them in such inclined position.

7. In a machine of the class described, the combination with cigarette supplying instrumentalities, of carrier bars adapted to engage cigarettes having unequal axes in cross section and arranged with their major axes in a horizontal position and bring them progressively to a position with their major axes inclined to the horizontal.

8. In a machine of the class described, the combination with cigarette supplying instrumentalities, of carrier bars having cigarette engaging notches, the angles of which vary so as to gradually shift cigarettes having unequal axes in cross section from a horizontal position to a position with their major axes inclined to the horizontal.

9. In a machine of the class described, the combination with a hopper, a conveyer receiving cigarettes having unequal axes in cross-section singly from said hopper, and shifting instrumentalities to remove the cigarettes singly from said conveyer and angle them progressively from a horizontal position to a position with their major axes inclined to the horizontal.

10. In a machine of the class described, the combination with a hopper, a conveyer, means for removing cigarettes from the hopper and depositing them at regular spaced intervals on the conveyer, and means for removing said spaced cigarettes from the conveyer and assembling them in close relation in groups.

11. In a machine of the class described, the combination with a hopper, a traveling conveyer, means for removing cigarettes from the hopper, and depositing them at regular intervals on said traveling conveyer, and means for removing cigarettes singly from the conveyer and assembling them in close relation in groups.

12. In a machine of the class described, the combination with a hopper, means for feeding cigarettes in a stream from said hopper, a traveling conveyer, means for taking cigarettes from said stream and depositing them on said traveling conveyer at

regular spaced intervals, and means for removing cigarettes singly from said traveling conveyer and assembling them closely packed in groups.

13. In a machine for packing cigarettes the cross-sectional axes of which are unequal comprising, in combination, a hopper, means for feeding cigarettes in a stream from said hopper, a conveyer, means for taking cigarettes singly from said stream and depositing them on said conveyer at regular spaced intervals, means for removing cigarettes from said conveyer and inclining their major axes to the horizontal, and means for assembling the cigarettes in closely packed groups of uniform inclination.

14. In a machine for packing cigarettes the cross-sectional axes of which are unequal comprising, in combination, a hopper, a feed belt to withdraw cigarettes in a single layer from said hopper, a conveyer, feed racks to remove the cigarettes singly from said belt and deliver them in spaced relation to said conveyer, and shifting means comprising four-motion racks adapted to remove said cigarettes singly from said conveyer and progressively angle them from a horizontal position to a position with their major axes inclined to the horizontal.

15. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means for shifting cigarettes of elliptical cross section from a horizontal position to a position with their major axes inclined to the horizontal, and grouping mechanism to assemble said angled cigarettes in close relation and preserve them in their inclined position.

16. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means for shifting cigarettes of elliptical cross-section from a horizontal position to a position with their major axes inclined to the horizontal, and grouping mechanism to advance said cigarettes step by step and assemble them in groups while maintaining their inclined position.

17. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means for shifting cigarettes of elliptical cross-section progressively from a horizontal position to a position with their major axes inclined to the horizontal, and grouping racks to receive said inclined cigarettes, advance them step by step, and assemble them in groups of a predetermined number.

18. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means for shifting cigarettes from a horizontal position to an inclined position, means for grouping the inclined cigarettes, means for raising and

lowering simultaneously said shifting and grouping instrumentalities, and means for moving said shifting and grouping instrumentalities forward and back at different
5 speeds.

19. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means for shifting cigarettes from a horizontal position to an inclined position, means for grouping the
10 inclined cigarettes, a rising and falling bed common to said shifting and grouping instrumentalities, means for giving a to and fro motion to said shifting instrumentalities, and independent means for giving a
15 to and fro motion to said grouping instrumentalities.

20. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means for shifting cigarettes from a horizontal position to an inclined position, means for grouping the inclined cigarettes, a rising and falling bed
20 common to said shifting and grouping instrumentalities, a bed-supported slide on which said shifting instrumentalities are mounted, an independent bed-supported slide on which said grouping instrumentalities are mounted, and means for operating
25 said slides at different speeds.

21. In a machine of the class described, the combination with cigarette supplying instrumentalities, of means for shifting cigarettes from a horizontal position to an inclined position, means for grouping said inclined cigarettes in groups of predetermined
35 numbers, and means for shifting said groups to a group-transfer mechanism without changing their inclined positions.

22. In a machine of the class described, the combination with cigarette supplying instrumentalities, of shifting racks to shift a cigarette from a horizontal to an inclined position, grouping racks to assemble said
40 inclined cigarettes in groups, a group-shifter adapted to engage and shift a group of cigarettes on its forward movement, and means for effecting a relative movement of said group-shifter and grouping racks to
45 effect their separation during the return movement of said group-shifter.

23. In a machine of the class described, the combination with cigarette supplying instrumentalities, of shifting racks to shift a cigarette from a horizontal to an inclined
55 position, grouping racks to assemble said inclined cigarettes in groups, and a group-shifter adapted to engage and shift a group of cigarettes on its forward movement and move out of the way of the grouping racks
60 on its return movement.

24. In a machine of the class described, the combination with cigarette supplying instrumentalities, of shifting racks to shift a

cigarette from a horizontal position to an inclined position, grouping racks to assemble said inclined cigarettes in groups, and a pivoted group-shifter adapted to engage a group of cigarettes on its forward movement and be swung clear of the grouping
65 racks on its return movement.

25. In a machine of the class described, the combination with cigarette supplying instrumentalities, of shifting racks to shift a cigarette from a horizontal position to an inclined position, grouping racks to assemble said inclined cigarettes in groups, a pivoted group shifter adapted to engage and shift a group of cigarettes on its forward movement, and means for swinging
75 said group shifter on its pivot on its return movement so as to clear the grouping racks.

26. In a machine of the class described, the combination with cigarette supplying instrumentalities, of shifting racks to shift a cigarette from a horizontal position to an inclined position, grouping racks to assemble said inclined cigarettes in groups, a pivoted group-shifter adapted to engage and shift a group of cigarettes on its forward movement, means for swinging said group-shifter on its pivot on its return movement so as to clear the grouping racks, and means for adjusting the angular movement
85 of said group shifter.

27. In a machine of the class described, the combination with cigarette supplying instrumentalities, of shifting racks to shift a cigarette from a horizontal position to an inclined position, grouping racks to assemble said inclined cigarettes in groups, and a group-shifter having means to engage individually the cigarettes of a group and shift them.
105

28. In a machine of the class described, the combination with cigarette supplying instrumentalities, of shifting racks to shift a cigarette from a horizontal position to an inclined position, grouping racks to assemble said inclined cigarettes in groups, and a group shifter having a series of spaced cigarette-engaging fingers to traverse the notches of the grouping racks and shift the cigarettes.
110

29. In a machine of the class described, the combination with duplicate cigarette inclining and grouping mechanisms, of a single transfer mechanism receiving grouped cigarettes from said first named instrumentalities.
115

30. In a machine of the class described, the combination with duplicate cigarette inclining and grouping mechanisms, of a single transfer mechanism, and group shifters adapted to alternately deliver a group of cigarettes to said transfer mechanism.
120

31. In a machine of the class described,

the combination with cigarette supplying and grouping mechanism, of transfer mechanism, and group shifters adapted to deliver groups of cigarettes from the grouping mechanism to the transfer mechanism, said group shifters serving alternately as alining gages for the grouped cigarettes.

32. In a machine of the class described, the combination with duplicate cigarette supplying and grouping mechanism, of a single transfer mechanism, and opposed group shifters adapted to deliver alternately groups of cigarettes to the transfer mechanism, each of said group shifters serving as an alining gage for the grouped cigarettes delivered by the opposed shifter.

33. In a machine of the class described, the combination with cigarette supplying and grouping mechanism; of transfer mechanism; opposed group shifters adapted to deliver groups of cigarettes alternately to said transfer mechanism and to serve as alining gages; and actuating mechanism for said group shifters to alternately advance, retract, and again advance the said group shifters.

34. In a machine of the class described, the combination with instrumentalities for inclining and grouping oval cigarettes, of means for shifting said groups, means for transferring a group to slide-filling position, means for supplying a slide to be filled, and means for moving a group from said transfer mechanism and depositing it in the slide without disturbing the inclination of the cigarettes.

35. In a machine of the class described, the combination with instrumentalities for inclining and grouping oval cigarettes, of means for shifting said groups, means for transferring a group to slide-filling position, means for supplying a slide to be filled, and a plunger to engage and deposit a group in the slide without disturbing the inclination of the cigarettes.

36. In a machine of the class described, the combination with instrumentalities for inclining and grouping oval cigarettes, of means for shifting said groups, means for transferring a group to slide-filling position, means for supplying a slide to be filled, and a plunger having cigarette engaging means for preserving the inclined position of the cigarettes to engage and deposit a group in the slide.

37. In a machine of the class described, the combination with instrumentalities for angling and grouping oval cigarettes, of means for shifting said groups, means for transferring a group to slide-filling position, means for supplying a slide to be filled, and a plunger having angled recesses in its face to engage and deposit a group of inclined cigarettes in the slide.

38. In a machine of the class described, the combination with instrumentalities for angling and grouping oval cigarettes, of means for shifting said groups, means for transferring a group to slide-filling position, means for supplying a slide to be filled, and a plunger having angled recesses and a depending end wall to engage and deposit a group of inclined cigarettes in the slide.

39. In a machine of the class described, the combination with cigarette feeding and grouping instrumentalities, of group-transferring mechanism, means for shifting a group of cigarettes from the grouping instrumentalities to said transferring mechanism, boxing mechanism and means for depositing a slip or card on a group of cigarettes in said transferring mechanism prior to transferring said group to a boxing mechanism.

40. In a machine of the class described, the combination with cigarette feeding and grouping instrumentalities, of group-transferring mechanism, means for shifting a group of cigarettes from the grouping instrumentalities to said transferring mechanism, boxing mechanism, a card tower, and means for removing a card from said tower and depositing it on a group of cigarettes in said group-transferring mechanism prior to transferring said group to a boxing mechanism.

41. In a machine of the class described, the combination with duplicate cigarette feeding and grouping instrumentalities, a single group-transferring mechanism, opposed group shifters which alternately deliver a group of cigarettes to said transferring mechanism, and means for depositing a card from a suitable supply upon a group of cigarettes in said transferring mechanism.

42. In a machine of the class described, the combination with cigarette feeding and grouping instrumentalities, of reciprocating group-transferring mechanism, a card tower in alinement with said transferring mechanism, and means for removing the bottom card from said tower and depositing it on a group of cigarettes in said transferring mechanism.

43. In a machine of the class described, the combination with cigarette feeding and grouping instrumentalities, of periodically reciprocating group-transferring mechanism, a card supply adjacent said mechanism, and a card-ejecting slide operable to deposit a card on a group of cigarettes in said transferring mechanism during its dwell.

44. In a machine of the class described, the combination with cigarette feeding, inclining, and grouping instrumentalities, of means for transferring a group of cigarettes to slide-filling position, slide blank supply-

ing means, means for shaping the blank to form a group-receiving cavity, and means to maintain the cigarettes of the group in inclined position and deposit said group in the slide.

45. In a machine of the class described, the combination with cigarette feeding, inclining, and grouping instrumentalities, of means for transferring a group of inclined cigarettes to slide-filling position, a slide strip feed, means for severing a slide blank from said strip, means for shaping said blank to form a group-receiving cavity, and means to maintain the cigarettes of the group in inclined position and deposit said group in the slide.

46. In a machine of the class described, the combination with instrumentalities for supplying grouped cigarettes to a slide, of a shell-receiving runway, means for supplying a shell to said runway, means for inserting a filled slide in said shell, and resilient means engaging a lateral wall of said shell to hold it in position in said runway against the thrust of the entering slide.

47. In a machine of the class described, the combination with instrumentalities for supplying grouped cigarettes to a slide, of a shell receiving runway, means for supplying a shell to said runway, means for inserting a filled slide in said shell, and resilient means to frictionally engage and hold said shell in position against the thrust of the entering slide.

48. In a machine of the class described,

the combination with instrumentalities for supplying grouped cigarettes to a slide, of a shell-receiving runway, means for supplying a shell to said runway, means for inserting a filled slide in said shell, and a spring dent on a wall of the runway to hold the shell against the thrust of the entering slide.

49. In a machine of the class described, the combination with cigarette supplying instrumentalities, of cigarette supporting racks having notches adapted to progressively incline the cigarettes, and shifting bars adapted to step the cigarettes along said supporting racks, said shifting bars having notches of progressively sharper inclination than those of said racks with which they coöperate.

50. In a machine of the class described, the combination with cigarette supplying instrumentalities, of cigarette supporting racks having inclining notches, the angle of inclination of which to the horizontal gradually increases, and cigarette shifting bars coöperating with said racks and having inclining notches, the angle of inclination of which to the horizontal gradually increases.

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

ELBERON D. SMITH.
BENJAMIN E. TEALE.

Witnesses:

J. GRANVILLE MEYERS,
L. W. HAMMERSLEY.