(No Model.) 5 Sheets—Sheet 1.

F. S. KINNEY & W. H. BUTLER.

CIGARETTE BUNDLING MACHINE.

No. 353,866. Patented Dec. 7, 1886.

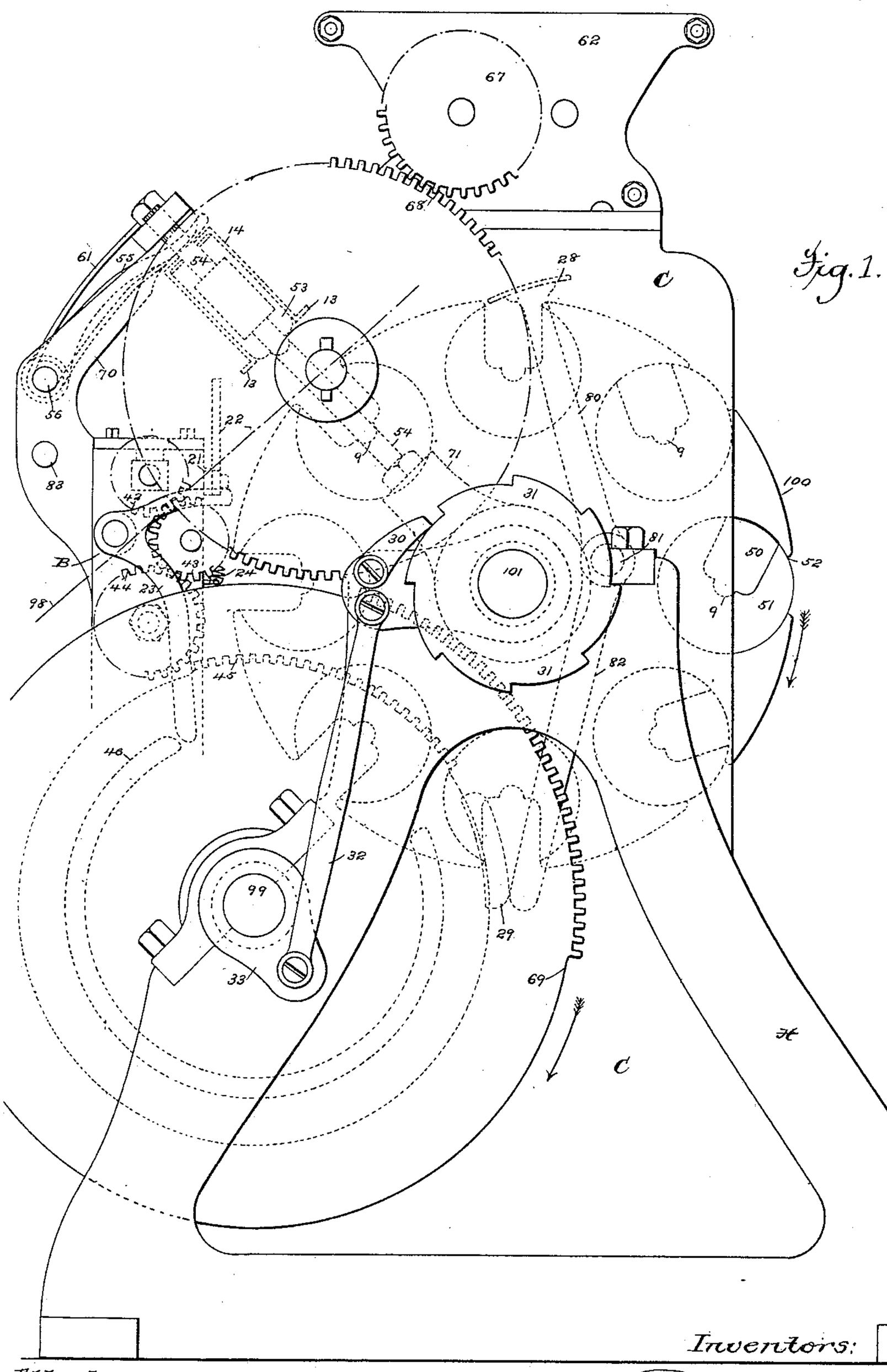

Fig. 1.

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(No Model.)

5 Sheets—Sheet 2.

F. S. KINNEY & W. H. BUTLER.

CIGARETTE BUNDLING MACHINE.

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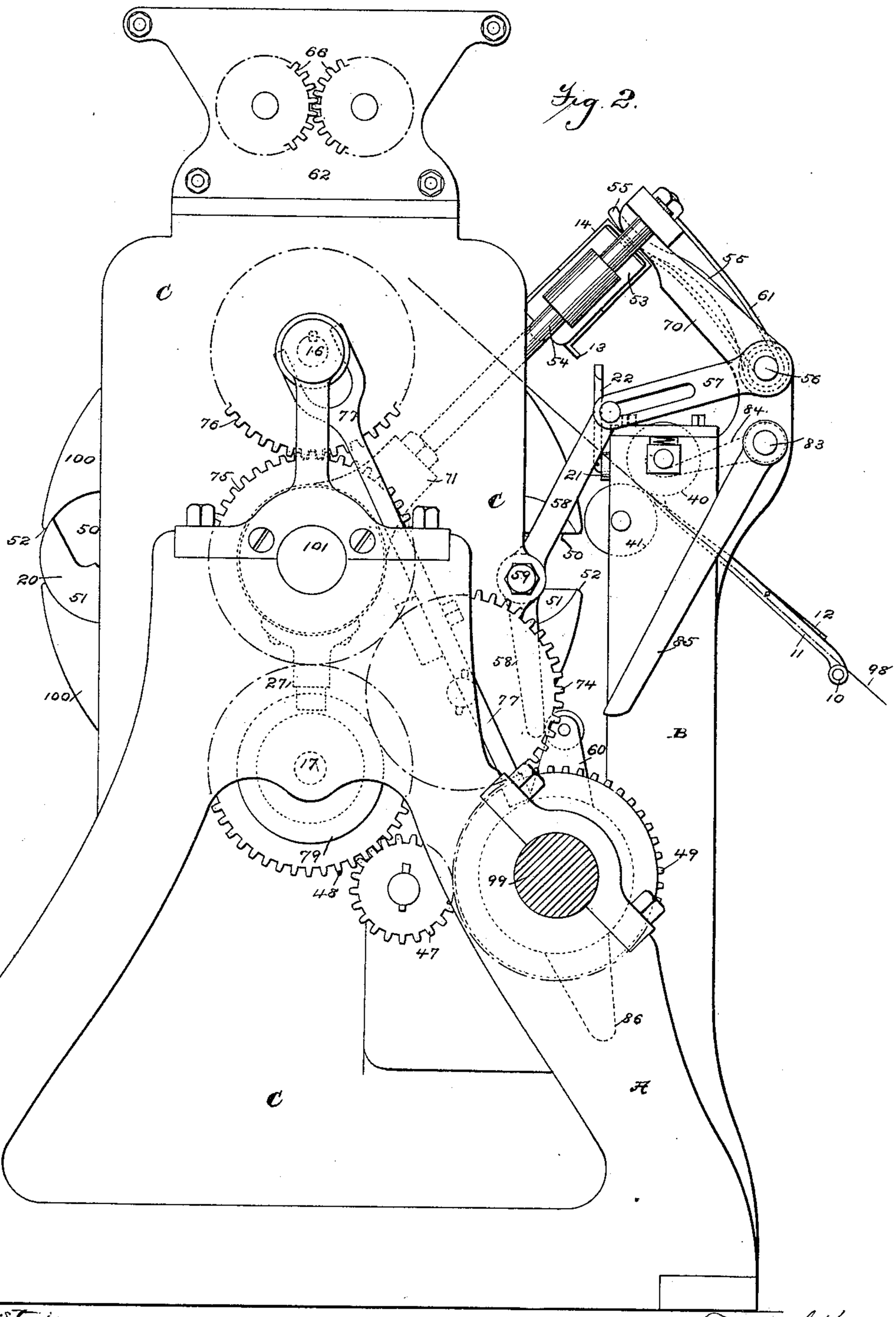
Fig. 2.



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(No Model.)

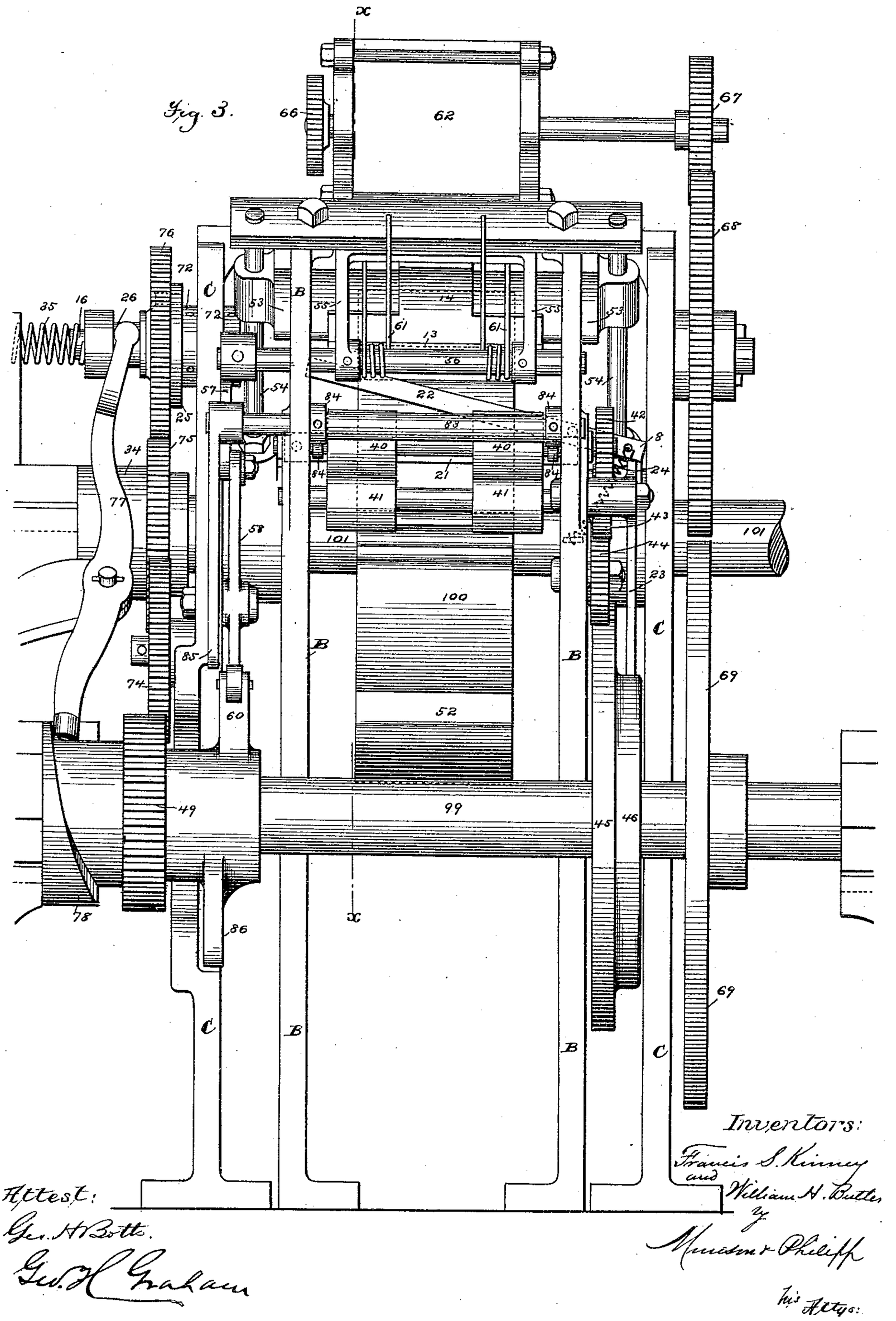
5 Sheets—Sheet 3.

F. S. KINNEY & W. H. BUTLER.

CIGARETTE BUNDLING MACHINE.

No. 353,866. Patented Dec. 7, 1886.

Fig. 3.



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(No Model.) 5 Sheets—Sheet 4.

F. S. KINNEY & W. H. BUTLER.

CIGARETTE BUNDLING MACHINE.

No. 353,866. Patented Dec. 7, 1886.

Fig. 4.

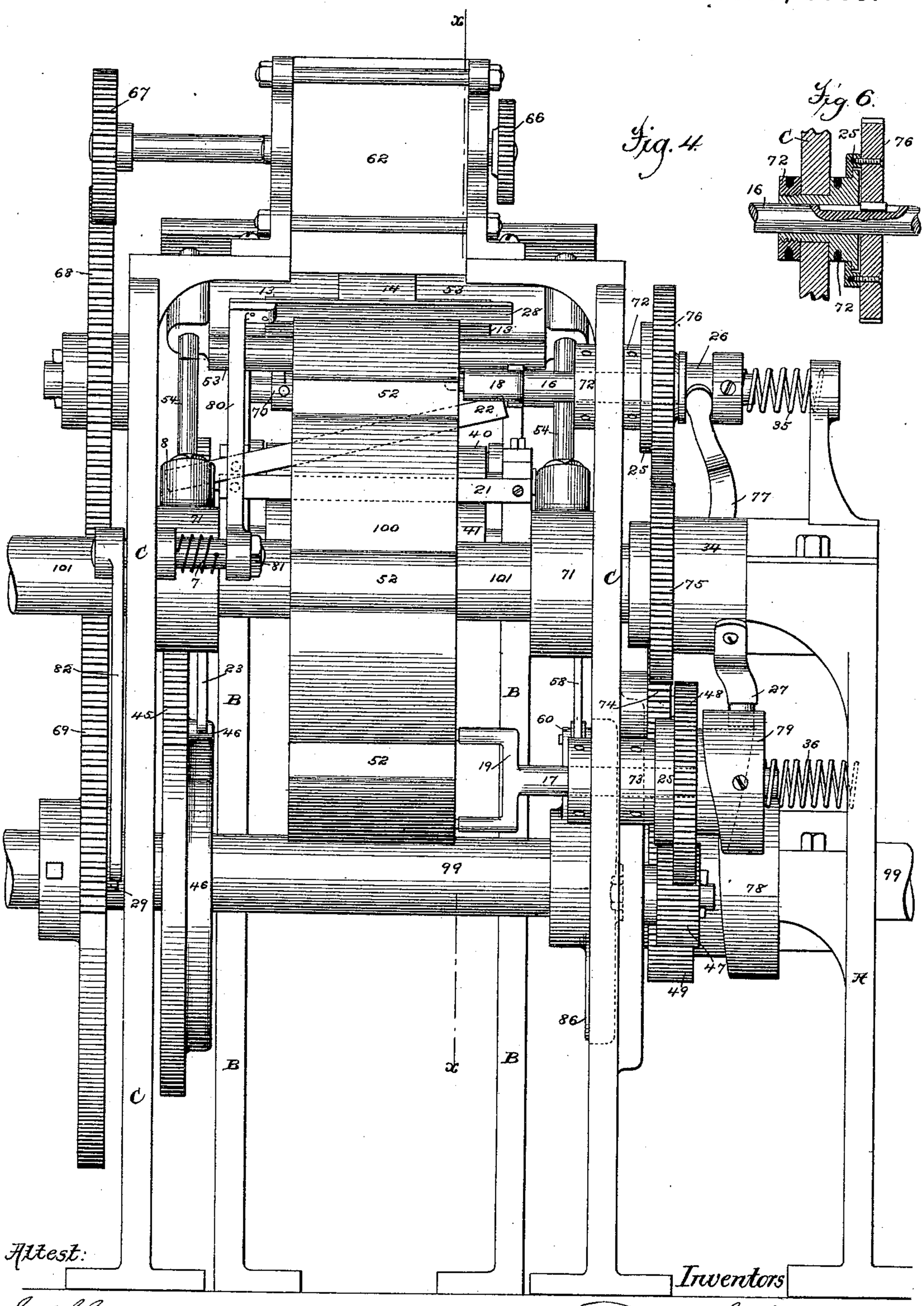
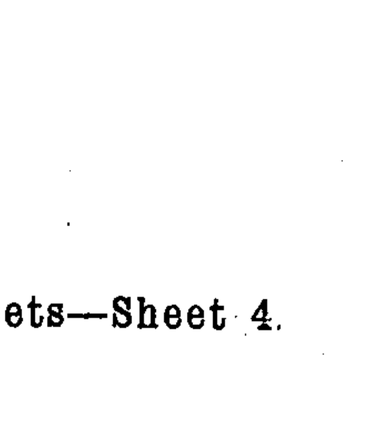


Fig. 6.



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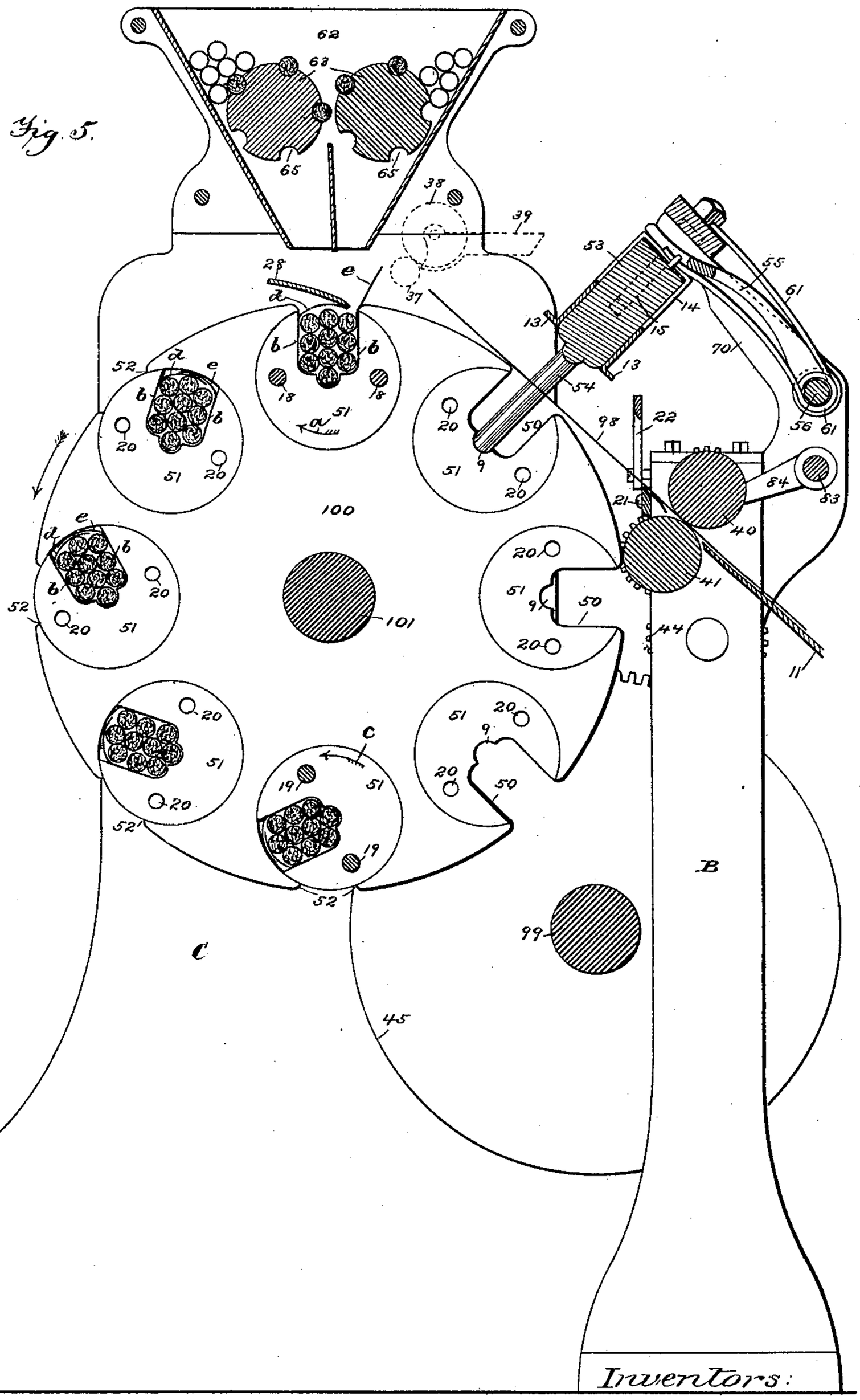
F. S. KINNEY & W. H. BUTLER,

CIGARETTE BUNDLING MACHINE.

No. 353,866. Patented Dec. 7, 1886.

Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANCIS S. KINNEY, OF NEW YORK, AND WILLIAM H. BUTLER, OF BROOKLYN, N. Y., ASSIGNORS TO THE KINNEY TOBACCO COMPANY, OF NEW YORK.

CIGARETTE-BUNDLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 353,866, dated December 7, 1886.

Application filed June 23, 1886. Serial No. 205,949. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS S. KINNEY and WILLIAM H. BUTLER, citizens of the United States, residing, respectively, at New York, county of New York, and Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Cigarette-Bundling Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates, generally, to that class of machines by which articles of merchandise are wrapped or put up in packages.

The invention relates particularly, however, to a machine of this class which is especially designed and adapted for use in assembling and wrapping the small packages of cigarettes, such as are commonly sold by retail dealers. The machine or many parts of it are, however, well adapted for use in packaging other classes of articles.

As a full understanding of the invention can only be given by a detailed description of the construction and organization of the complete machine, all preliminary description will be omitted and a full description given, reference being had to the accompanying drawings, in which—

Figures 1 and 2 are opposite side elevations of a packaging-machine embodying the present invention. Fig. 3 is an end elevation looking from the right of Fig. 2. Fig. 4 is a similar view looking from the left of the same figure. Fig. 5 is a vertical sectional elevation taken upon the line *x x* of Figs. 3 and 4; and Fig. 6 is a sectional detail, which will be hereinafter referred to.

Referring to said figures, it is to be understood that the machine therein illustrated includes a mechanism for assembing the cigarettes into packages, and for folding and pasting the wrapper around them, a mechanism for presenting the wrapper in proper position, and a mechanism for counting the cigarettes and supplying them to the assembling and wrapping mechanism.

The assembling and wrapping mechanism consists, primarily, of a carrier, 100, secured upon a shaft, 101, that is mounted to turn in bearings in standards A. This carrier is provided near its periphery with a number of circular recesses, in which are seated like-shaped package-holders 51, which are each provided with a package-forming recess, seat, or receptacle, 50, which, in the normal position of the holders 51, opens out to the periphery of the carrier 100, the surface of which is broken or cut away at such points to provide mouths 52, through which the wrapper and the cigarettes to be wrapped are introduced into the recesses of the holders 51, as will hereinafter appear. The shaft 101 of the carrier is provided outside of one of the standards A (see Fig. 1) with a ratchet, 31, which is engaged by a pawl, 30, which is operated through a connecting-rod, 32, from a crank, 33, on the end of the driving-shaft 99. By this means an intermittent or step-by-step rotary movement is imparted to the carrier. After each step of its movement the carrier is allowed to rest or dwell for a time while the pawl 30 is being retracted, and during this period of rest the operation of introducing the wrappers into the recesses 50, and the assembling of the cigarettes therein for the packages, takes place, as will hereinafter appear. The package-forming recesses 50 extend from end to end of the holders 51 and carrier 100, and are of such dimensions as to contain the wrapper and the proper number of cigarettes to form a package of the desired size.

In putting up cigarettes for the trade it is highly desirable, not only that the cigarettes should be so arranged as to occupy as little space as possible, but that all of the packages should be of uniform size and shape.

The machine illustrated in the present case is organized to form packages containing ten cigarettes, and where the packages contain this number of cigarettes the most desirable arrangement of the cigarettes is in three rows, the center row containing four cigarettes and the outside rows three each. By this arrangement the cigarettes of the outside rows fit into the spaces between those of the center row, and thus form a compact package. In order to effect the assembling of the ten cigarettes in this manner automatically, each of the recesses 50 is provided at its bottom with a central depression, 9, which is of sufficient

depth and size to accommodate one-half of the body of a cigarette. By reason of this central depression the first cigarette dropped into the package-forming recess will take a position at the center of the recess, and as a consequence the remaining cigarettes will, as they are dropped into the recess, arrange themselves in the manner just described, and thus the upper portion of the assembled package will take the same form as its lower portion, as shown in Fig. 5.

The package-holders 51 are so mounted in the carrier 100 as to be capable of a partial rotation in their seats, so as to cause the openings of their recesses 50 to pass under one edge of the mouths 52 for a purpose that will hereinafter appear, and then be returned to their normal position in order to discharge the package of cigarettes. This movement of the holders 51 is effected by means of two rotating shafts, 16 17, which are mounted in bearings 72 73 in the intermediate frame, C, and are so arranged that when the carrier 100 is at rest after each step of its movement they will be directly in line with the two of the holders 51 which are upon the upper and lower sides of the carrier respectively. The shafts 16 17 are made capable of a longitudinal movement to and from the carrier 100, and the ends of the shafts next to the carrier are provided with forks 18 19, the arms of which are arranged to enter openings 20 in the ends of the holders 51 when the shafts are moved toward the carrier. The shafts 16 17 are continuously revolved, the former being provided for that purpose with a gear, 76, which is connected by intermediate gears 75 74 with a gear, 49, upon the main shaft 99, while the latter is provided with a gear, 48, which is connected by an intermediate gear, 47, with the gear 49. The gears 76 and 48 are splined to their shafts 16 17, as shown in Fig. 6, so that the shafts can be moved longitudinally while the gears remain in the same position. The gears are held in position by means of flanged rings 25, which are secured to the inner faces of the gears and engage with flanges formed on the bearings 72 73, as also shown in Fig. 6. The intermediate gears 74 and 47 are mounted upon simple studs, while the intermediate gear 75 is mounted upon a sleeve, 34, which is secured to and extends inward from the standard A and surrounds the shaft 101 of the carrier.

The shafts 16 17 are provided with springs 35 36, which are arranged to normally hold the shafts inward, and in such position that the arms of the forks 18 19 will enter the openings 20 in the ends of the holders 51. The shafts 16 17 are, however, provided with means by which, during a greater portion of the time, including the time when the carrier 100 is being moved, they are moved outward, so that the arms of the forks 18 19 are drawn out of the openings 20. For this purpose the shaft 16 is provided at its outer end with a collar, 26, having a circumferential groove, in which rests the forked end of a lever, 77, which is fulcrumed on the frame-work, and has its opposite end acted on by a cam, 78, on the shaft 99. The shaft 17 is given a similar longitudinal movement for the same purpose by means of a stationary arm, 27, which engages with a cam, 79, mounted upon the outer end of the shaft 17. The purpose of the several movements just described will be made clear when the operation of the complete organization is described.

The folding of the wrappers around the packages in the holders 51 is effected in part by the partial rotation of the holders 51, before referred to, and in part by a folding-blade, 28, which lies horizontally just above the carrier 100, and is secured to the end of an arm, 80, which extends from a rock-shaft, 81, mounted in the frame C, and having an arm, 82, which is acted upon by a cam projection, 29, formed on the inner face of a gear, 69, mounted on the main shaft 99. The gear 69 will be hereinafter more particularly referred to. By this means the shaft 81 is rocked at each revolution of the main shaft 99, so as to carry the blade 28 across the mouth of the recess 50, which is at the top of the carrier, and thus fold over one side of the wrapper, as will be hereinafter more fully explained. The return movement of the blade 28 is effected by means of a spring, 7.

The necessary paste for securing the wrappers around the packages is applied to the edges of the wrappers by any suitable pasting mechanism, as a pasting-roll, 37, (see dotted lines in Fig. 5,) which is supplied from a roll, 38, revolving in a paste fountain or vat, 39.

The mechanism for presenting the wrappers in proper position consists of three sets of mechanisms, viz: a mechanism for feeding forward a web of wrapping material, a mechanism for severing the wrappers from the web, and a mechanism for introducing the wrappers into the recesses 50. The feeding mechanism consists of a pair of rolls, 40 41, which are mounted in the inner frame-work, B, and are cut away at their centers, as shown in Fig. 3, so as to only bite upon the edges of the web. These feed-rolls 40 41 are provided with engaging gears 42 43, by which they are caused to move in unison, and are revolved intermittingly by means of an intermediate gear, 44, which engages with a mutilated or segmental gear, 45, mounted on the main shaft 99. The rolls 40 41 are so positioned with respect to the carrier 100 that the web 98 of wrapping material as it emerges from the rolls is directed onto the surface of the carrier in proper position to be introduced into the recesses 50 by the mechanism for that purpose. The apparatus may be provided with a guiding and supporting surface, as 11, and a leading-roll, as 10, (see Figs. 2 and 5,) over which the web passes as it is led to the feed-rolls, and also with a light spring, as 12, which is arranged to bear upon the web 98, and thus keep it at the proper tension.

The severing mechanism consists of a stationary blade, 21, mounted just in advance of the feed-roils, and a pivoted shear-blade, 22, which is arranged to co-operate with the stationary blade in the usual manner. The pivoted blade 22 is provided with an arm or extension, 8, which is acted on by one arm of a bell-crank lever, 23, the other arm of which is engaged by a cam projection, 46, formed on the outer face of the segmental gear 45. By this means the blade 22 is rocked downward at regular intervals, so as to co-operate with the blade 21 and sever a wrapper-length from the web 98. The return movement of the blade 22 is effected by means of a spring, 24, which acts to hold the blade raised when the lever 23 is out of engagement with the cam 46.

The bearings of the upper roll, 40, of the feed-rolls are spring-seated, as shown, and the frame B is provided just in frönt of these rolls with a rock-shaft, 83, from which extend arms 84, the ends of which lie under the shaft of the roll 40. The shaft 83 is provided at its end with an arm, 85, the end of which lies in the path of a cam, 86, mounted upon the main shaft 99. By this means, after each wrapper-length has been severed from the web 98, the roll 40 is raised slightly, so as to allow the web to adjust itself in case it has been distorted or drawn slightly out of position by the blade 22 in the cutting operation.

The mechanism for introducing the wrappers into the recesses 50 consists of a forming-head or plunger, 53, which is of suitable size and form to just fit into the package-holding recesses 50. This plunger is arranged to reciprocate upon inclined guide-rods 54, which are fixed at their upper ends in brackets 70, extending from the frame-work B, and at their lower ends in sockets 71, surrounding the carrier-shaft 101. Reciprocating motion is imparted to the plunger 53 by means of arms 55, extending from a rock-shaft, 56, and arranged to bear upon the upper side of the plunger.

The rock-shaft 56 is mounted in suitable bearings in the bracket 70 of the frame B, and is provided at one end with a slotted arm, 57, which is connected to one end of a lever, 58, pivoted upon a stud, 59, the other end of which lever depends and lies in the path of a rotating arm, 60, carried by the driving-shaft 99. From this it will be seen that each time the pivoted lever 58 is rocked the arms 55 will bear upon the plunger 53 and force it downward into the recess 50 of one of the package-holders. Suitable springs, 61, are provided to cause the plunger to return to its normal position when the arms 55 cease to press it downward.

The action of the plunger is such that it will force the paper strip or wrapper that has been fed under it into one of the recesses 50, so as to line its two sides and bottom, said strip or wrapper being of such dimensions that its ends will project from the mouth of the recess, and thus form flaps that may be united to make the package into tubular form, as will be hereinafter described.

In order to prevent any liability of the wrapper being distorted or its position changed in the recess 50 by the withdrawal of the plunger 53, the latter is provided with followers 13, which lie upon its opposite sides, near the lower end of the plunger when it is in its raised or normal position. These followers are loosely mounted upon the plunger 53, so as to be capable of movement thereon, and are connected by a U-shaped strap, 14, that straddles the upper side of the plunger between the arms 55, and carries a guide-rod, 15, which projects into a recess formed in the plunger, by which the followers are properly guided during the reciprocations of the plunger. From this arrangement it will be seen that as the plunger 53 is forced downwardly into recess 50, carrying the wrapper with it, the followers will move therewith until they abut against the surface of the carrier 100 on either side of the mouth of the recess, at which point they will rest and hold the wrapper in place by bearing upon its projecting flaps until the head of the plunger, in its upward movement, its lower end being then free of the recess, abuts against the top of the strap 14, when the followers and plunger will return to their normal position together, leaving the wrapper resting in the recess 50 undisturbed.

The mechanism for counting the cigarettes and presenting them to the assembling and wrapping mechanism consists of a hopper, 62, which is mounted upon the intermediate frame, C, directly above the carrier 100, and in such position that the cigarettes, as they are fed down through the outlet in the bottom of the hopper, will pass into the recesses 50 of the package-holders as they are brought in succession under the hopper by the rotation of the carrier. The hopper 62 is provided with a feeder consisting of a pair of feeding-cylinders, 63, each of which is provided with a number of recesses or grooves, 65, which are of a size to hold a cigarette, so that when the feeders are rotated each groove will convey a cigarette from the upper portion of the hopper into position to be discharged out of the same. These feeding-cylinders 63 are mounted to turn in bearings in the ends of the hopper, and are geared together by wheels 66, (see Fig. 2,) so as to run in unison. Rotary motion is imparted thereto through a gear, 67, fixed on the shaft of one of the cylinders 63, which is engaged by an intermediate gear 68, secured upon a stud projecting from the side of the intermediate frame, C, and receives motion from the gear 69, before referred to, fixed upon the driving-shaft 99. The gear 69 is mutilated, and is so proportioned that upon each revolution of the driving-shaft the feeding-cylinders 63 will be caused to make one rotation, and thus feed a number of cigarettes out of the hopper equal to the number of grooves in the cylinders. In practice, the grooves 65 of the feeding-cylinders will be of such a num-

ber (five in each cylinder in the present case) as to feed at each revolution thereof the proper number of the cigarettes or other articles to form a single passage.

It is to be understood that the position and arrangement of the reciprocating plunger 53 and the discharging-mouth of the hopper 62 will be such with respect to the positions of the recesses 50, as they are moved in succession thereunder and come to rest, that at each successive intermittent movement of the carrier a recess will be brought into position in line with the reciprocating movement of the plunger, so as to be provided with a wrapper, while a recess previously supplied with a wrapper by the plunger will also be brought under the discharging-mouth of the hopper, and thus permit one recess to be filled with the articles to be packed while another is being provided with a wrapper.

The operation of the machine thus organized is as follows: The main shaft 99 will be set in motion so as to turn the various gears and cams which it carries in the direction indicated by the arrow in Fig. 1. During each revolution of the shaft 99 the crank 33 will operate the pawl and ratchet 30 31, so as to revolve the carrier 100 one step, or a distance equal to the distance between two of the recesses 50. The hopper 62 and plunger 53 are so positioned that when the carrier is brought to rest, after each step of its rotation, one of the recesses 50 will be directly under the mouth of the hopper, and another of the recesses in position to receive the plunger 53. The segmental gear 45 is so proportioned and arranged that just after the carrier is moved, as stated, it will come into engagement with the gear 44, and through that gear and the gears 42 43 operate the feed-rolls 40 41, so as to feed forward the web 98, and cause a wrapper-length to project past the blades 21 22 and above the carrier and beneath the plunger 53, as shown in Figs. 1, 2, and 5. Immediately after the gear 45 passes out of engagement with the gear 44, and the feeding of the web is arrested, the cam projection 46 will come into engagement with the lever 23 and rock the blade 22 downward so as to sever a wrapper from the web. At the same time that the wrapper is thus severed from the web the cam 60 comes into engagement with the lever 58, and, through the arm 57, rock-shaft 56, and arms 55, forces the plunger 53 downward into the recess 50 beneath it, thus carrying the severed wrapper *b* into the recess. As the plunger 53 enters the recess 50 the followers 13 will be arrested by the walls of the recess and will press upon the edges *d e* of the wrapper and hold it and prevent it from wrinkling. As soon as the cam 60 passes out of engagement with the lever 58 the springs 61 will act to draw the plunger 53 out of the recess 50 and restore it and the followers to their raised position, and as the plunger is withdrawn the followers 13 bear upon the edges *d e* of the wrapper, and prevent it from being withdrawn by the plunger. Just before the gear 45 comes into engagement with the gear 44 upon its next revolution, the cam 46 will pass out of engagement with the lever 23, upon which the spring 24 will restore the blade 22, to its raised position, and at or about the same time the cam 86 will come into engagement with the arm 85, and, through the shaft 83 and arms 84, raise the roll 40 slightly, so as to permit the web to adjust itself if it has been distorted during the cutting operation. At the same time that the wrapper *b* is being severed from the web and inserted into the recess 50 beneath the plunger 53, as just described, a bundle of cigarettes is being assembled and wrapped in the next recess in advance, which is at this time directly beneath the mouth of the hopper 62, and into which a wrapper has been inserted at the previous revolution of the shaft 99. Directly after the carrier comes to rest, after each step of its movement, the segmental gear 69 comes into engagement with the gear 68, and through the gears 67 66 gives one revolution to the counting-cylinders 63, thereby causing ten cigarettes to be fed down through the mouth of the hopper, so as to drop into the wrapper *b*, which is in the recess 50 beneath the hopper, where they will arrange themselves in the order shown, as already explained. Immediately after the gear 69 passes out of engagement with the gear 68, the cam 29 will come into engagement with the arm 82, and through the shaft 81 and arm 80 rock the blade 28 across the mouth of the recess 50, so as to fold over the flap *d* of the wrapper *b*, as shown. Immediately after this takes place the cam 78 will arrive in such position as to allow the spring 35 to move the shaft 16 inward, so as to cause the forks 18 to enter the openings 20 in the end of the holder 51, and give the holder a partial rotation in the direction indicated by the arrow *a* in Fig. 5, thereby closing the side of the recess 50 and folding over the flap *e* of the wrapper *b*, as shown. As the carrier 100 is given its partial rotation to carry the recess containing the wrapper from its position beneath the plunger 53 to its position beneath the hopper, the flaps *d e* of the wrapper will pass in contact with the paste-roll 37, and will thereby receive paste, so that when the flaps are folded down by the action of the blade 28 and by the partial rotation of the holder, as just described, they will be pasted together around the assembled cigarettes. As soon as the holder containing the cigarettes has been partially rotated in its seat, as stated, the cam 78 will act upon the lever 77, so as to move the shaft 16 outward and withdraw the forks 18 from the openings 20 of the holder, thus allowing the holder to remain in that position. After the holder 51, containing the package of cigarettes, has been partially rotated, as described, the cam 29 will pass out of engagement with the arm 82 and allow the spring 7 to move the blade 28 back to its normal position. After these various operations have been performed, as described, the crank 33

will again arrive in position to operate the pawl 30 and rotate the carrier 100 another step, so as to bring the recess 50, into which the wrapper has just been introduced, under the hopper 62 and the next recess into position to receive a wrapper, after which the operations described will be repeated.

The cam 79 is so formed and arranged that each time the carrier 100 is brought to rest in its step-by-step rotation it will permit the spring 36 to move the shaft 17 inward and enter the forks 19 into the openings 20 in the end of the holder, which is at the bottom of the carrier, and thus give the holder a partial rotation in the direction indicated by the arrow *c* in Fig. 5, back to its normal position. This will permit the package of cigarettes to be discharged from the holder, and will bring the holder into position to receive a wrapper when it again arrives beneath the plunger 53. As soon as the holder 51 has been partially rotated, so as to permit the package to be discharged from the recess 50, the cam 79, acting against the stud 27, will move the shaft 17 outward and withdraw the fork 19 from the openings 20.

No provision is made, in the mechanism shown in the present case, for closing the ends of the packages. The packages are therefore discharged from the machine with their ends unclosed, and this operation is afterward performed by hand or otherwise. A mechanism for automatically closing the ends of the packages, and which is adapted to operate in connection with the mechanism herein shown and described, will, however, form the subject-matter of a future application for Letters Patent.

As herein shown, the wrappers *b* are supplied from a continuous strip or web, and this will in practice usually be found the most desirable way of supplying the wrappers; but it will be readily seen that the wrappers, already cut to the proper dimensions, may be placed in proper position beneath the plunger 53 by hand, or that the detached wrappers may be delivered by hand or otherwise to the feed-rolls 40 41, and be advanced by the rolls into proper position. When the wrappers are previously cut to the proper form, the cutting mechanism may of course be omitted, and when the wrappers are placed in position beneath the plunger 53 by hand the feed-rolls may be also omitted. When the feed-rolls are employed to feed detached wrappers, they will, of course, be placed nearer to the plunger 53.

What we claim is—

1. The combination, with the carrier 100, of the holders 51, provided with the recesses 50, and arranged to have a rotary movement in the carrier, substantially as described.

2. The combination, with the carrier 100, of the holders 51, provided with the recesses 50, and arranged to have a rotary movement in the carrier, and the folding-blade 28, substantially as described.

3. The combination, with the carrier 100, of the holders 51, provided with the recesses 50, having the depressions 9 in their bottoms, substantially as described.

4. The combination, with the carrier 100, of the holders 51, provided with the recesses 50, and arranged to have a rotary movement in the carrier, and the plunger 53, substantially as described.

5. The combination, with the carrier 100, of the holders 51, provided with the recesses 50, and arranged to have a rotary movement in the carrier, and the plunger 53, provided with the followers 13, substantially as described.

6. The combination, with the carrier 100, of the holders 51, provided with the recesses 50, and arranged to have a rotary movement in the carrier, the plunger 53, and the feeding mechanism for advancing the wrapper into position, substantially as described.

7. The combination, with the carrier 100, of the holders 51, provided with the recesses 50, and arranged to have a rotary movement in the carrier, the plunger 53, and mechanism for advancing the web and for severing the wrappers therefrom, substantially as described.

8. The combination, with the rotating carrier 100, of the holders 51, having the recesses 50, and arranged to have a rotary movement in the carrier, the plunger 53, and the pasting mechanism, substantially as described.

9. The combination, with the rotating carrier 100, of the holders 51, provided with the recesses 50, and having a rotary movement in the carrier, the folding-blade 28, and the pasting mechanism, substantially as described.

10. The combination, with the carrier 100, of the holders 51, provided with the recesses 50, and arranged to have a rotary movement in the carrier, and a feeding mechanism for supplying the cigarettes to the recesses, substantially as described.

11. The combination, with the rotating carrier 100, of the holders 51, having the recesses 50, and the feeding and counting mechanism consisting of the cylinders 63, having the recesses 65, substantially as described.

12. The combination, with the rotating carrier 100, of the holders 51, having the openings 20, and the revolving and longitudinally-moving shafts 16 17, having the forks 18 19, substantially as described.

13. The combination, with the rotating carrier 100, of the holders 51, provided with the recesses 50, and arranged to have a partial rotation in the carrier, the plunger 53, and the folding-blade 28, substantially as described.

14. The combination, with the intermittingly-rotating carrier 100, of the holders 51, provided with the recesses 50, and arranged to have a partial rotation in the carrier, the plunger 53, folding-blade 28, and the pasting mechanism, substantially as described.

15. The combination, with the intermittingly-rotating carrier 100, of the holders 51, pro-

vided with the recesses 50, and arranged to have a rotary movement in the carrier, the plunger 53, folding-blade 28, pasting mechanism, and the feeding and counting mechanism for supplying the cigarettes to the recesses, substantially as described.

16. The combination, with the carrier 100, of a holder, 51, having a package-forming recess, 50, and arranged to have a rotary movement in the carrier, substantially as described.

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

FRANCIS S. KINNEY.
WM. H. BUTLER.

Witnesses:
JAS. J. KENNEDY,
J. A. HOVEY.