July 1, 1924. 1,499,505

E. J. CONLEY ET AL

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922 13 Sheets-Sheet 1

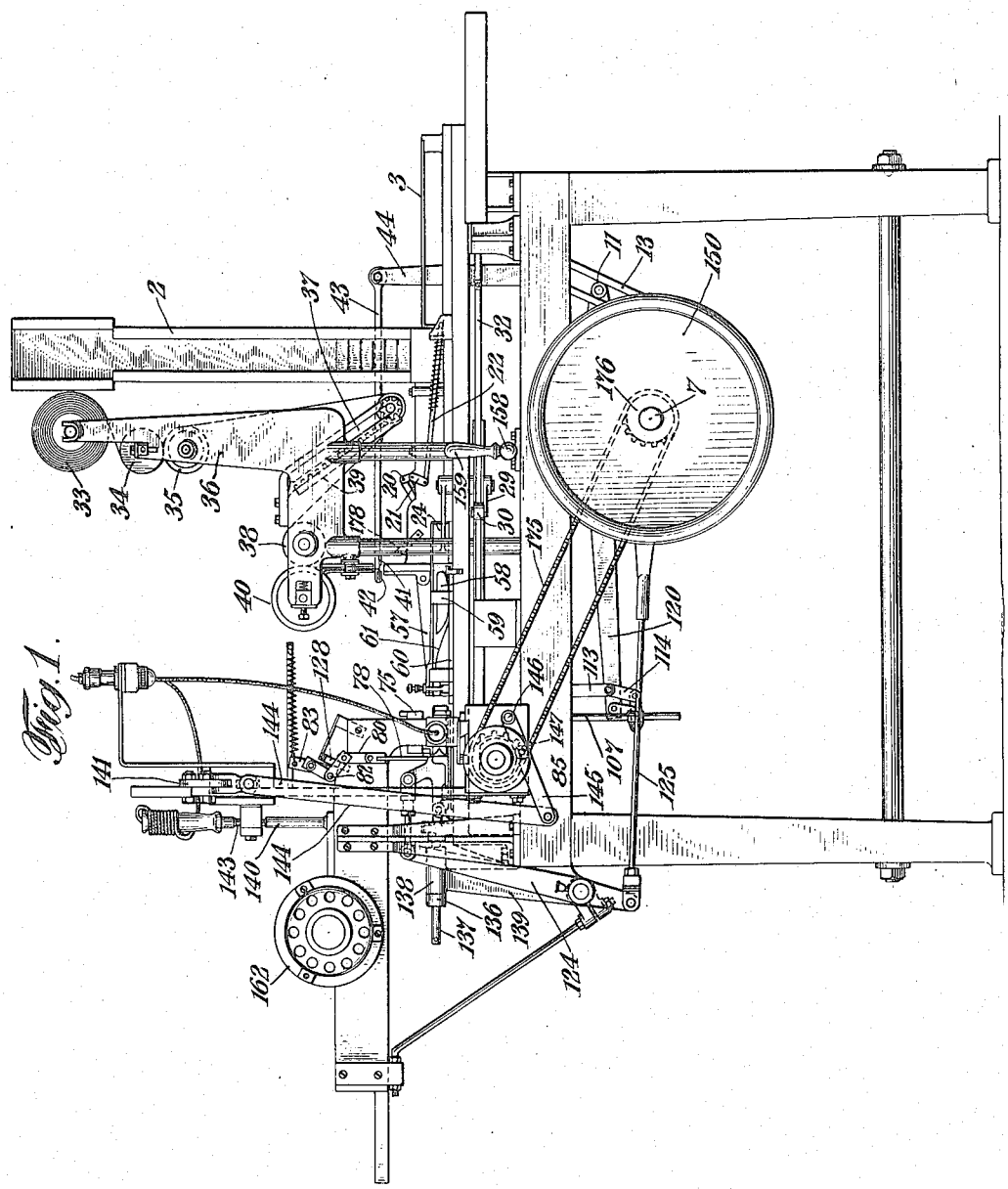


Fig. 1.

Inventors
Edwin J. Conley and
Edward J. Whalen
By their Attorneys
Prindle, Wright, + Small.

July 1, 1924. 1,499,505

E. J. CONLEY ET AL

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922 13 Sheets-Sheet 2

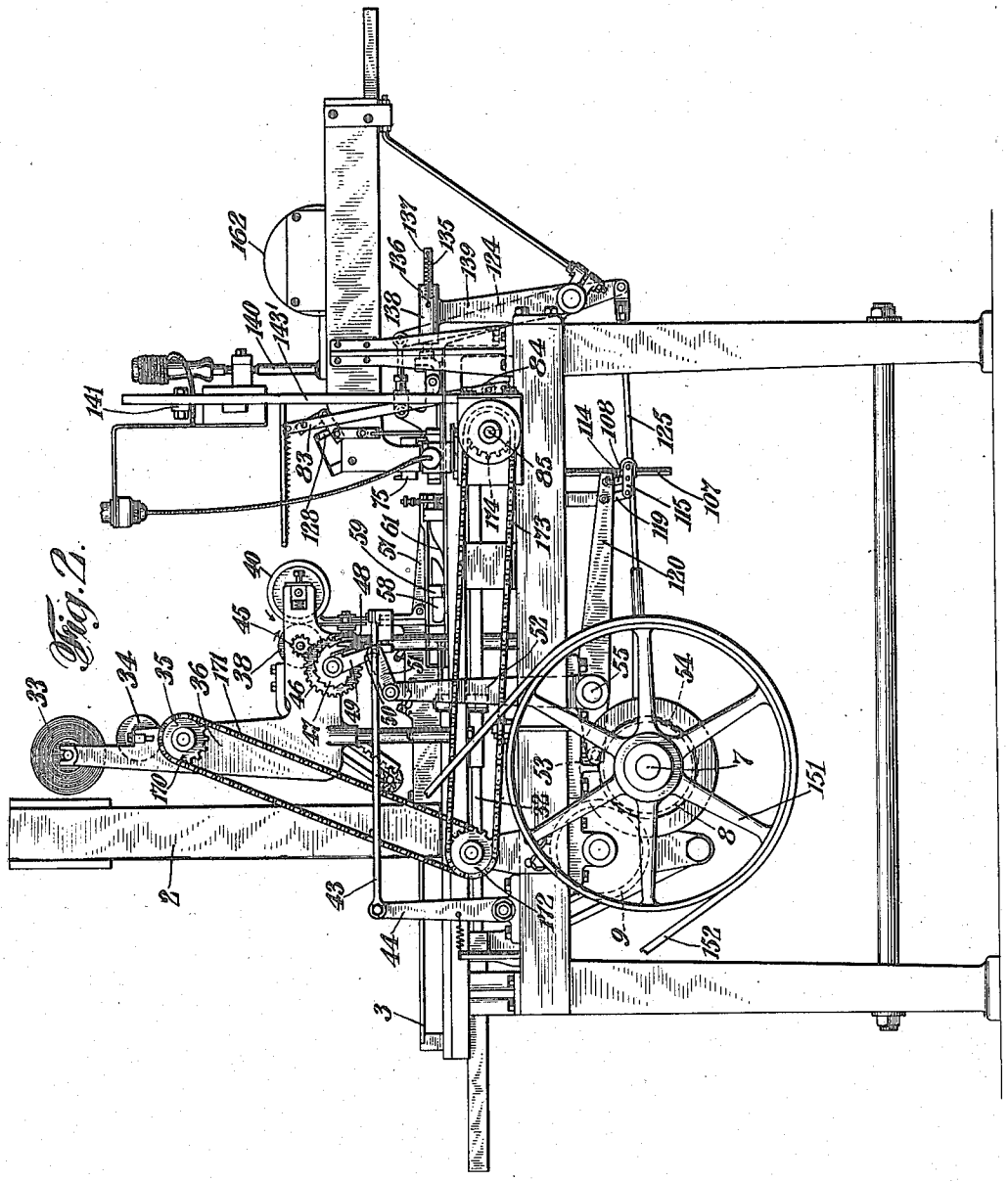


Fig. 2.

Inventors
Edwin J. Conley and
Edward J. Whalen
By their Attorneys
Prindle, Wright, & Small.

July 1, 1924. 1,499,505

E. J. CONLEY ET AL

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922 13 Sheets-Sheet 3

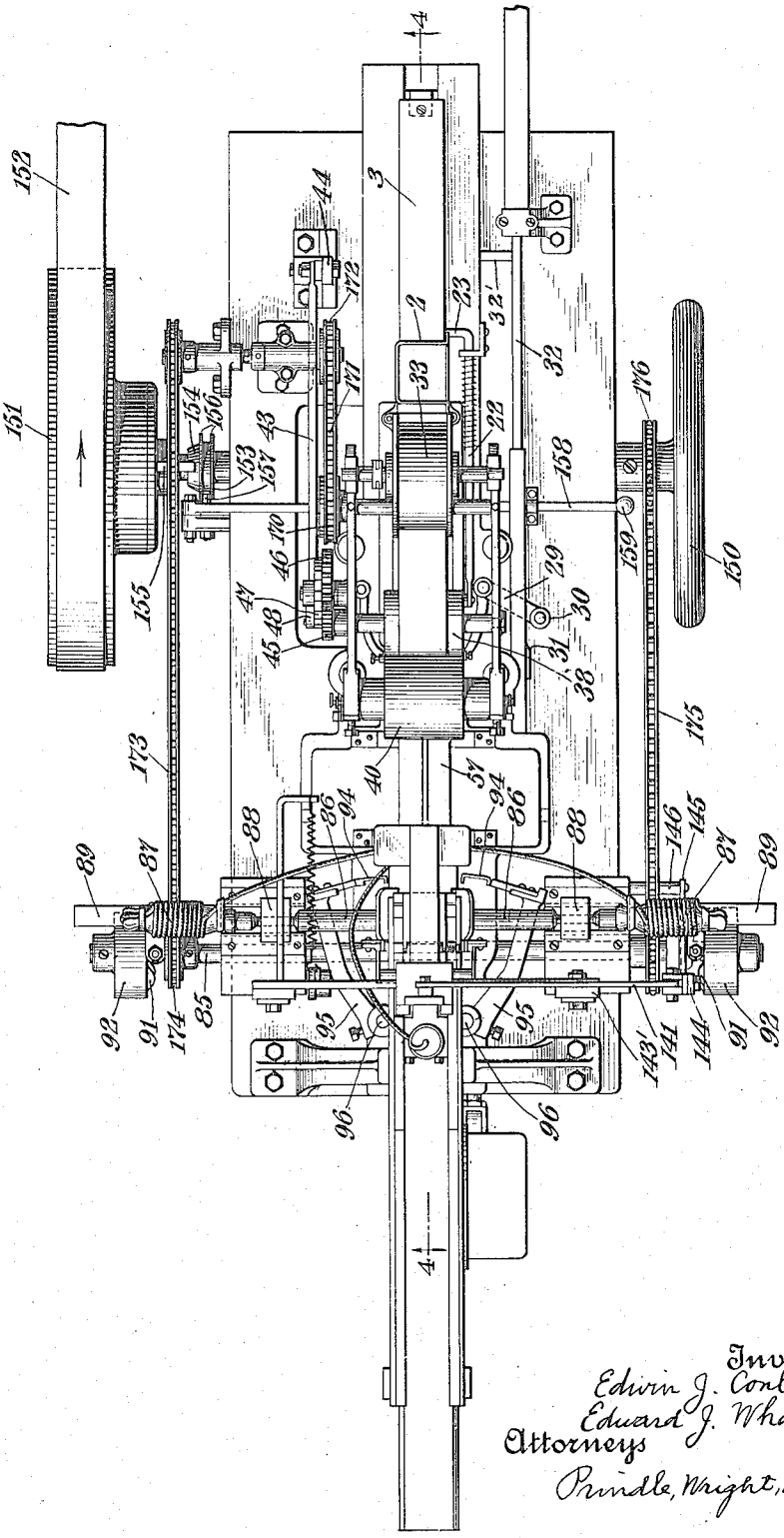


Fig. 3.

Inventors
Edwin J. Conley &
Edward J. Whalen.
Attorneys
Prindle, Wright, & Small.

July 1, 1924. 1,499,505

E. J. CONLEY ET AL

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922 13 Sheets-Sheet 4

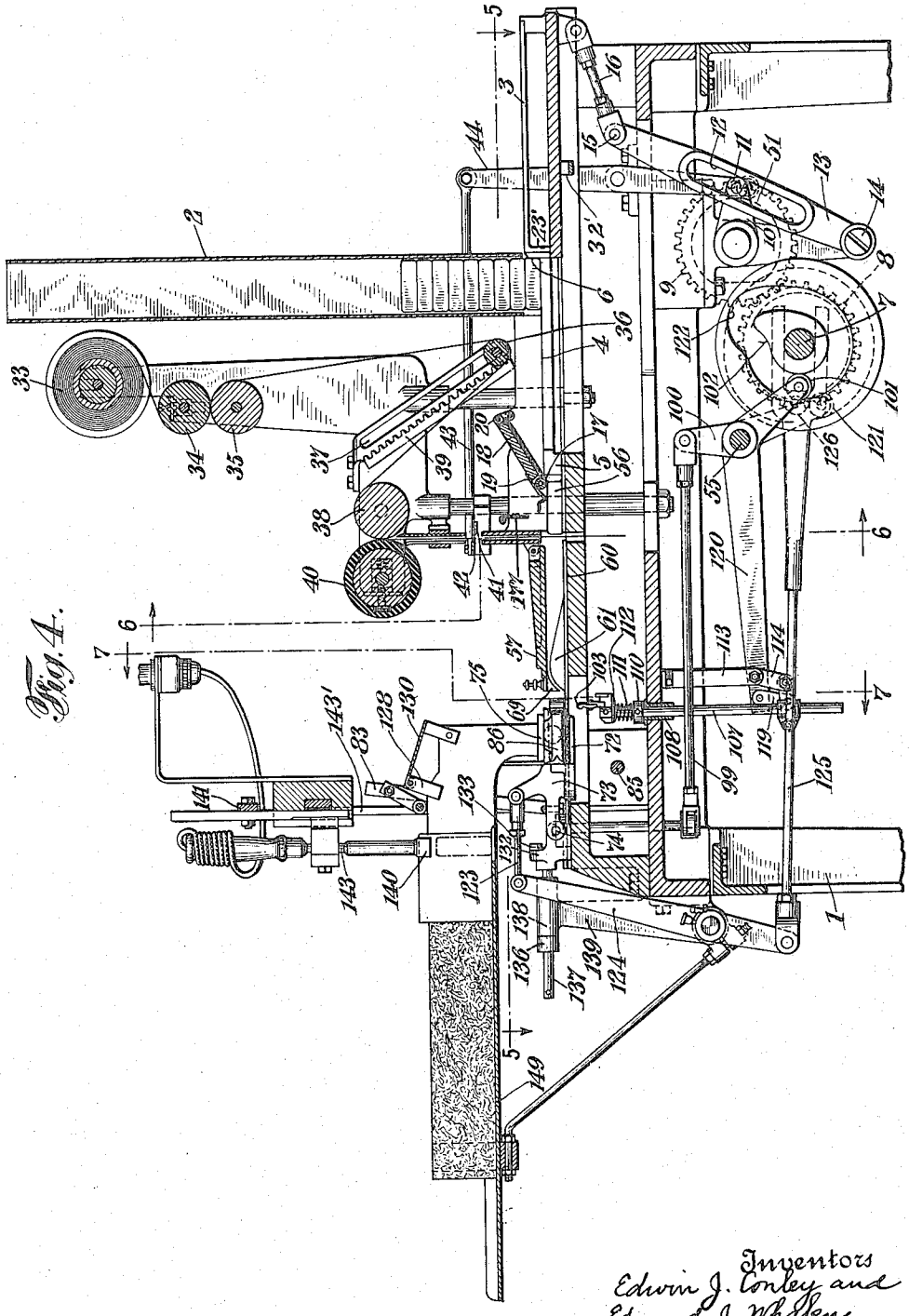


Fig. 4.

Inventors
Edwin J. Conley and
Edward J. Whalen
By their Attorneys
Prindle, Wright, and Small.

July 1, 1924. 1,499,505

E. J. CONLEY ET AL

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922 13 Sheets-Sheet 5

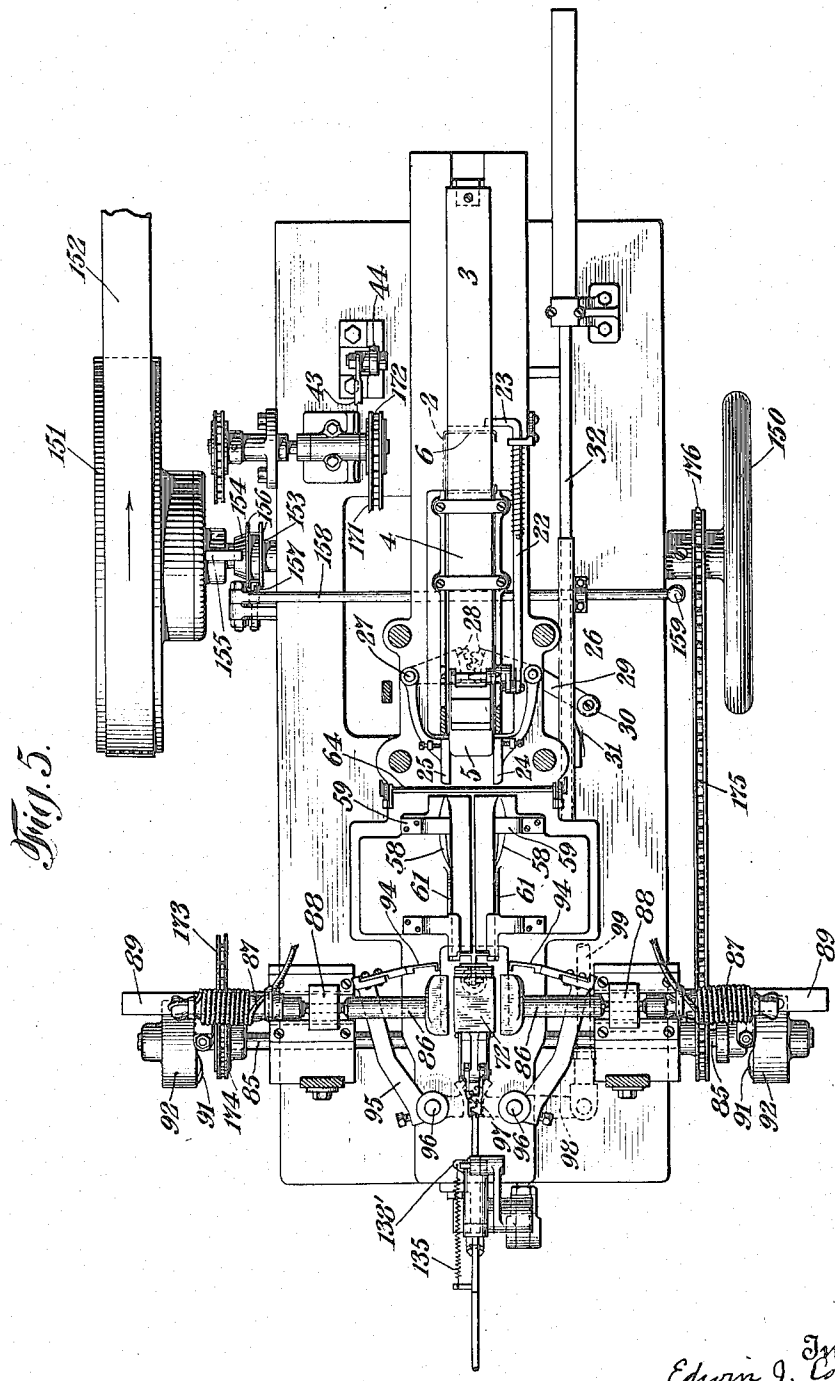


Fig. 5.

Inventors
Edwin J. Conley and
Edward J. Whalen
By their Attorneys
Prindle, Wright, and Small.

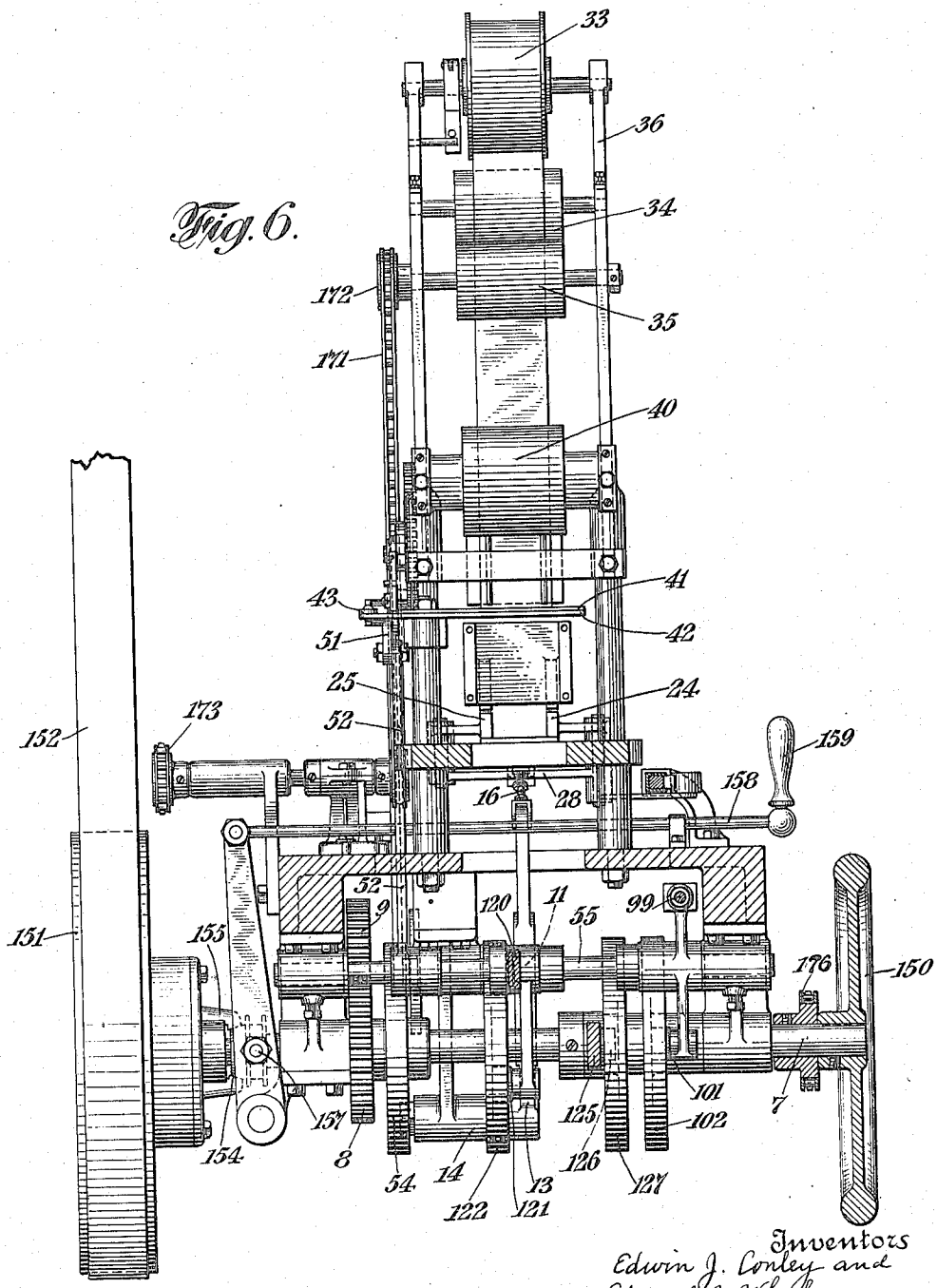
July 1, 1924. 1,499,505

E. J. CONLEY ET AL

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922 13 Sheets-Sheet 6

Fig. 6.



Inventors
Edwin J. Conley and
Edward J. Whalen
By their Attorneys
Prindle, Wright, & Small.

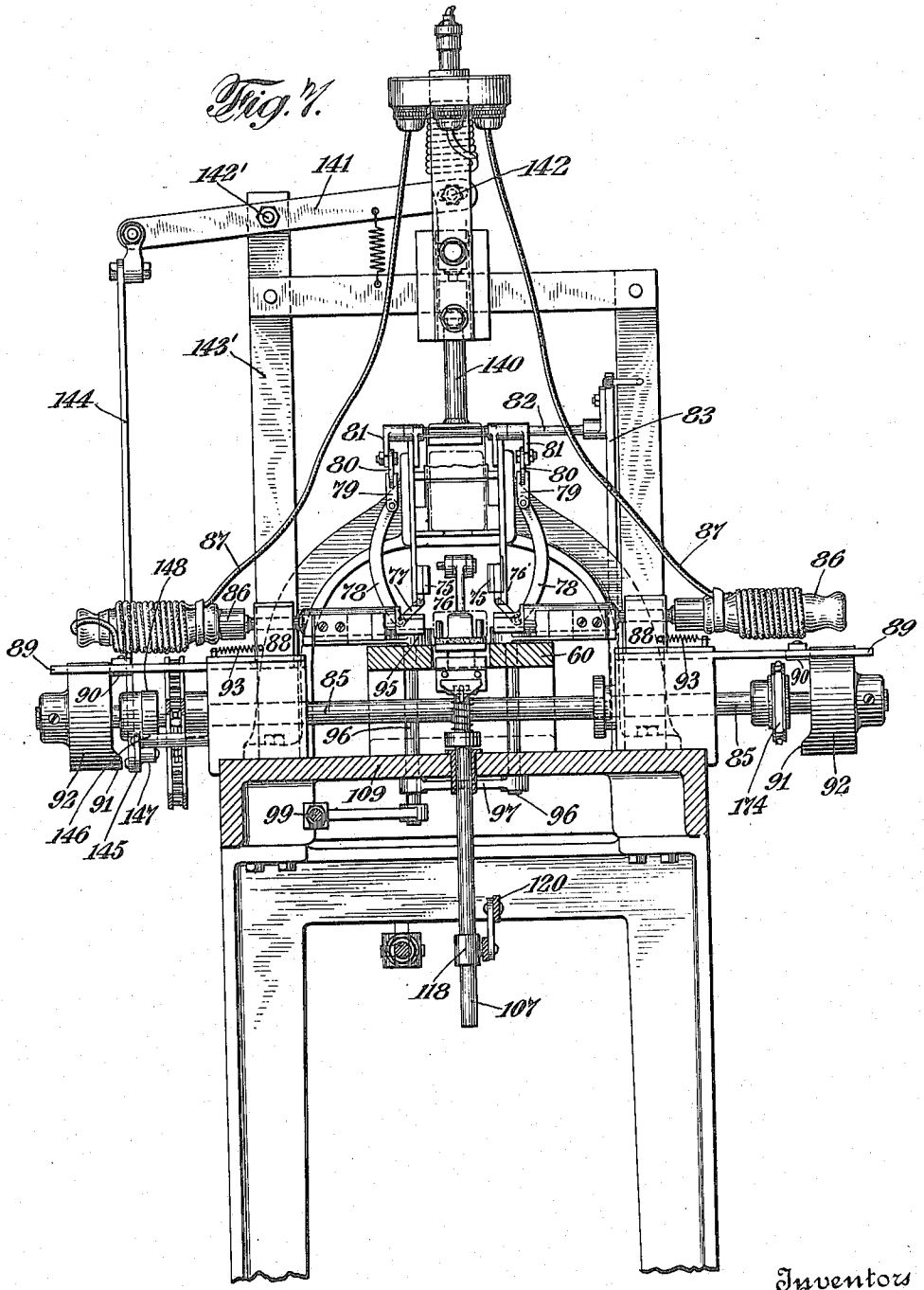
July 1, 1924. 1,499,505

E. J. CONLEY ET AL

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922. 13 Sheets-Sheet 7

Fig. 7.



Inventors
Edwin J. Conley and
Edward J. Whalen
By their Attorneys
Prindle, Wright, and Small.

July 1, 1924. 1,499,505

E. J. CONLEY ET AL.

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922 13 Sheets-Sheet 8

Fig. 8.

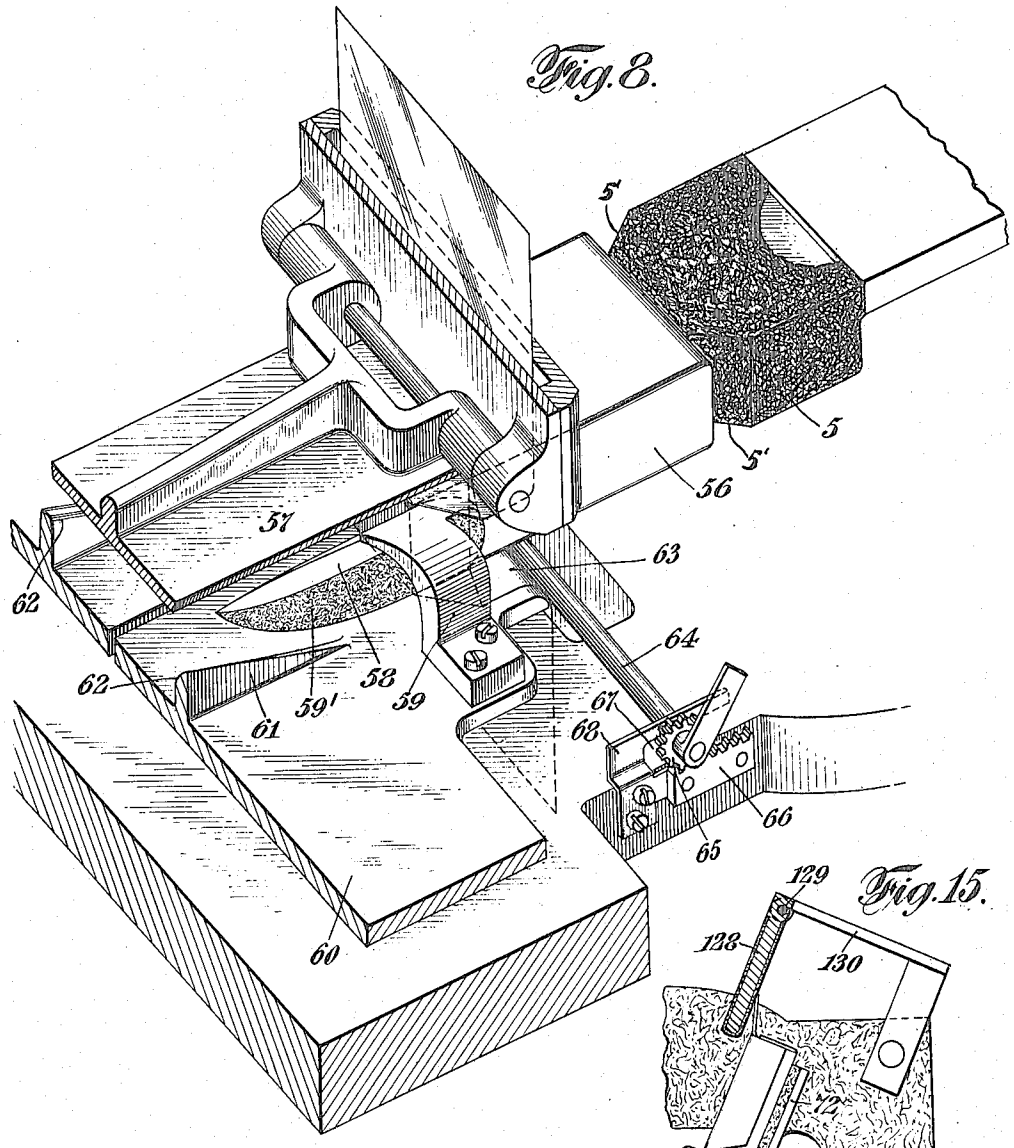


Fig. 15.

Inventors
Edwin J. Conley and
Edward J. Whaley.

By their Attorneys
Prindle, Wright, & Small.

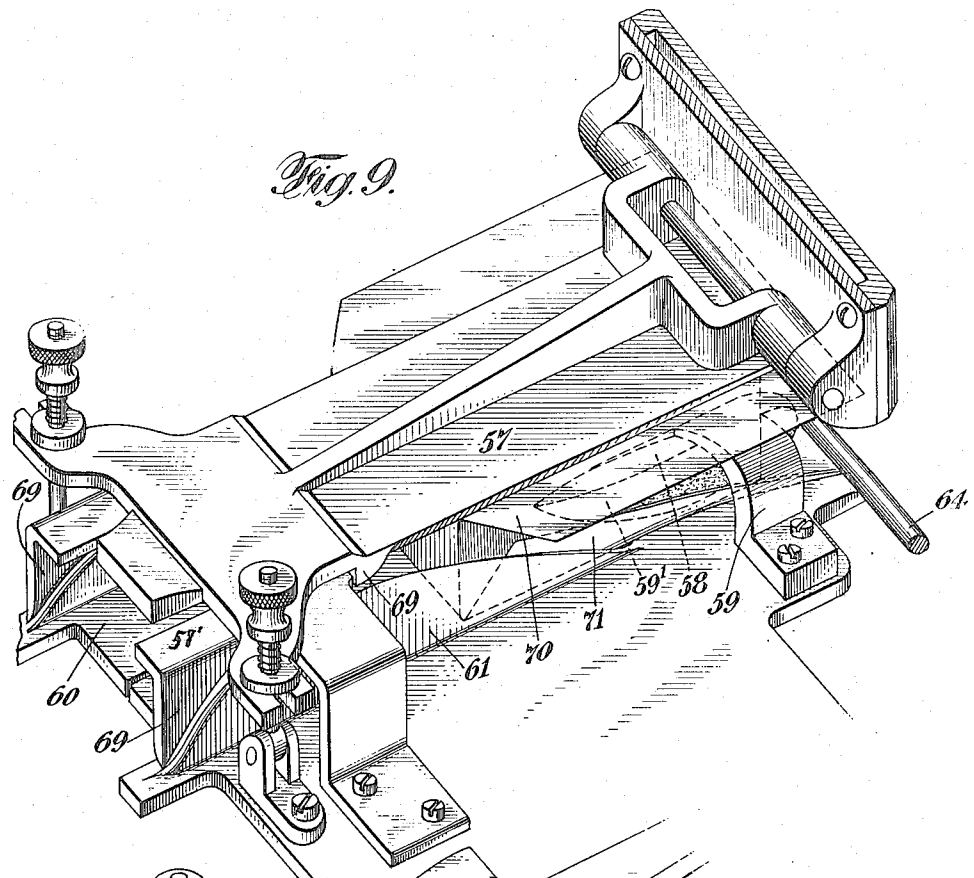
July 1, 1924. 1,499,505

E. J. CONLEY ET AL

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922 13 Sheets-Sheet 9

Fig. 9.



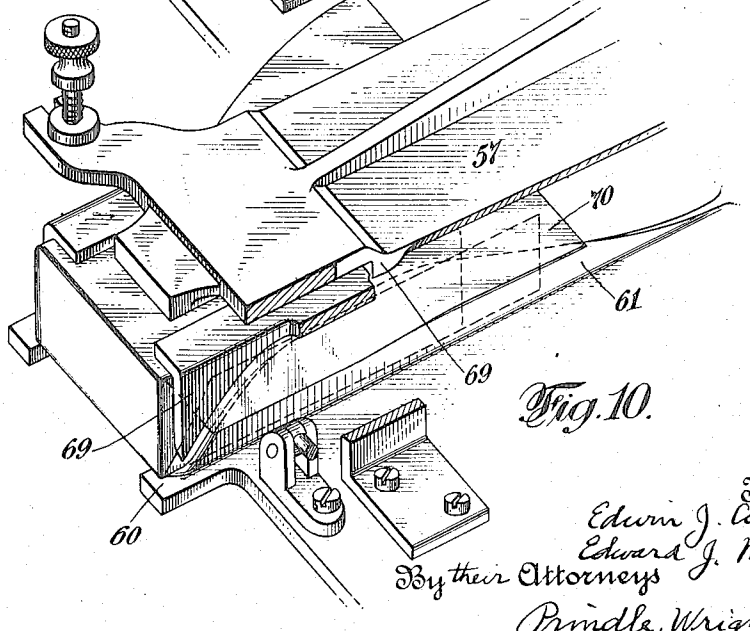


Fig. 10.

Inventors
Edwin J. Conley and
Edward J. Whalen.
By their Attorneys
Prindle, Wright, & Small.

July 1, 1924. 1,499,505

E. J. CONLEY ET AL

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922 13 Sheets-Sheet 10

Fig. 11.

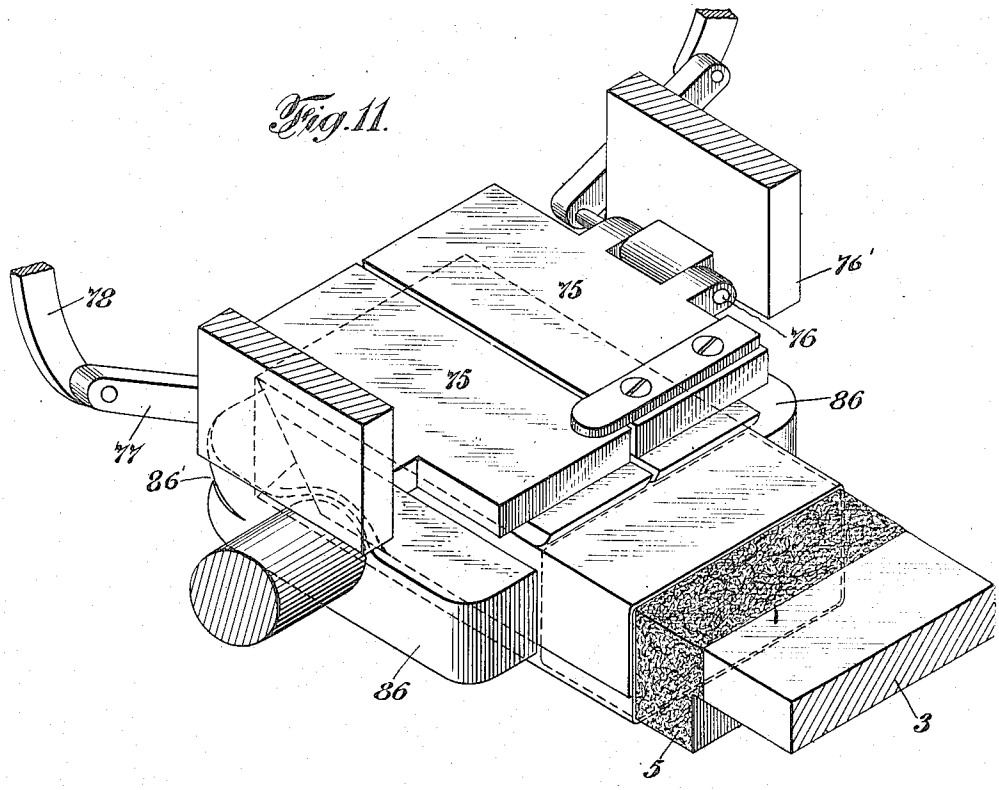
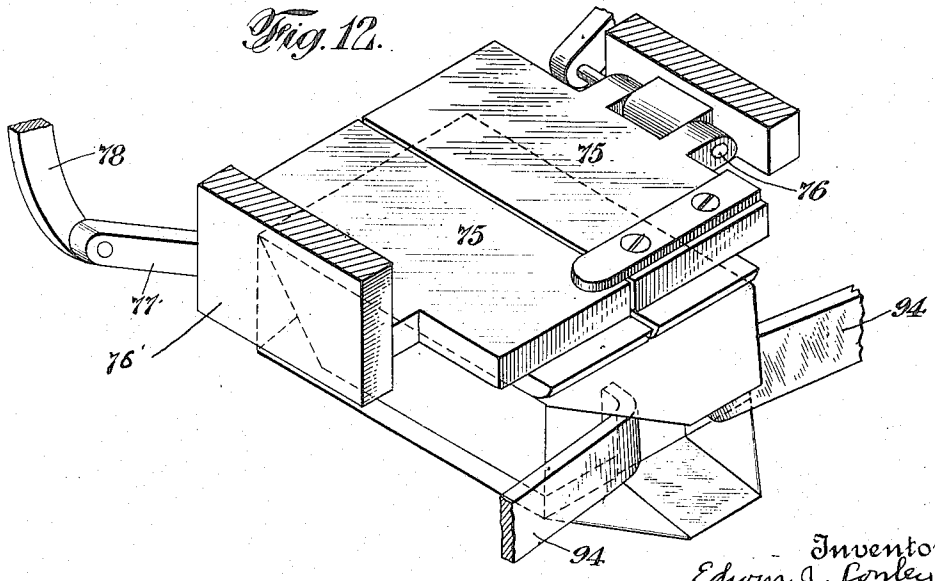


Fig. 12.



Inventors
Edwin J. Conley and
Edward J. Whalen
By their Attorneys
Prindle, Wright, & Small.

July 1, 1924. 1,499,505

E. J. CONLEY ET AL

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922 13 Sheets-Sheet 11

Fig. 13.

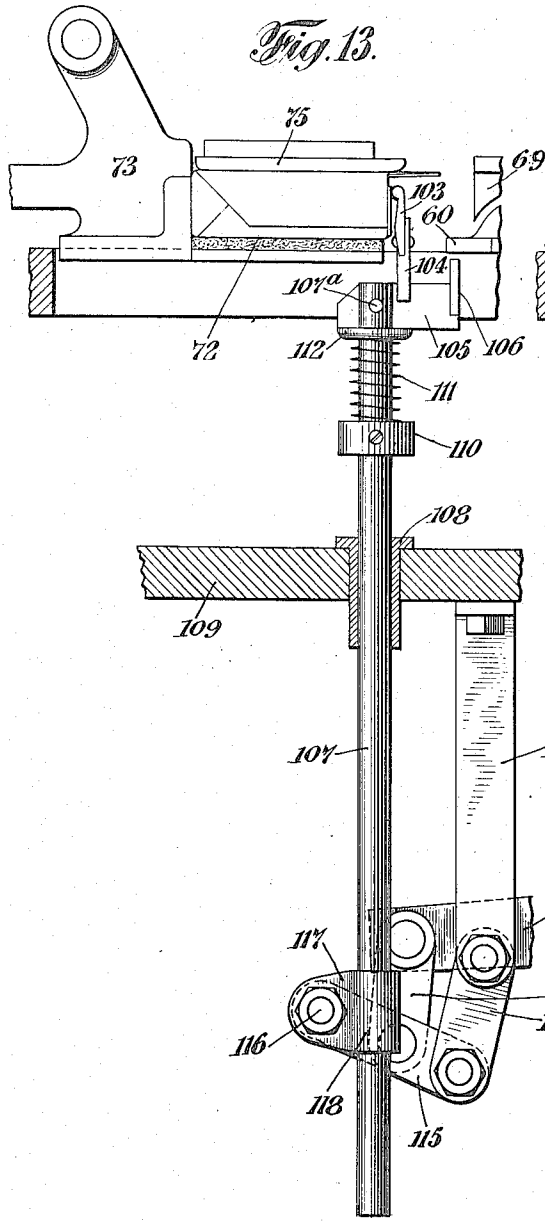
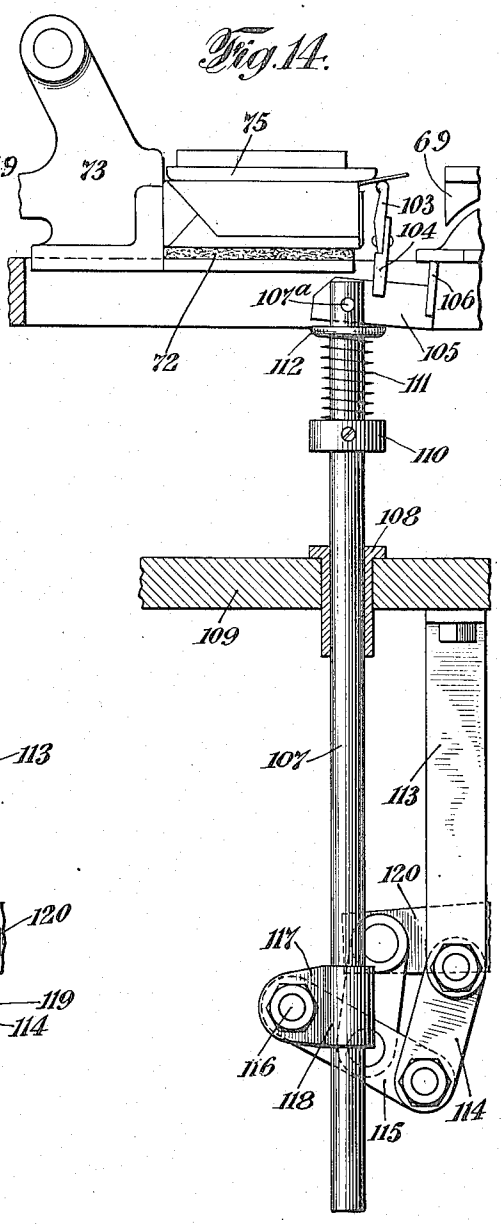


Fig. 14.



Inventors
Edwin J. Conley and
Edward J. Whalen.
By their Attorneys
Prindle, Wright, & Finale.

July 1, 1924. 1,499,505

E. J. CONLEY ET AL

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922 13 Sheets-Sheet 12

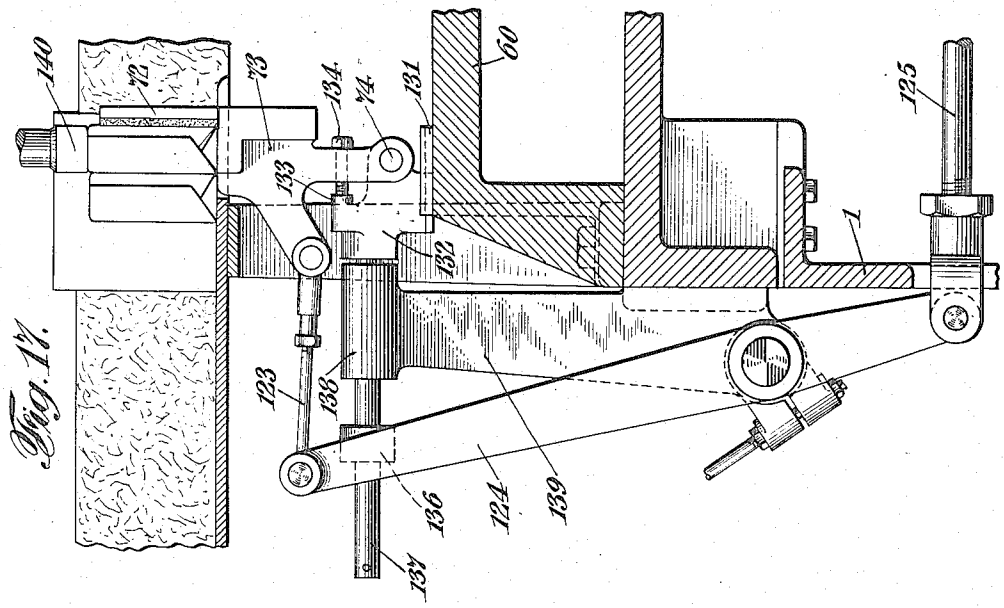


Fig. 17.

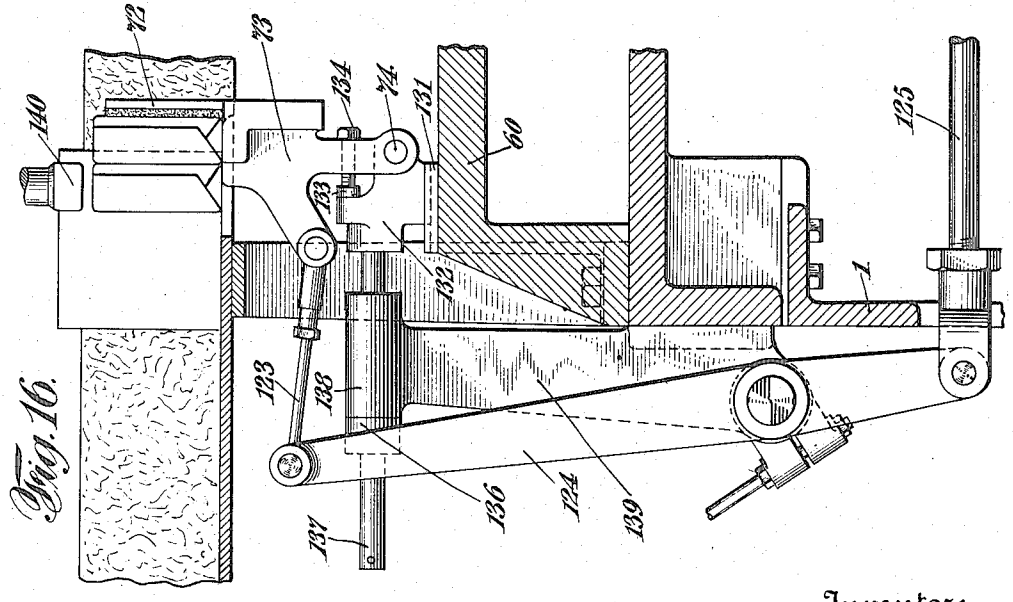


Fig. 16.

Inventors
Edwin J. Conley and
Edward J. Whalen.
By their Attorneys
Prindle, Wright, and Linell.

July 1, 1924. 1,499,505

E. J. CONLEY ET AL

MACHINE FOR WRAPPING AND SEALING METAL FOIL

Filed April 27, 1922 13 Sheets-Sheet 13

Fig. 18.

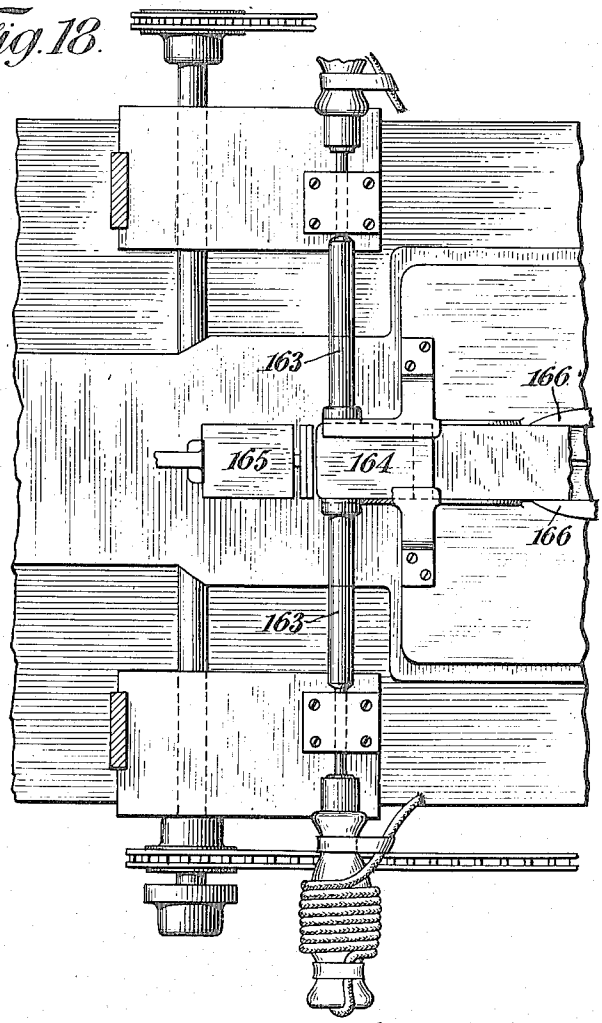
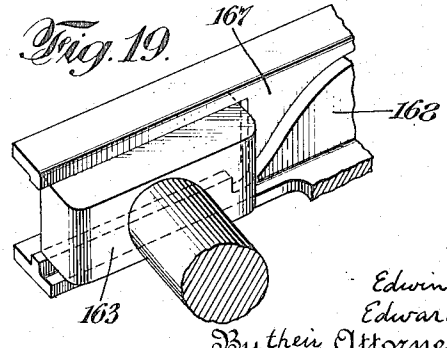


Fig. 19.



Inventors
Edwin J. Conley and
Edward J. Whalen
By their Attorneys
Prindle, Wright, and Small.

Patented July 1, 1924. 1,499,505

UNITED STATES PATENT OFFICE.

EDWIN JEROME CONLEY, OF NEW YORK, AND EDWARD JAMES WHALEN, OF HOWARD BEACH, NEW YORK, ASSIGNORS TO THE CONLEY FOIL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

MACHINE FOR WRAPPING AND SEALING METAL FOIL.

Application filed April 27, 1922. Serial No. 556,952.

To all whom it may concern:

Be it known that we, EDWIN JEROME CONLEY, a citizen of the United States, and a resident of New York, county and State of New York, and EDWARD JAMES WHALEN, a citizen of the United States, a resident of Howard Beach, in the county of Queens and State of New York, have invented a certain new and useful Machine for Wrapping and Sealing Metal Foil, of which the following is a specification.

This invention relates to a machine for wrapping and sealing metal foil in the manufacture of certain kinds of packages which have been previously partially formed of paper or other material, and it relates more particularly to a machine which is adapted for wrapping and sealing metal foil and particularly relatively thin tin foil, to hermetically enclose cigarette packages or other packages of a similar nature.

The machine described and claimed hereinafter is of a type which is adapted for general operations in wrapping and sealing packages, but one of its principal advantages consists in the fact that it is capable of handling relatively thin tin foil, that is, foil of a thickness less than 3/1000 of an inch without breaking, tearing or otherwise disarranging it during the wrapping operations. The proper handling of relatively thin tin foil is a difficult matter and cannot be performed in the ordinary type of wrapping machine designed to operate with paper or paper mounted tin foil. Relatively thin foil presents a peculiar problem of its own, and necessitates a particular construction and design suitable for proper operation. It has been found highly advantageous to seal thin metal foil as above described by a fusing operation without the aid of fluxes or solders by the introduction of proper fusing elements into the mechanism. This necessitates a careful arrangement of the various operative mechanisms so that the fusion may take place without injury to the foil.

It is an object of this invention to provide a machine which can rapidly and efficiently operate on partially formed packages, such as cigarette packages, to enclose them with metal foil, particularly relatively thin metal foil. A further object is to provide in such a machine means for sealing the foil by fusing it without the aid of any flux or solder and without distorting or breaking the foil. A further object is to provide means in such a machine whereby any undesired or unnecessary creasing of the foil may be regularly avoided. Still another object of the invention is to devise means whereby the package is at all times under secure control and firmly gripped during stages of the operation where no motion of the package is desired. Further objects of the invention will be apparent from the following description of the machine and its operation.

The accompanying drawings which form part of this specification illustrate the preferred embodiment of the invention. In said drawings,

Fig. 1 shows a side view of the entire machine;

Fig. 2 also shows a side view of the machine on the side opposite to that of Fig. 1;

Fig. 3 shows a plan view of the entire machine looking down from the highest point thereof;

Fig. 4 shows a side view somewhat similar to Fig. 1, but with certain parts in section for the purpose of illustrating in a general way the principal operating mechanisms and the general course of the package through the machine;

Fig. 5 shows a plan view taken along the line 5—5 of Fig. 4 in the direction of the arrows;

Fig. 6 shows an elevation of the right end of the machine taken along line 6—6 of Fig. 4 in the direction of the arrows, this figure being intended to show some of the details of the driving mechanisms;

Fig. 7 shows an elevation of the left side of the machine taken on line 7—7 of Fig. 4 in the direction of the arrows;

Figures 8 to 17 show various stages of the operation of wrapping and sealing the foil about the cigarette package, and by way of a more detailed statement;

Fig. 8 shows the first stage of the wrapping operation when the sheet of foil has been engaged by the advancing package and the extending edge of the foil has been folded up against the narrow side of the package;

Fig. 9 shows the next step in which the bottom flap of the foil is being brought up-

wardly into position against the narrow side of the package;

Fig. 10 shows the next step in which the upper flap has been forced into position against the narrow side of the package;

Fig. 11 shows the next step in which the electrically heated fusing irons are applied to the folded flaps to seal them, holding plates having been swung downwardly to hold the package against movement;

Fig. 12 shows the next operation in which fingers advancing along the end of the package fold the foil against the package in the first step of closing its open end;

Fig. 13 shows the next step of closing the end consisting in upwardly moving the finger against the bottom end flap to bring it up against the package;

Fig. 14 shows the immediately succeeding step in which this finger is caused to rise slightly to press the top end flap against the plates above in order to facilitate the subsequent folding operation;

Fig. 15 shows the manner in which the top end flap is forced over to cover the bottom end flap while the package is being raised to a vertical position;

Fig. 16 shows the end of this movement and the resulting vertical position of the package immediately prior to being advanced laterally under the vertical fusing iron;

Fig. 17 shows a package after it has been moved laterally to the left to bring it under the fusing iron, which is caused to descend and fuse the flaps formed on the end of the package. This figure, therefore, shows the last step in the formation and sealing of the foil cover of the package. The package is thereafter shoved laterally to the left for delivery from the machine.

Modifications are shown in Figures 18 and 19 in order to illustrate one way in which the fusing irons may be made stationary so that the fusing may take place while the package is passing between the irons.

In said Figures 8 to 17, one side of the package has been shown, but it is to be understood that the same operation takes place on the other side throughout the course of operation.

Before going into the various details, it is desired to very generally describe the general operations, and for this purpose Fig. 4 will be taken. The cigarette packages are placed in the vertical chute and are fed by gravity into contact with a long plunger at the right of the machine, which moves them to the left immediately adjacent a vertical sheet of tin foil. When the plunger returns to the right the package is eventually caused to drop off the left end of the plunger into the position shown in the middle of Fig. 4, where it is ready to be pushed to the left into the sheet of foil when the plunger returns on its next stroke. When the latter occurs the package is driven into the sheet of foil, which has in the meantime been severed, and the first stage of the wrapping operation takes place as will be seen in Fig. 8. The subsequent operations of folding the sides of the package are clearly shown in Figures 9 and 10. During this time the plunger is continually advancing the package to the left, and at the end of the stroke the package arrives upon a movable platform which is awaiting it. While positioned upon this platform and held by certain plates, the fusing irons are caused to move in and effect the sealing of the flaps on the narrow sides of the packages, and immediately thereafter lateral fingers begin to fold the foil against the right end of the package, thereby forming extending top and bottom flaps. The bottom flap is at once folded up by the vertical finger advancing from below, and thereupon the platform upon which the package rests is swung upwardly about a pivot to eventually bring it under the vertical fusing iron. During this upward movement, which traverses an angle of 90°, the upper end flap is forced down by an extending finger. The package is then forced laterally a short distance to the left to bring it laterally under the fusing iron, which then descends to complete the fusing and sealing of the foil.

The detailed description of the various mechanisms will now be taken up in approximately the order in which they operate upon the packages.

The general framework of the machine may be seen in the various figures of the drawings, and it is generally denoted by the numeral 1. Suitably mounted upon said framework is a vertical chute 2 into which the packages to be wrapped with foil are delivered by hand or mechanical means. The chute is open at the bottom to permit a plunger 3 to move therethrough, said plunger having an upper surface as denoted by the numeral 3 and also a lower surface denoted by the numeral 4. The plunger is hollow under said upper surface, and the extreme left end thereof denoted by numeral 5 serves to advance the package to the left to its most extreme position, while the shoulder at point 6 serves to advance the package from its initial to its intermediate position. As shown in Fig. 8, the end 5 is substantially rectangular in section and is cut away at the corners 5′, the surface being covered with a layer of felt, whose edges are nearly rectangular but slightly rounded in order to properly shape the foil. The plunger is actuated by mechanism connected to the main driving shaft 7 of the machine, said mechanism consisting of a

gear 8 on said shaft meshing with a gear 9 mounted to rotate with a short arm 10 having at the end thereof a roller 11 engaging a long slot 12 in an arm 13 pivoted to the main frame at 14, and at the other end connected by a pivot 15 to a link 16 which directly connects to the plunger. It will be seen that by the rotation of the main driving shaft 7 the plunger is caused to move back and forth. The end 5 snugly fits the folding box.

During the forward motion of the package from the chute, it is brought into contact with a roller 17, mounted upon a plate 18 which also carries a holding strip 19, and said plate is hinged at 20 to a small bell crank 21 so that the roller 17 may ride up on top of the advancing package and hold it down. The bell crank 21 is attached to an arm 22 having an inturned finger 23 for engagement with the inside surface of the plunger 3 at about point 23′ when the plunger has almost finished its return stroke to the right. This engagement causes the plate 18 with the holding strip 19 to descend, with a result that the pointed end of 19 forces the package down off the platform into the position shown in Fig. 4, and continues to hold it there until the plunger is ready for its next forward stroke. A spring surrounding the arm 22 serves to return said arm to normal position when the finger 23 is released from engagement with the shoulder of the plunger.

Directly after the package is in the position shown in the center of Fig. 4 it is gripped on both sides by plates 24 and 25, which serve to carefully aline the package for further advance and to more perfectly form it for the ensuing wrapping operation with the foil. These plates are pivoted at 26 and 27 to segmental gears 28 which are actuated by an arm 29 having thereon a roller 30 positioned to contact with a bevel surface 31 of a rod 32 which is suitably mounted to be moved laterally in unison with the plunger 3 to cause a slight motion of the gears 28 and thereby a slight opening and closing of the plates 24 and 25. The rod 32′ connects the rod 32 with the plunger 3. These plates are so operated as to be open during the time that the package descends between them.

The means for providing the sheet of foil will now be described. A roll of foil 33 of suitable width is mounted upon a suitable standard as shown, and the end of the foil is caused to pass around rollers 34 and 35, the former being adjustable with respect to the latter and roll 35 being provided with means for continuously driving it. This means will be described later. The foil, after passing over the roller 35, passes over a roller 36 journaled for movement in a long slot 37 and thence passes over another driven roller or cylinder 38. The roller 36 is mounted for rotation with pinions which engage racks 39 on both sides of said roller and which travel in close contact with guides to prevent lateral movements. An adjustable roller or cylinder 40, covered with some yieldable material such as rubber, is mounted adjacent to the roller 38 to keep the foil straight and smooth, and roller 38 intermittently feeds suitable lengths of foil for the packages. The foil is severed periodically by knives, one of which is stationary as shown at 41, and the other, denoted by 42, is movable and attached to a rod 43 which is actuated by a crank 44 whose other end has a roller engaging a cam mounted for rotation with the gear 9 upon the same shaft. The foil is severed just at the moment when the advancing package makes contact with it. The vertical guideway or slot in which the foil drops after severance may contain a plate swinging from a rod over the top of the slot. Fig. 4 shows a sheet of foil immediately after being cut. When a sheet has been cut off the roller 38 is positively driven to supply another sheet for the knives and the driving means consists in a pinion 45 rotating with the roller 38 and meshing with a gear 46 driven by a ratchet and pawl 47 and 48, the pawl being periodically moved a predetermined distance downwardly and clockwise and then in a reverse direction by a link 49 and a pin 50 which passes through said link and the pawl; the link 49 is in turn actuated by another link 51 journaled in a bell crank 52 whose other end has a roller 53 traveling in a camway 54 on the driving shaft 7. The bell crank is mounted upon a shaft 55 which serves also for other purposes.

The foil feeding mechanism is arranged to maintain the advancing foil sheet correctly centered and free from wrinkles, that is, in a fairly taut and extended condition. The fixed motion of the oscillating roller 36 in the guide-way prevents any lateral movement of the roller or advancing foil. The foil from the reel 33 is unwound at a uniform rate carefully timed with respect to the intermittent rotation of the roller 38.

The package 56 is shown in the central position in Fig. 4, and when this package is now caused to move forward by the plunger and into the sheet of foil about to be severed, it is brought under a hinged plate or weight 57 which serves to hold the package down and keep it smooth, and while under this plate the foil is folded against the package along its narrow sides as will be more fully described in connection with Figures 8 to 17. The principal parts of this folding means consist of a specially shaped piece of felted material 58 which is mounted on a bracket 59 attached to a bed 60 upon which the pack-

age moves. Immediately in advance of this piece 58 is provided an inclined ridge or plate 61 of the form illustrated and whose inside is curved as shown at 62, and filleted on the inside at the junction with the base 60. This inclined piece is given the shape as shown and described in order to most advantageously fold up the bottom flap of the foil. The felt member 58 does not fold the top flap but keeps it extended in an unwrinkled condition over the top of the bracket 59, while it performs the function of folding in a portion of the extended sides of the foil sheet against the narrow sides of the package at the very beginning of the folding operations as shown in Fig. 8. The piece 58 has a curved portion 59′ for the purpose of properly directing the lower flap of the foil as it turns into an upright position by reason of the action of the inclined plate 61. In order to prevent any possible wrinkling or undesired folding of the sheet of foil in the vicinity of numeral 63, there is provided a rolling bar or rod 64 having at the end thereof a pinion 65 running on a short rack 66 and moving in a groove 67 within a bracket 68. This rod 64 which is freely movable and the plate 61 are so spaced apart that when the foil begins to fold up by reason of the action of member 61, the other end of the foil is just passing from under the rod. The roller or rod 64 is actuated by the forward movement of the package above it, and as a result it bears against the curved surface of the bottom of the bed and holds the foil in a straight position in order to prevent unnecessary wrinkling, there being no positive drive for said roller, and the small upstanding arm shown in Fig. 8 near the pinions may be used if desired to operate the roller by hand in case some obstruction is encountered, but such arm is unnecessary. After passing the inclined ridge 61 the upper flap encounters a depending member 69 which is positioned close to the inclined member 61 and serves to fold down the upper flap of the foil denoted generally by the numeral 70, the lower flap being indicated by the numeral 71. The member 69 is filleted on the inside like member 61 (see Figs. 9 and 10 showing slight curves at the inside corners of the folding box) and is spaced outwardly from 61 to allow the flap 70 to pass between. The member 69 is a vertical plate beginning at 69 (near the middle of Fig. 9) and extending to the left as shown. Its lower edge is curved to follow the curve of member 61 and is positioned slightly outside of 61, being curved at its lower portion from the inside wall to the outside wall as clearly shown. After passing this depending and curved folding member 69 the package is moved by the plunger over onto a platform 72 topped with felt upon which the plunger leaves it for the ensuing operations. This platform forms part of a rocker arm 73 pivoted at the pivot 74, which mechanism will be later described.

As the package moves onto the platform, it passes under felt surfaced plates 75 which have been previously dropped into horizontal positions. These hold it in position during the side fusing and end folding operations and are each thereafter released to allow the package to ascend. These plates are pivoted by means of a pivot at 76 on a support 76′ to a crank 77 which is actuated by a curved bar 78 connected to a link 79 which in turn is connected by an intermediate link 80 to a crank 81 on the shaft 82, which shaft is periodically rotated a predetermined distance through an attachment of an oscillating bar 83 whose lower end is provided with a roller 84 moving on a cam surface rotating on the shaft 85.

After the package has come to a stop under the plates 75, the electrically heated fusing irons 86 are moved inwardly against the overlapping foil flaps on the narrow sides of the package and held there a sufficient time to cause the foil to fuse and thereby provide a hermetic seal. The irons are heated to the proper temperature to effect a proper sealing without injury to the foil, and current is supplied to the irons for this heating through conductors 87. The means for moving these heaters inwardly at the proper time comprise standards 88 in which the heaters are mounted, said standards having flat bars 89 attached thereto which are provided with rollers 90 positioned to be engaged by cam surfaces 91 upon pulleys 92 upon the shaft 85. The rotation of the shaft and pulleys causes the cams to engage the rollers and move the heaters inwardly against the package. Springs 93 return the bars and associated parts to their original positions.

The means for folding the end of the package will now be described. There are provided fingers 94 at the sides of the fusing irons, which fingers are suitably mounted on arms 95 journaled at 96 to fragmentary gears 97, which are actuated at the proper time by an arm 98 engaged by a rod 99 attached to a bell crank 100, which has a roller 101 operated by a cam 102 on the main driving shaft 7. This cam is so arranged with reference to the cooperating parts as to cause the fingers 94 to move inwardly shortly after the irons 86 have moved towards the package and the plunger 3 has withdrawn, and to form the first end-folding operation as shown in Fig. 12, thereby forming upper and lower end flaps on the hitherto unfolded end of the package. The fingers 94 now move out away from the package.

When this action has been completed, the lower flap is folded up by means of a finger

103 mounted upon a bar 104 which is attached to a cross lever or bar 105 having at its right end a projecting lug 106 adapted to contact with the bed 60. The bar 105 is pivoted at 107a to a vertical shaft 107 which slides within a sleeve 108 mounted in a portion 109 of the main frame of the machine. Collar 110 is screwed to the vertical shaft and a spring 111 is interposed between said collar and a washer 112 which is loosely slidable on the shaft. A bracket 113 attached to the main frame has pivoted therein a link 114 which in turn is pivoted to a link 115 which is pivoted at its other end 116 to a lug 117 on a collar 118 fixed on the vertical shaft 107. The link 115 is connected by a short link 119 to the end of a long bell crank 120, whose other end has a roller 121 riding on a cam surface 122 rotating with the main shaft 7. By these mechanisms actuated by the cam 122, the vertical shaft 107 is moved upwardly at the proper time to allow the finger 103 to fold up the lower end flap. The movement is continued upwardly against the upper flap at its juncture with the package and then rearwardly of the package as shown in Fig. 14, the rearward motion being accomplished by the striking of the lug 106 and the tilting of the bar 105. This movement marks the upper limit of the movement of the rod 107, and when it begins to descend again by reason of the cam action, the spring 111 acting against the washer 112 forces the bar 105 into a horizontal position again. The rearward motion of the finger is of course to allow clearance of the lower flap, and the pressure against the upper flap provides a square corner thereby avoiding unnecessary creases when the upper flap is folded down later.

At the moment when the finger 103 moves away from the package to its uppermost position, the plates 75 and the irons 86 are quickly released, and the finger 103 descends.

The package now being ready for the upward movement with the rocker arm 73, the latter is thereupon caused to swing upwardly about its hinge 74 as shown in Fig. 15. The means for accomplishing this movement comprise a horizontal link 123 attached to the rocker arm 73 and to a lever 124 whose other end is connected to a long rod 125 bifurcated at its right end as shown in Fig. 4 to rest upon the main shaft 7 and which is provided with a roller 126 mounted thereon so as to engage a cam surface 127 rotating on the main shaft 7. The cam action causes the rocker arm 73 to tilt upwardly around the pivot 74 until it gets into the position shown in Fig. 16 having passed through a 90° turn. During this upward movement it passes a spring-held felted plate 128 suitably hinged at 129 to a bracket 130 mounted upon the machine frame. The plate 128 functions to fold down the upper end flap over the lower end flap as shown in Fig. 15.

The end of the turning movement about the pivot 74 brings the rocker arm 73 with its package into upright position (see Fig. 16). A lateral sliding movement now takes place to the left whereby the package comes directly under the vertical heating iron. This lateral movement is accomplished by the following means:—

A plate 131 mounted upon the frame has a groove therein for the reception of a sliding member 132 upon which is pivoted the member 73, this sliding member having an abutment 133 designed to contact with an adjustable set screw 134 in the member 73; when the lever 124 moves a little further to the left after the set screw has engaged abutment 133, no further pivotal action is possible and therefore the member 132 starts the sliding bars to the left as shown in Fig. 17. The spring 135 is attached to a collar 136 on an extension 137 from the sliding member 132, and the other end of the spring is attached to a stationary lug 138′ so that the member 132 will not slide to the left until the set screw strikes against its abutment and the lever 124 positively pulls the member 132 against the resistance of its spring. A bearing 138 on a suitable standard 139 attached to the frame is provided for receiving the sliding extension 137.

When the package arrives in the position shown in Fig. 17 as a result of this lateral sliding movement, the motion of the lever 124 ceases and the vertical fusing iron 140 is caused to descend to hermetically seal by fusion the end flaps of the package which have just been folded. The mechanism for operating this vertical fusing iron 140 comprises a slotted lever 141 engaging a pin 142 on the vertical shaft 143 of the fusing iron, said lever being fulcrumed at 142′ to a standard 143′ and having its other end connected to an operating bar 144 (Fig. 7) whose lower end is journaled to a link 145 pivoted at 146 and provided with a roller 147 engaging a cam 148 on the shaft 85. The cam is of course designed to cause the vertical fusing iron to descend for a given time upon the end of the package and then to immediately recede again.

When this final fusing operation is completed, the package is finished as far as the foil wrapper is concerned, and is moved along the guide-way 149 towards the left, such motion being occasioned by the forcible displacement of the packages due to the upward movement of the platform 72 with another package. The completed packages may then be removed from the guide-way 149.

The means for heating the electric fusing irons may be of any suitable design and need not be further described herein. The

irons have a cutout 86′ of a V-shaped contour at one end, corresponding to the area of single foil thickness, in order to prevent any possible melting of the foil.

A hand wheel 150 may be mounted upon the main driving shaft 7 on the opposite side of the machine from the driving pulley 151 for the purpose of operating the machine by hand in case repairs or inspection are desired. A driving belt 152 drives the pulley 151 and the latter may be disengaged by a clutch mechanism generally designated by 153 and comprising a conical member 154 engaging another clutch member 155 upon the pulley, said conical member having flanges 156 to receive a pin 157 which may be moved along the shaft by a rod 158 operable from the opposite side of the machine by means of a handle 159. This clutch mechanism with the hand wheel 150 of course forms no necessary part of the apparatus.

A rheostat 162, circular in design as shown at Fig. 1, is mounted on the guideway, and the electrical connections may be made through this means. The rheostat has a construction permitting careful regulation of the temperature, particularly when a temporary stoppage of the machine necessitates a lowering of the temperature in the irons. This can be performed automatically.

In Figures 18 and 19 a modification is shown showing the fusing irons 163 in fixed position immediately adjacent the end of the bed 164 (corresponding to bed 60 above described). The pivoted small platform 165 here shown corresponds to the platform 72 above. The felted guides 166 correspond to the parts 58 above described. It will be seen by this arrangement that the fusing irons may be made stationary, being spaced apart by the width of the package to pass therebetween, and that during such passage the fusion may take place. Fig. 19 shows the iron in further detail, the depending portion 167 (corresponding to 69 above) and the lower inclined portion or edge 168 (corresponding to 61 above) serving to fold the upper and lower side flaps respectively. As will be seen, the fusing iron is stationed at a point immediately after the side folding operations are completed.

The means for driving roller 35 comprise a gear 170, sprocket chain 171, gear 172, sprocket chain 173, and gear 174 mounted on the shaft 85 which is driven from the shaft 7 by the chain 175 and the gear 176.

For the purpose of preventing any upward movement of the package 56 a plate 177 may be hinged (see Fig. 4) above the bed 60 to brackets 178 attached to the sides of the passageway near the roller 17.

Operation of the machine.

When starting the machine, the requisite quantities of packages are supplied to the chute 2, the reel of tin foil 33 is properly mounted upon and inserted in the apparatus, and the machine is set in operation. The electrical fusing irons are of course brought to the proper temperature before starting the machine. Such temperature may in certain cases be from 400 to 600° F. as stated in the patent to E. J. Conley, 1,398,840. The lowermost package in the chute is advanced by the forward motion of the plunger 3 and passed under the plate 18, which serves to hold it down in position, to a point just above that occupied by the package 56 (Fig. 4). On the return stroke of the plunger the package drops to the position illustrated by 56 and during this drop the package is, to a certain extent, forced down and held by the member 19 attached to the plate 18 which is, at this point, actuated by the rod 22. On the next stroke of the plunger the lower portion 5 pushes the package, which is now in the position of 56, forward into the sheet of foil which has just been cut off by knives 41, 42. The package now moves forward with the sheet of foil, and at the same time another package is started from the bottom of the chute.

As the package moves forward into the sheet of foil the latter is of course wrapped around its advancing end and is thereupon folded over on the narrow sides by contact with the member 58, which is preferably of felt and serves to smoothly fold down the foil. The roller 64 keeps the unfolded sheet unwrinkled and smooth by its rolling action induced by the passing of the package. As the advancing package approaches the member 61 the lower extending edge of the foil sheet is gradually raised and folded up against the narrow side of the package as seen in Fig. 8. The curved surface of 58, denoted by 59′, regulates the extent of upward turning of the lower fold as shown in Fig. 9. During this movement the hinged plate 57 smoothes the upper side of the fold and holds the package down. As the latter advances, the upper extending edge of the foil denoted by 70 is forced downwardly by the folding member 69 and its associated parts and is caused to overlap the lower flap (see Fig. 10) on the outside of plate 61. The filleting between member 69 and plate 57′, and the curved edges of 69 materially assist to fold down the upper flap.

The package then is driven upon pivoted platform 72 where the plunger leaves it and moves back again to the right on its return stroke. The hinged plates 75 have already been dropped as the package moves onto 72. Thereupon the fusing irons are caused to move inwardly and respectively perform the fusing operation on the narrow sides of the package, according to the

principle set forth in the said patent to E. J. Conley. The end tuckers 94 move in just after the plunger 3 has withdrawn and while the irons 86 are still in contact with the foil. The first step of this folding is shown in Fig. 12 where the sides are folded in, thereby leaving top and bottom flaps. The tuckers 94 now withdraw and at about the same time the irons 86 are caused to leave the foil. The time of contact may be varied as may also the sequence of operations. Immediately thereafter the finger 103 moves upwardly to fold up the bottom flap (see Fig. 13). This motion, however, continues for a short distance in that the said finger 103 moves upwardly into the right-angled recess against the top flap. This operation is advantageous in folding down the upper flap in the subsequent operation as it avoids undesirable irregularities in the folds. As this last movement begins the plates 75 and irons 86 move away to their initial positions.

The rocker arm 73 now swings upwardly with the package, turning through about 90°, and during the turn the extending upper flap is folded down by the plate 128 as shown in Fig. 15. Fig. 16 shows the end of the turn about the pivot 74 just as the set screw 134 contacts with the abutment 133 and thus brings the turning movement to an end. This is immediately followed by a lateral movement to the left as shown in Fig. 17 by reason of the further action of the lever 124, thus bringing the package directly under the upper and vertical fusing iron 140. The latter at once descends and fuses the end flaps. The packages thus completed are moved along the guide-way 149 towards the left by virtue of the displacement caused by other packages being brought into position under arm 140 by the rocker arm. The packages may thereafter be wrapped with paper such as a label bearing cup or other material and are ready for the market. It is not necessary that the contents of the package be rigid, for they may contain yielding materials or objects like cigarettes.

It is evident that this machine may be used for wrapping packages with other materials than tin foil or relatively thin tin foil, since various parts may be disconnected, such as the fusing irons, and left out of the operation. The machine has, however, been particularly designed and is highly advantageous for the use of relatively thin metal foil such as tin foil having a thickness of less than 3/1000 of an inch, and it is therefore desired to briefly refer to some of the parts of the mechanism which function admirably and most usefully when such relatively thin foil is being used. It is at all times necessary to keep the foil smooth and to prevent accidents in wrinkling it by reason of its swift passage through the machine. Accordingly, there has been provided an oscillating roller mechanism 36 which maintains the foil centered in an extended condition at all times. Owing to the fact that the roller 36 is provided at its ends with pinions which move along racks and between guides, no irregularity of motion, such as an uneven tilting or a sidewise motion, is possible. When the foil is cut, the portion of it being cut is for the moment at rest. A soft roll 40 covered with rubber maintains the foil in a smooth condition during its downward course and prevents any sidewise shifting of the foil. The separated sheet of foil is of course unsupported in the guide-way and would drop if it were not for the immediate advance of the package which is unfailingly supplied by the advancing plunger, and is able to occupy its proper position by virtue of the forcing-down action of the member 19, together with the swinging plate 18. The plunger 3, having its face covered with a soft material such as felt, is rectangular in section having right-angled edges at the end 5 so that the rear portions of the foil which enclose the end 5 will be given the same shape, thus making a proper end folding operation possible without forming extra creases. The angle of the folding edge 61 and its curvature 62 are particularly designed for use with relatively thin foil as the folding must be done in a careful manner. This angle is of course not necessarily fixed at any particular degree of angularity, but will vary with different arrangements of the mechanism and with various types of foil and packages. Considerable space occurs between the roller 64 and member 61 to give the foil time to adjust itself.

The subsequent operations of fusing and folding are efficiently performed by this machine in view of the fact that the fusing members automatically move in at right angles to the surface of the package to be treated, and therefore no displacement of the foil will take place, the package being, in fact, firmly gripped by the upper gripping plates. The folding fingers 94 are so positioned as to neatly and quickly fold in the sides in such a manner that unnecessary wrinkling will not occur while the lower finger 103 moves upwardly. The end sealing operation is also done at right angles to the surface of the package, and thus it will be seen that throughout the entire course of the operations the package is firmly held and quickly treated without subjecting the foil to any strain whatever. Without the use of such mechanism as has been described, it is not possible to handle relatively thin foil (of less than 3/1000 of an inch in thickness) without so badly tearing and wrinkling it that the completed package would be unmarketable. This machine not

only efficiently performs all its intended operations, but it furnishes a package which is absolutely hermetically sealed. The resulting package is proof against atmospheric deterioration and the ingress of bacteria. It is also proof against loss of aroma and moisture from the contents of the package. It will therefore be seen that this machine has in a practical way accomplished the actual hermetic sealing of packages with relatively thin foil in an efficient manner and with such speed that the process can be run with commercial success.

As many apparently widely different embodiments of this invention may be made without departing from the spirit thereof, it is to be understood that we do not intend to limit ourselves to the specific embodiment thereof except as indicated in the appended claims.

We claim:

1. A machine for the purpose described comprising the combination of means for advancing a package into a sheet of foil, means for folding the foil against the package to provide overlapping edges, and fusing irons positioned to move against the said foil edges after the package has left the said folding means.

2. A machine for the purpose described comprising the combination of means for advancing a package into a sheet of foil, means for folding the foil against the package to provide overlapping edges, and fusing irons positioned to move at right angles against said foil edges while the package is at rest and after it has left said folding means.

3. A machine for the purpose described comprising the combination of means for folding a package with a foil sheet to provide overlapping edges, fusing irons positioned to move against said foil edges after the package has left said folding means, folding fingers adjacent said irons to form flaps, means to rotate the package through a quadrant, and fusing means to seal the said flaps of foil.

4. A machine for the purpose described comprising the combination of means for advancing a package along a bed, means for providing a foil sheet, folding means on said bed to provide overlapping foil edges, fusing means at the end of the bed for fusing said edges, means for forming flaps, means for rotating the package through a quadrant, and fusing means for thereupon fusing said flaps together.

5. A machine for the purpose described comprising the combination of a bed or surface and means for advancing a package along it, means for positioning a sheet of foil in the path of said package, means for folding the foil around the package to provide overlapping edges, means for fusing the latter while the package is at rest, means for folding the foil to provide flaps at the end of the package, and means for fusing said flaps while the package is at rest.

6. A machine for the purpose described comprising the combination of a bed or surface and means for advancing a package along it, means for positioning a sheet of foil in the path of the package, means for folding the foil around the package to provide overlapping edges, means for fusing the latter while the package is at rest, means for folding the foil to provide flaps at the end of the package, means for rotating the package through an angle, and means for fusing the end flaps of the package while at rest.

7. A machine for the purpose described comprising the combination of a bed or surface and means for advancing a package along it, means for positioning a sheet of foil in the path of the package, means for folding the foil about the package to provide overlapping edges, a movable platform on the end of the bed, fusing means and means for moving the latter against the overlapping edges while at rest on the platform, means for folding the foil to provide end flaps, means for moving the platform, and means for fusing the end flaps.

8. A machine for the purpose described comprising the combination of a bed or surface and means for advancing a package along it, means for positioning a sheet of foil in the path of the package, means for folding the foil about the package to provide overlapping edges, a movable platform at the end of the bed, fusing means and means for moving them against the overlapping edges while at rest, means for folding the foil to provide end flaps, means for rotating the platform through an angle, and means for fusing the end flaps while the package is at rest.

9. A machine for the purpose described comprising the combination of a bed or surface and means for advancing a package along it, means for positioning a sheet of foil in the path of the package, means for folding the foil around the package to provide overlapping edges, fusing irons positioned to move in at right angles against the foil edges after leaving said folding means, laterally moving fingers for forming end flaps, means for folding down the end flaps, and a fusing iron for sealing them after the folding operations are completed.

10. A machine for the purpose described comprising the combination of a bed or surface for moving a package along it, means for positioning a sheet of foil in the path of the package, means for folding the foil around the package to provide overlapping edges, means for fusing the latter, laterally movable fingers for forming flaps at the end

of the package, a vertical finger movable upwardly to fold up the bottom end flap, means for moving the package, means for folding down the top end flap during said motion, and means for sealing the end flaps by fusion when the motion has been completed.

11. A machine for the purpose described comprising the combination of a bed or surface and means for advancing a package along it, means for positioning a sheet of foil in the path of the package, means for folding the foil around the package to provide overlapping edges, means for fusing the latter to the package, laterally movable fingers for forming end flaps, an upwardly movable vertical finger for folding up the bottom end flap, means for moving the package through an angle, means for folding down the upper end flap during said motion, and means for fusing the end flaps at the termination of said motion.

12. A machine for the purpose described comprising the combination of a bed or surface and means for advancing a package along it, means for positioning a sheet of foil in the path of the package, means for folding the foil around the package to provide overlapping edges, a pivoted platform at the end of the bed, fusing means and means for moving them against the overlapping edges while the package is at rest on the platform, laterally movable fingers for forming end flaps, a vertical movable finger for folding up the bottom end flap, means for rotating the platform about its pivot to a vertical position, means for folding down the upper end flap during said rotation, and means for fusing the end flaps when said rotation has been completed.

13. A machine for the purpose described comprising the combination of a bed or surface and means for advancing a package along it, means for positioning a sheet of foil in the path of the package, means for folding foil around the package to provide overlapping edges, a pivoted platform at the end of the bed, fusing means and means for moving them against the overlapping edges while the package is at rest, laterally movable fingers for forming end flaps, a vertical finger movable upwardly for folding up the bottom end flap, means for moving the vertical finger upwardly and outwardly, means for rotating the platform to a vertical position, means for folding down the upper end flap comprising a hinged plate positioned to contact with the upper end flap during rotation, means for moving the platform sidewise under the fusing means, and means for moving the latter down upon the end flaps to fuse them while the package is at rest.

14. A machine for the purpose described comprising the combination of a horizontal bed or surface and means for advancing a package along it, means for moving a sheet of foil into the path of the package, means for folding the foil against the package to provide overlapping edges, means for sealing the latter by fusion at the end of the bed, means for elevating the package, means for forming end flaps, and means for sealing them by fusion.

15. A machine for the purpose described comprising the combination of means for feeding forward a sheet of foil into a vertical position, means for severing a suitable sheet of foil, means for immediately advancing a package into the severed sheet, means for holding the sheet around the package to provide overlapping edges, and means to seal them by fusion after the folding operation.

16. A machine for the purpose described comprising the combination of a horizontal bed or surface and means for advancing a package long it, means for feeding forward a sheet of foil into a vertical position in said path, means for severing a suitable sheet of foil, means for immediately thereafter advancing a package into said vertically positioned sheet, means for folding said sheet around the package to provide overlapping edges, and means for sealing them by fusion at the end of said bed.

17. A machine for the purpose described comprising the combination of a horizontal bed or surface and means for advancing a package along it, means for feeding forward a sheet of foil into a vertical position in said path, means for severing a suitable sheet of foil, means for immediately thereafter advancing a package into said vertically positioned sheet, means for folding said sheet around the package to provide overlapping edges, and means for sealing them by fusion while the package is at rest.

18. A machine for the purpose described comprising the combination of means for folding a sheet of foil around a package to provide overlapping edges and end flaps, fusing irons positioned to move in against the package along said edges directly after they are formed, means for folding the end flaps, and a fusing iron positioned to move against said end flaps after they are folded.

19. A machine for the purpose described comprising the combination of means for wrapping a sheet of foil around a package to provide overlapping edges and end flaps, means for sealing the overlapping edges by fusion while the package is at rest, means for moving the package, and means for thereupon fusing the end flaps while the package is at rest.

20. A machine for the purpose described comprising the combination of means for folding a sheet of foil around a package while it is advancing in a horizontal position to provide overlapping edges, means to fuse said overlapping edges while the pack-

age is at rest in a horizontal position, means for forming end flaps, means for bringing the package into a vertical position and folding the end flaps, and means for sealing the latter by fusion when the package has come to rest in a vertical position.

21. A machine for the purpose described comprising the combination of a bed or surface and means for advancing a package along it, means for severing and positioning a sheet of foil in the path of the package, means for folding the foil around the package to provide overlapping edges, means for preventing the bottom part of the foil sheet from being distorted during the formation of the bottom side flap, and means for sealing the overlapping edges.

22. A machine for the purpose described comprising the combination of a bed or surface and means for advancing a package along it, means for severing and positioning a sheet of foil in the path of the package, means for folding the foil about the package to provide overlapping edges, a roller positioned over the bottom part of the foil sheet and actuated by the forward motion of the package so as to keep the foil sheet unwrinkled, and means for sealing the overlapping edges by fusion.

23. In a machine for wrapping and sealing metal foil, means for delivering and severing a sheet of foil, means for wrapping it around a package as it advances, and electrically heated fusing irons mounted for reciprocal motion at right angles to the sides of the package to fuse the overlapping edges thereof.

24. In a machine for wrapping and sealing metal foil, means for delivering and severing a sheet of foil, means for wrapping it around a package as it advances, electrically heated fusing irons mounted for reciprocal motion at right angles to the sides of the package to fuse the overlapping edges thereof, and a fusing iron at right angles to the aforesaid fusing irons and above them for fusing the end flap of the package.

25. In a machine for wrapping and sealing metal foil, means for advancing a package, means for severing and delivering a sheet of foil for said package, means for wrapping the foil around said package, and electrically heated fusing irons mounted at right angles to the sides of the package at the end of its line of advance for fusing overlapping edges of the foil.

26. In a machine for wrapping and sealing metal foil, a horizontal bed along which packages advance, a plunger for causing the packages to advance, and a hinged plate mounted above the forward end of the plunger for riding over the packages, said plate being provided with a holding strip operating to force the packages off the end of the plunger near the end of its movement and preventing displacement of the package prior to its forward movement by the plunger.

27. In a machine for wrapping and sealing metal foil, a bed along which packages are advanced, a plunger for advancing them, a hinged plate having a holding strip thereon mounted above the line of advance near the forward end of the plunger, and actuating means for the plate operated by the plunger near the end of its stroke for causing the strip to positively force down the package off the plunger into position for the next forward movement.

28. In a machine for wrapping and sealing metal foil, a horizontal bed along which packages advance, means for causing the packages to advance, means to prevent the packages from moving upwardly off the bed during said advance, said latter means being provided with a holding strip operating to force the packages off the end of the advancing means near the end of its movement and preventing displacement of the package prior to its forward movement.

29. In a machine for wrapping and sealing metal foil, a bed or surface along which packages to be wrapped are moved, means for supplying a severed sheet of foil at right angles to said surface, folding means mounted upon said bed in advance of the foil sheet comprising inclined members positioned at the sides of the package as it advances, and also positioned relatively far from the place of severance and depending members adjacent said inclined members and also mounted at an angle to the said surface.

30. In a machine for wrapping and sealing metal foil, a bed or surface along which a package to be wrapped is advanced, means for supplying a severed sheet of foil for the wrapping of the package, a preliminary folding means for folding the edges of the sheet against the sides of the package, and inclined folding members on the sides of the advancing package and positioned relatively far from the preliminary folding means in order to give the foil time to fold without wrinkling.

31. In a machine for wrapping and sealing foil, a bed along which a package to be wrapped is moved, a vertical passage through which a sheet of foil is lowered for the package, means for folding the foil about the package, and means for keeping the unfolded lower portion of the foil smooth and unwrinkled during the forward advance of the package.

32. In a machine for wrapping and sealing metal foil, a bed along which a package to be wrapped is moved, a vertical passage through which a sheet of foil is lowered for the package, means for folding the foil about the package, and a roller in the plane of the vertical passage and positioned at the

said bed for maintaining the lower part of the foil sheet in a smooth and unwrinkled condition as the package advances.

33. In a machine for wrapping and sealing foil, a bed or surface along which a package to be wrapped is moved, a vertical passage through which a sheet of foil is lowered through the bed, the latter having a rounded edge at the forward part of the passage, a roller positioned adjacent said rounded edge for holding down the lower part of the foil sheet to prevent wrinkling and unnecessary folding, said roller being held against said foil by the forward motion of the package.

34. In a machine for wrapping and sealing metal foil, means for advancing a package, means for delivering and severing a sheet of foil for the package, means for wrapping the foil around the package, and electrically heated fusing irons mounted at right angles to the line of advance of the package and movable inwardly against overlying flaps of the package to fuse them as the package comes to rest adjacent said fusing irons.

35. In a machine for the purpose described, a preliminary folding means for folding the extending edges of a sheet of foil against a package, a folding device relatively far from the said preliminary folding means and comprising a surface on which a package advances, laterally inclined plates whose forward portions curve downwardly, an upper plate, depending lateral plates having curved edges similar to and adjacent said curved portions, said depending plates being spaced outwardly from the lower plates to allow foil to pass between them.

36. In a machine for the purpose described, a folding device comprising a surface on which a package advances, laterally inclined filleted plates whose forward portions curve downwardly, an upwardly yieldable upper plate, depending lateral filleted plates having curved edges similar to and adjacent said curved portions, said depending plates being spaced outwardly from the lower plates to allow foil to pass between.

37. In a machine for the purpose described, the combination of means for wrapping a package in a sheet of foil to provide overlapping edges of foil, means to fuse said edges to provide a hermetic seal by a movement of fusing means perpendicular to the sides of the package while the latter is at rest, means to form end flaps, and additional means to fuse them.

38. In a machine for the purpose described, a folding device comprising a surface on which a package advances, means for inserting a foil sheet across said surface, a movable rod on a level with said surface and near said foil sheet, and folding means comprising inclined lateral plates positioned in advance of the rod a sufficient distance so that when the forward end of the foil begins to encounter the lateral plates the rear end is passing from under the rod.

39. In a machine for wrapping and sealing metal foil, means for delivering and severing a sheet of foil, means for wrapping it around a package as it advances, and electrically heated fusing irons positioned in the line of advance of the package and movable at right angles to the package while it is at rest.

40. In a machine for the purpose described, means for advancing a package along a bed, means for supplying a foil sheet in the path of the package, lateral folding means for folding overlapping edges at the side of the package, upper holding plates at the end of the bed, means for dropping them before the arrival of the package and means for retracting them thereafter, fusing means for fusing the overlapping edges, and means for folding and fusing the flaps at the rear end of the package.

41. In a machine for the purpose described, the combination of means for advancing a package along a bed or surface, means for supplying a sheet of foil in the path of the package, lateral folding means for folding the sides of the package, upper holding plates at the end of the bed or surface, means for dropping them in advance of the arrival of the package, means for simultaneously advancing fusing irons and lateral folding fingers, means for withdrawing said fingers and raising the lower folding finger, means for releasing the irons and holding plates, means for raising the package and folding the upper flap, and means for fusing said flaps.

42. A machine for the purpose described comprising the combination of means for folding a sheet of foil around one end of the package to provide overlapping edges, means for folding the foil against the other end of the package to form flaps, and means for fusing all of said overlapping edges and flaps to provide a hermetic seal.

43. A machine for the purpose described comprising the combination of means for engaging the center portion of a sheet of foil with one end of a package, means for folding and sealing the foil about the sides of the package, means for folding edges of the sheet of foil about the other end of the package, and means for fusing said latter edges on said latter end of the package.

44. A machine for the purpose described comprising the combination of means for engaging the center portion of a sheet of foil with one end of a package and for folding the foil about the sides of the package, means for folding edges of the sheet of foil about the other end of the package, and

means for fusing all of the flaps and edges to provide a hermetic seal.

45. A machine for the purpose described comprising the combination of means for relatively advancing a package into a sheet of foil, means for folding the foil against the package to provide overlapping edges and flaps, and means for fusing the flaps and overlapping edges.

46. In a machine for wrapping and sealing metal foil, a bed or surface along which packages to be wrapped are moved, means for supplying a severed sheet of foil at right angles to said surface, folding means mounted upon said bed in advance of the foil sheet comprising inclined members positioned at the sides of the package as it advances, and also positioned relatively far from the place of severance.

47. In a machine for the purpose described, means for providing a sheet of foil for a package, means for folding the foil about the package to provide overlapping edges, means for sealing said overlapping edges by fusion, and means for holding the package in a fixed position while said sealing operation takes place.

48. In a machine for the purpose described, means for providing a sheet of foil for a package, means for folding the foil about the package to provide overlapping edges, means for sealing the overlapping edges by fusion, and a movable plate to grip and hold fixed the package while the sealing means is performing the fusing operations.

In testimony that we claim the foregoing, we have hereunto set our hands this 26th day of April, 1922.

EDWIN JEROME CONLEY.
EDWARD JAMES WHALEY.