

June 12, 1956

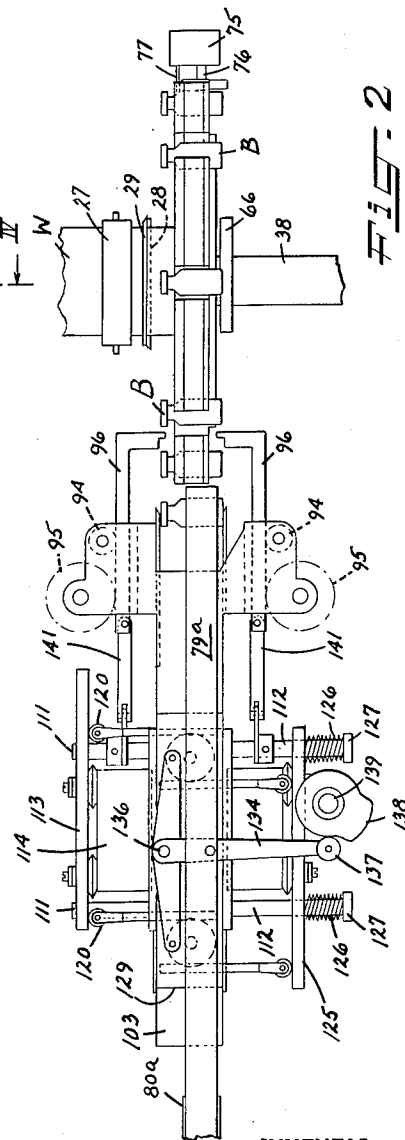
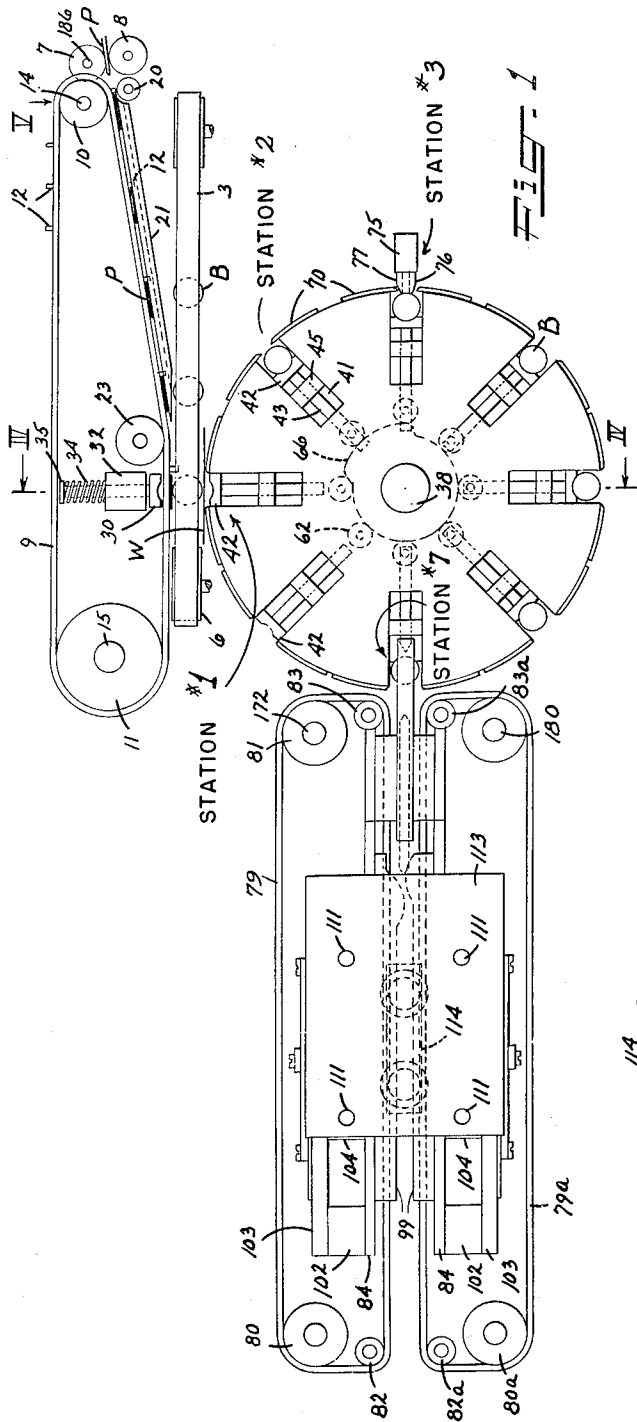
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ARTICLE-PACKAGING APPARATUS

Original Filed Oct. 16, 1951

5 Sheets-Sheet 1



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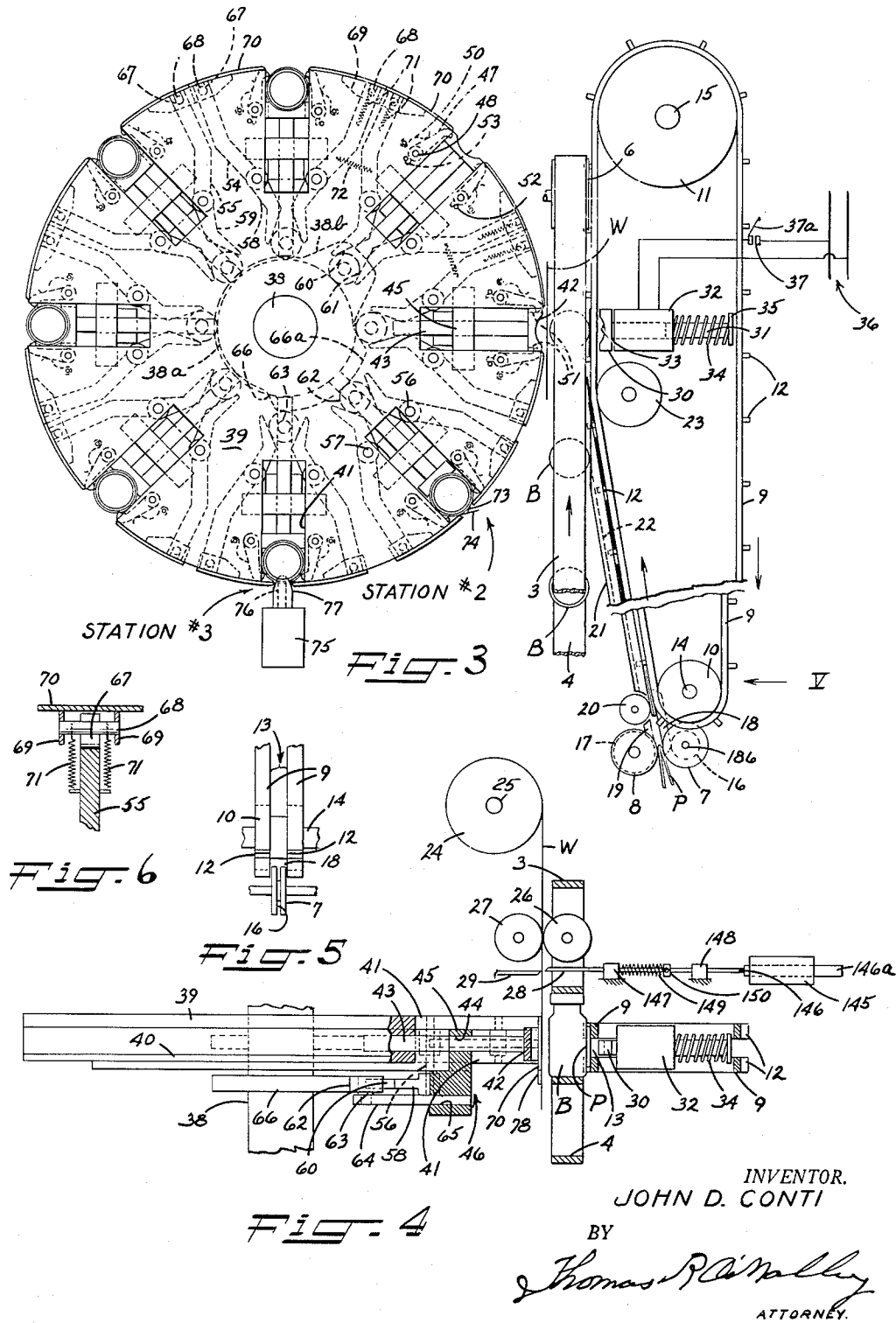
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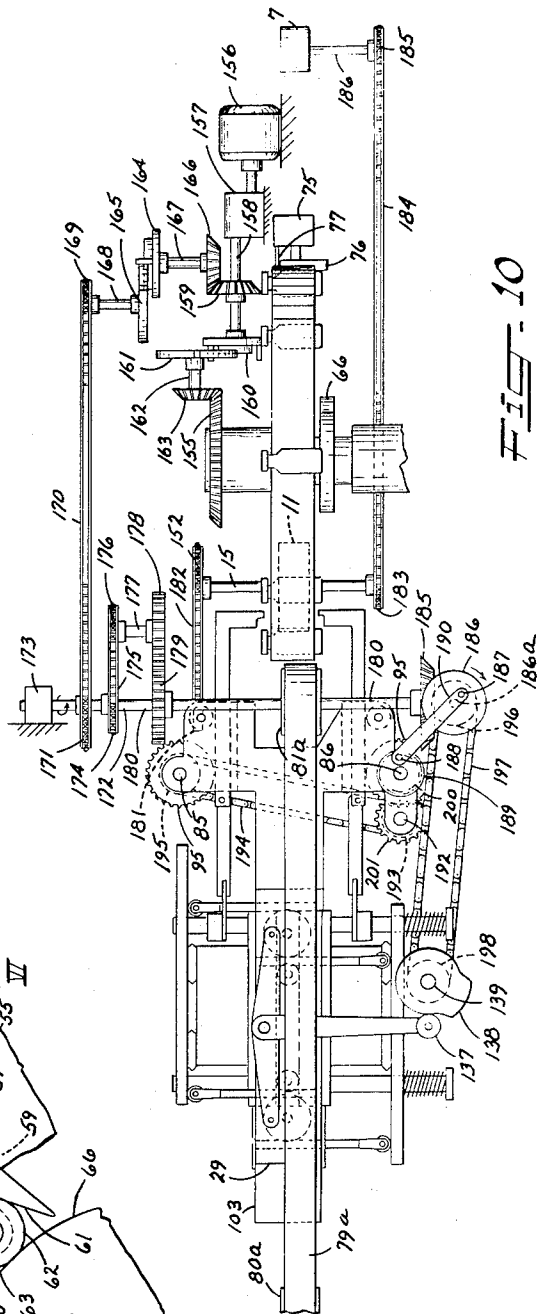
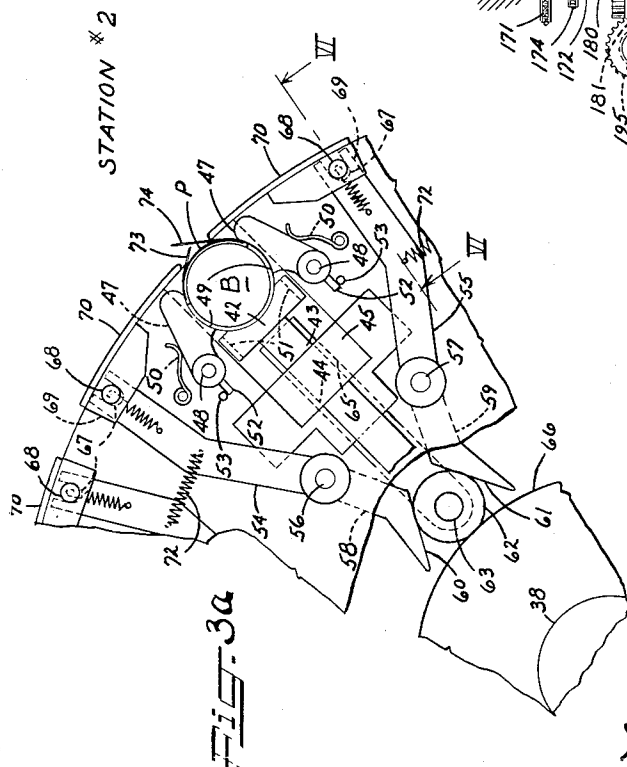
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ARTICLE-PACKAGING APPARATUS

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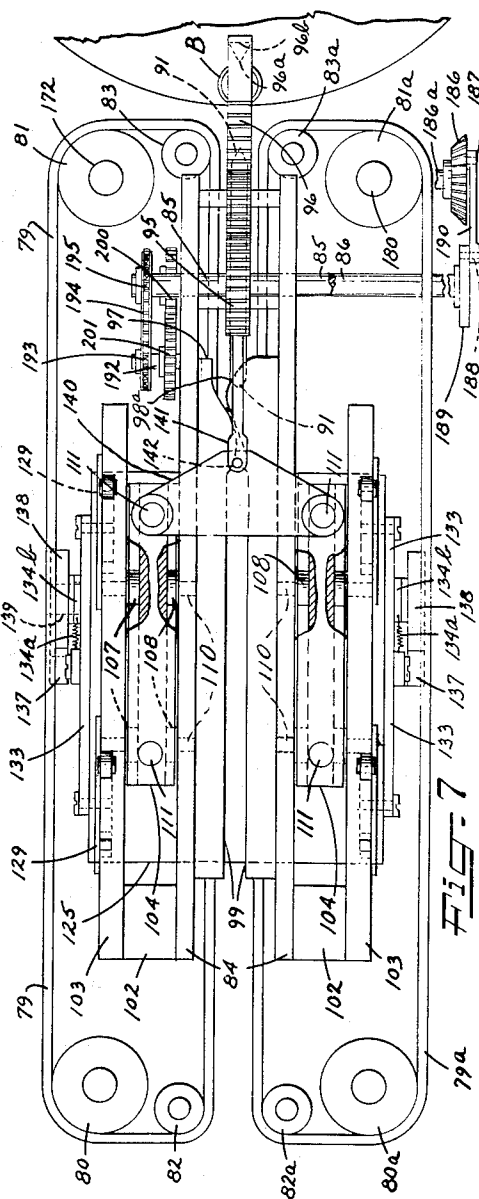
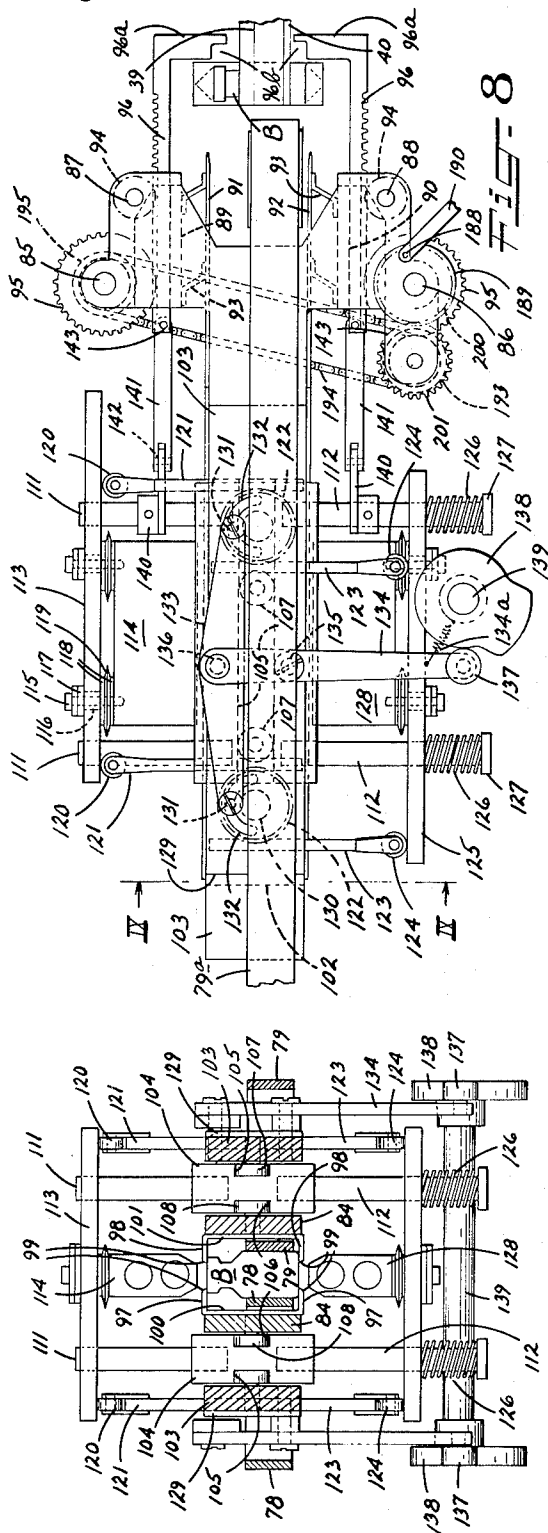
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9-10-11

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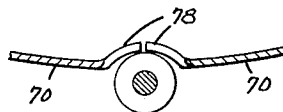
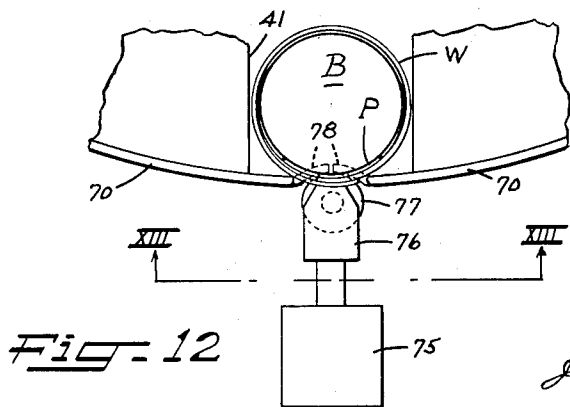
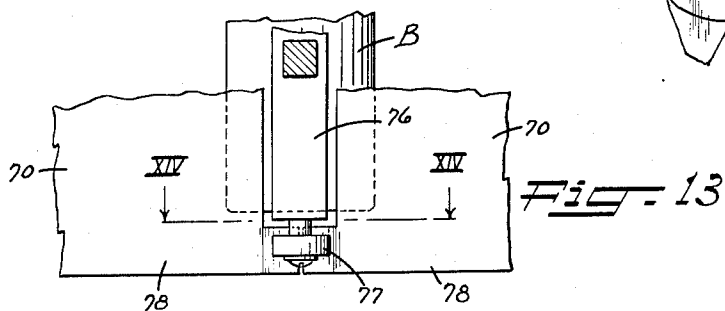
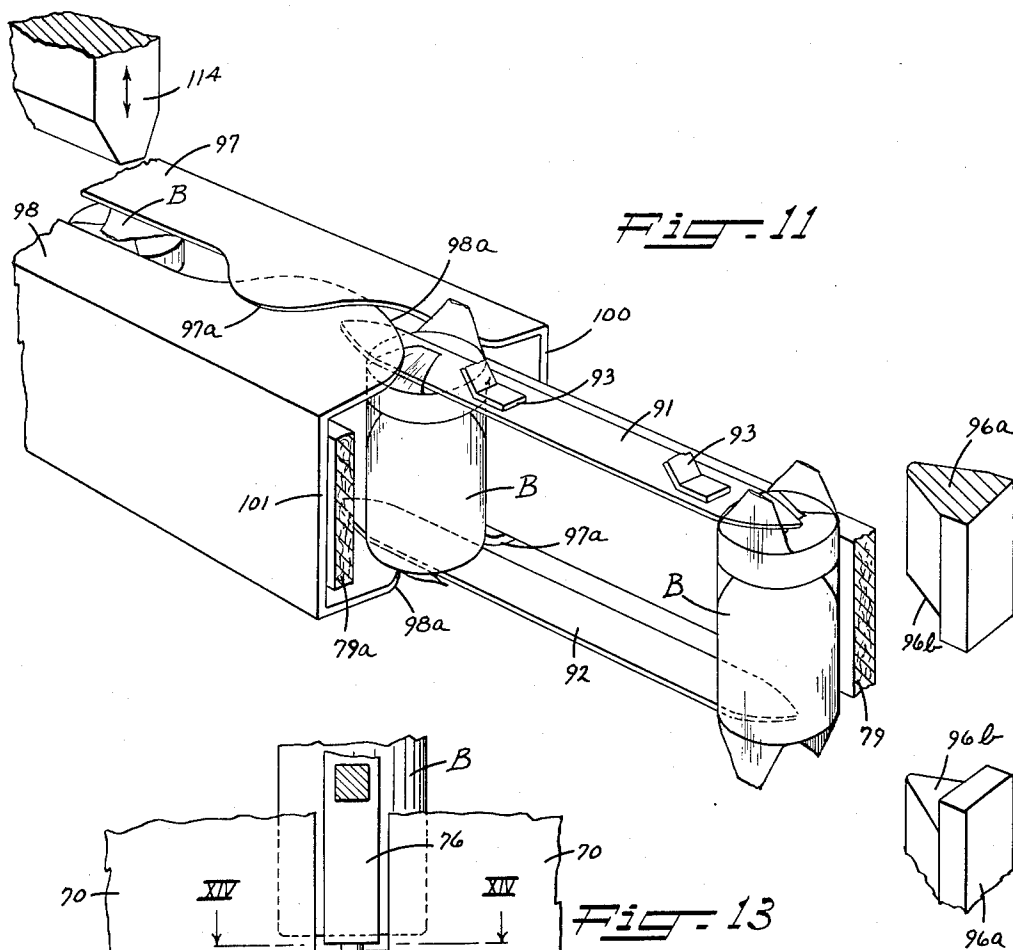
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1

2,749,692

ARTICLE-PACKAGING APPARATUS

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Original application October 16, 1951, Serial No. 251,511.
Divided and this application November 8, 1951, Serial No. 255,485

6 Claims. (Cl. 53—234)

This application relates to an apparatus for wrapping packages and is particularly concerned with an automatic and high-speed system for wrapping a booklet with a package to which it relates, such as a folded leaflet or pamphlet providing instructions for dealing with the contents of the package. This application is a division of application Serial No. 251,511, filed October 16, 1951 and now abandoned.

It is an object of the present invention to provide a high-speed automatic system for wrapping packages, particularly those of the type hereinabove mentioned, in an efficient manner. Other objects and advantages of the invention will be apparent from the drawing and the description thereof hereinafter.

In the drawing, which is illustrative of the invention,

Figure 1 is an overall plan view with certain of the driving connections omitted,

Figure 2 is a side elevation,

Figure 3 is an enlarged plan view of the right half of Figure 1,

Figure 3a is an enlarged view of a portion of the turret,

Figure 4 is an end view and partial cross-section taken along line IV—IV of Figure 2,

Figure 5 is an elevation view of the pamphlet feeding system looking in the direction of the arrow V (Fig. 1),

Figure 6 is a section of a detail on line VI—VI of Figure 3a,

Figure 7 is an enlarged plan view of the left half of Figure 1, partly sectioned,

Figure 8 is a side elevation of the portion of the mechanism shown in Figure 7,

Figure 9 is an end elevation with a portion in section taken on line IX—IX of Figure 8,

Figure 10 is a general view showing driving connections.

Figure 11 is an enlarged perspective, partly sectioned, showing details of the end feeding and wrapping structure,

Figure 12 is an enlarged fragmentary detail of the side sealing structure,

Figure 13 is a view of Figure 12 seen at XIII—XIII, and

Figure 14 is a fragmentary sectional detail as seen at XIV—XIV in Figure 13.

In the embodiment of the invention hereinbelow described, it is specifically provided with means for associating a pamphlet with a bottle, vial, or other package so that the leaflet is wrapped simultaneously with the bottle or the like in a common outside wrapper. However, it is to be understood that the invention may be employed for wrapping the bottle or other article alone in which case the means for introducing the leaflet may be omitted.

While the cross-section of the bottle shown is round, slight modifications may be made to wrap bottles or packages of other cross-sections, such as square, rectangular,

2

oblong, and the like. Any suitable heat-sealing wrapping material may be used, such as films or sheets of a rubber hydrochloride or other derivative, sheets of thermoplastic resins, regenerated cellulose or paper base sheets provided with suitable heat-sealing coatings which may, if desired, be moistureproof coatings, such as regenerated cellulose films or paper carrying coatings of a thermoplastic resin, such as polyethylene, saran, or rubber hydrochloride, such heat-sealing coatings being anchored to the base sheet, if desired, by an intermediate coating or sub-coating of ureaformaldehyde or melamine-formaldehyde resins.

In general, the invention comprises means for delivering the article to be wrapped into proximity to a rotating turret comprising a plurality of circumferentially-spaced recesses for receiving the wrapper and article, means for feeding a strip of wrapping material between the article and the turret, means for pushing the article against the wrapper into holding means on the turret at the receiving station. When a pamphlet or leaflet is to be associated with the article, it is fed into proximity with the article on the side thereof opposite to that adjacent the wrapper sheet and the pamphlet is pushed with the article and the wrapper into the holding means of the turret at the article-receiving station. The turret receiving the article and wrapper rotates on its axis and during such rotation, the side flaps are overlapped to completely enclose or embrace the lateral periphery or surface of the article with or without the pamphlet thereagainst. After thus being embraced, the overlapped areas are pressed with a heated shoe to effect sealing along the side of the article. This sealing may be continuous throughout the entire length of the overlapped areas or it may be limited to only one or several portions of such overlapped areas as will appear hereinafter. After the wrapper has thus been sealed at the side, the turret rotates to a discharging station in proximity to a conveying system for feeding the articles between devices for folding the ends, that is, the top and bottom ends in the case of an upright article, and then to sealing means for applying heat and pressure to the folded portions at the ends of the article.

Article conveying or feeding means

Means is provided for delivering or feeding the articles to the receiving station of the rotary turret. This feeding means comprises belts 3 and 4. The lower reach of belt 3 engages the top of the article such as the bottle B and the upper reach of the lower belt 4 engages the bottom of bottle B. The belts 3 and 4 proceed about pulleys at their ends, such as pulley 6. One of the pulleys associated with each belt is driven either continuously or in intermittent steps by driving means which will be described hereinafter and which may comprise any conventional driving means.

Pamphlet feeding means

When pamphlets P are to be associated with the articles B, they are fed by means of rollers 7 and 8 into engagement with a pair of belts 9 which run side by side about pulleys 10 and 11 and may have a plurality of outer projections 12 spaced apart at least the distance, and preferably greater than the distance, occupied by the pamphlet as it reaches the belts 9. The pulleys 10 and 11 are spool-shaped as indicated in Figure 5 to provide a space 13 between their reaches. Pulleys 10 and 11 are mounted on shafts 14 and 15 respectively, and one of them, such as 15, may be driven continuously or in intermittent steps as will be described hereinbelow. The rollers 7 and 8 are grooved as at 16 and 17 respectively and fixed guide bars 18 and 19 are disposed so that they extend partially into the grooves 16 and 17 and serve to guide

3

the folded pamphlet from the feed rolls 7 and 8 into the nip between belts 9 and idler roll 20. A guiding plate 21 provided with a pair of grooves 22 to receive the projections 12 serves to guide the pamphlets as the projections on the belts 9 push them to the bottles B adjacent the turret-receiving station. An idler roll 23 deflects the belts 9 into a path which extends substantially parallel to the direction of travel of belts 3 and 4 carrying the bottles B so that the pamphlet is brought into engagement with one surface of the bottle with which it is to be wrapped as it approaches the receiving station of the wrapping turret.

Wrapper feed

A continuous sheet of wrapping material W may be fed from a supply 24 (Fig. 4) consisting of a wound roll thereof mounted rotatably on a shaft 25. The wrapper sheet is delivered to the receiving station of the turret in a direction extending at right angles to the direction of delivery of the bottles to such receiving station. The wrapper is fed in this direction by the nip rollers 26 and 27 which are arranged above the receiving station and in such a position that the wrapper fed downwardly thereby is just outside the periphery of the turret and between its periphery and the bottle. A reciprocating knife 28 is arranged to cooperate with a stationary blade 29, both being disposed between the feed rolls 26, 27 and the turret. The rolls 26 and 27 may be driven continuously or in intermittent steps, as desired, by any conventional mechanism such as described hereinbelow and the reciprocating knife may be driven by continuous driving means or intermittently as will be described hereinbelow.

Turret feeder

Between the opposite reaches of the two belts 9, there is disposed a reciprocable plunger 30, the plunger rod 31 attached to which is slidably mounted in a stationary sleeve within a solenoid 32 stationarily mounted on a suitable frame. The outer face of the plunger 30 may be shaped in a contour, such as the arcuate contour shown at 33, which is complementary to that of the article being wrapped, in this case the bottle B. The plunger 30 is normally urged into the position shown by means of a spring 34 which bears against one end of the casing of the solenoid 32 and one face of a collar 35 fixed on the rod 31. It will be noted (see Fig. 4) that the plunger 30 and rod 31 are narrow enough to fit in the space 13 between the two belts 9 so that it may be reciprocated through such space without interfering with the belts.

Rotating turret

The rotating turret is driven continuously or preferably intermittently about or on a fixed shaft 38 and comprises two parallel plates 39 and 40 driven rotatably about the fixed shaft 38 (see Fig. 4). Each of the plates is provided with a plurality of radial slots 41. Within the way or recess thus provided, a piston 42 is slidably mounted. The piston has a piston rod 43 which extends through a bore 44 in a portion 45 of a stationary block 46. The main part of block 46 extends below the plate 40 and is secured thereto in fixed position. The portion 45 of block 46 projects upwardly through the slot 41 of plate 40. A pair of gripping or holding lugs 47 (Fig. 3a) are pivotally mounted on pins 48 extending between the plates 39 and 40 on each side of the slots 41 therein. The outer ends of the lugs 47 are rounded so that the bottle or article being pushed into the slots 41 may swing the lugs aside by cam action. At an intermediate portion of the lug, there is a curved surface 49 which is complementary to the surface of the bottle or other article and is adapted to grip the periphery of such article and hold it in position. Leaf springs 50 urge the lugs into the position shown in Figure 1 wherein a portion of the outer ends thereof projects into slots 51 in the opposite sides of the piston 42 so that the piston is relatively slidable with respect thereto. The lugs 47 have pins 52 extending from

4

the hubs thereof. Pins 52 engage detent pins 53 secured to one or both of the plates 39 and 40 for limiting the swing of the lugs toward each other.

There is disposed between plates 39 and 40 and on either side of the recess therein provided by the slots 41 a pair of arms 54 and 55 which are pivotally mounted on pins 56 and 57 respectively which extend through suitable bores in the plates 39 and 40 and project beyond the plate 40 to positions where they are fixed rigidly to arms 58 and 59 respectively. Arms 58 and 59 are provided with opposed cam surfaces 60 and 61 which bear upon a roller 62 mounted on a stub shaft 63 secured in a rod 64 which is slidably mounted in the bore 65 of the stationary guide block 46. The rollers 62 ride on cam 66 which is fixed stationarily, such as on the shaft 38. The outer ends of arms 54 and 55 are slotted as at 67 and the slots receive cross pins 68 which are fastened at their ends in the side plates or lugs 69 which extend inwardly from the outer wrapper folding plate 70. The folder plates 70 are curved to the circular contour of the outer periphery of plates 39 and 40 and they slide over such peripheries in response to the action of the cam 66. As shown in Figure 6, one or two springs 71 may be provided on either side of the lever 55 and connected to the pin 68 for urging the pin 68 radially inward thereby holding the folding plate 70 against the periphery of plates 39 and 40.

A spring 72 is provided between the adjacent arms 55 and 54 of adjacent stations of the turret. These springs serve to urge plates 70 into the position shown at the article-receiving station of the turret where they are completely retracted to leave the slots 41 open to receive a bottle B.

The turret is rotated either intermittently or continuously, preferably the former, by means and in a manner which may comprise conventional elements, such as described hereinbelow. Figures 1 and 3 show a turret comprising eight stations, one being disposed opposite the plunger 30 so that it is adapted to receive one of the articles, such as bottle B, when the plunger 30 is actuated. Thus, plunger 30 pushes a bottle B and pamphlet P against the piston 42 which is thereby depressed into the position shown in the next station in a clockwise direction from the receiving station. As the bottle B is pushed into this position, the lugs 47 are momentarily pushed aside until the maximum diameter of the bottle has passed the outer curved ends of the lugs, after which springs 50 urge the lugs into the gripping engagement shown in the second station (see especially Fig. 3a). In this position, the wrapper has been brought around the pamphlet P and the outer ends of lugs 47 press the wrapper against the opposite lateral extremities of the pamphlet and these in turn against the bottle. Furthermore, during the movement of the turret from the receiving station to the second station referred to, follower roll 62 is forced up on the rise 66a of cam 66. The roll 62 engages cam surfaces 60 and 61 which are differently contoured so that the folding plate 70 carried on arm 54 is caused to engage the wrapper first and to lay one edge of the wrapper at 73 against the pamphlet P, after which the shoe 70 associated with lever 55 lays the other edge 74 around the first edge (Fig. 3a).

Side sealing means

The turret then rotates the package having the overlapped wrapper edges 73 and 74 into proximity with the side sealing assembly at the third station. At this station, a stationary support 75 carries a reciprocable heating shoe or element 76. This element 76, which may be heated in any way desired, such as by an electric heating coil, is rigidly secured through an insulating material to a cam follower or element 77. This element 77 is displaced to the side of the turret a distance sufficient to escape engagement by the package, in this case the bottle B, but is adapted to be engaged by the projecting ends 78 (Figs. 2, 4, and 10) of the shoes 70. Because of this engagement, when the turret rotates, the plate 70 moves the

5

cam element 77 radially outwardly from the turret and of course moves the shoe 76 out of engagement with the package just sealed. As the next package to be sealed reaches the third station, however, the cam element 77 enters the space between the opposed edges of plates 70 and allows the heating shoe 76 to press against the overlapped wrapper edges, thereby sealing the wrapper along the side of the package. As stated previously, the shoe 76 may extend continuously along the overlapped edges or it may extend along only one or more portions of such overlapped edges.

As the turret rotates from the heat-sealing station, the follower roll 62 descends from the rise 66a of the cam 66 so that the folding plates 70 are moved back out of the way of the article in the recess defined by slots 41. At one of the subsequent stations, such as at station #7, the thus side-sealed package is discharged. A cam 38a fixed on the stationary shaft 38 causes the piston 42 to move outwardly into the position shown in stations #8 and #1. This is effected as the foot of piston rod 43 passes over rise 38b (Fig. 3).

End folding and sealing

There is disposed, opposite the discharge station of the turret, end-folding and sealing means and means for conveying the package into the folding and sealing means. The conveying means also serves to discharge the package from the turret and leaves the elements at this station of the turret in readiness to proceed to the article-receiving station (station #1).

The conveying means comprises a pair of belts 79 and 79a, each of which is mounted upon suitable rollers and pulleys 80, 81, 82 and 83 for belt 79 and pulleys 80a, 81a, 82a, and 83a for belt 79a. One of the pulleys in each set, such as 81 and 81a, may be driven intermittently or continuously in conventional manner as will be described hereinbelow. They are driven so that the immediately opposed reaches proceed in the same direction away from the discharging station of the turret. Adjacent each inner course of these belts and spaced between the inner and outer courses thereof, there is provided a stationary upright supporting plate 84 which extends generally horizontally in the direction of its length but has at the right end as viewed in Figure 8 a transverse upright cross-piece. Shafts 85, 86, 87, 88, and 192 extend between the extremities of the cross-pieces of the supporting plates 84. Horizontal plates 89 and 90 also extend between cross-pieces of the plates 84 and rigidly interconnect them. The plates 89 and 90 support an upper folder plate 91 and a lower folder plate 92 by suitable brackets 93. Preferably, the folder plates 91 and 92 are gently curved at their ends to a central point as shown in Figure 7.

Shafts 87 and 88 carry idler gears 94 and shafts 85 and 86 carry driving gears 95, both the idlers 94 and the driven gears 95 engaging rack gear teeth on the rods 96 which are slidably mounted in suitable grooves or guideways in plates 89 and 90. The right ends of rods 96, as viewed in Figure 8, have opposed projecting prongs 96a which are recessed at their termini as at 96b. The horizontal surfaces of the recess serve to fold the wrapper end against the end surface of the article, in this case bottle B, when the vertical surfaces of the recess are being brought into engagement with the ends of the article during the stroke of racks 96 to the left as viewed in Figs. 7 and 8 for the purpose of discharging the article from the turret and transferring it into the nip of the conveyor belts 79 and 79a. The gears 95 are oscillatably driven by means hereinbelow described in order to produce the reciprocating action of the rods 96.

As the package is about to leave the top and bottom folder plates 91 and 92, it enters between the inwardly extending edges of a pair of plates 97 and an opposed pair of plates 98, one of each pair being above and the other of each pair being below the bottle (see Fig. 9). Near the entrance to these plates, the upper plate 98 has the

6

curved edge 98a which extends over the top of the back end of the upper folder plate 91, the corresponding plate 98 at the bottom being disposed under the folder plate 92 and having similar curvature. These edges 98a are curved so as to gradually fold one side of the outwardly projecting end of the wrapper against each end of the article and the curved edges 97a of the opposite folder plates 97 fold the other sides of the wrapper ends against those previously folded by the edges 98a. After the curved edges 98a and 97a are passed, the inwardly extending edges of these opposite folding plates follow a straight line indicated at 99 (Fig. 7) and as shown, in Figure 9 particularly, the edges 99 overlap a marginal portion of the folded wrapper ends to hold them against the ends of the article or bottle B. The folding plates 97 and 98 may be integrally joined with the vertically extending plates 100 and 101 respectively (see Fig. 9) to provide channel-shaped guides. It should be noted that the inner ends along line 99 of the plates 97 and 98 project only partially over the end surfaces of the wrapped article so as to keep the folded layers of the wrapper against the ends of the article without completely covering the ends of the article, the purpose being to leave an intermediate area exposed so that it is adapted to be engaged by the heat-sealing elements for sealing the ends as will be described hereinbelow.

End sealing means

At their left ends, as viewed in Figure 7, the plates 84 are rigidly secured by elements 102 to parallel supporting plates 103. Between each adjacent pair of plates 84 and 103, there is provided a slide block 104 which is provided with grooves 105 and 106 on opposite sides or surfaces thereof. These grooves are adapted to receive rollers 107 and 108 rotatably mounted on stub shafts 109 and 110 which are secured in plates 103 and 84 respectively. Grooves 105 and 106 extend longitudinally of each slide block 104. Each slide block 104 is provided with a pair of upstanding rods or posts 111 and a pair of downwardly extending rods or posts 112 rigidly fixed to the slide block.

The four upright posts 111 extend through bores in a plate 113 to which there is secured a heat-sealing block 114, such as by bolts or cap screws 115. The plate 113 may be insulated from the heat-sealing shoe 114 by providing washers of insulating material 117 and 118 and bores 116 much larger than the screw shanks. Between adjacent pairs of washers 118, a heat-dissipating fin 119 may also be provided to assist in protecting plate 113 from excessive transfer of heat from the shoe 114. Plate 113 is slidable vertically on the rods 111 and rests of its own weight on the rollers 120 carried at the upper ends of vertical rack-toothed rods 121 (four being provided) which extend downwardly through suitable bores in the stationary plates 103, two racks 121 extending into each plate 103.

Gears 122 are mounted in recesses in the plates 103 (see Figs. 7 and 8) and engage the rack-toothed surface of rods 121 as well as the rack-toothed surface of similar downwardly extending rods 123 which have lower rollers 124 engaging a lower plate 125 which is slidably mounted on the four downwardly extending rods or posts 112. Springs 126 bearing against enlarged lower termini or feet 127 of the rods 112 urge the plate 125 upwardly against the rollers 124. The lower heat-sealing shoe 128 is mounted on plate 125 in a manner similar to that by which shoe 114 is mounted on plate 113. The shoes 114 and 128 may be heated in any suitable fashion, such as by an electrical heating coil.

Cover plates 129 are secured to plates 103 to retain the gears 122 and the rack rods 121 and 123 in their recesses and slots respectively. The gears 122 are rotatably mounted on shafts 130 and have stub shafts 131 secured eccentrically therein and projecting out through a suitable slot 132 in the cover plate 129. A link 133 interconnects the stub shafts 131 on the pair of gears in each of

plates 103. Levers 134 pivotally mounted on stub shafts 135 which are fixed in the plates 103 are connected to each lever 133 at a point midway between the shafts 131. This connection may be by means of a stub shaft 136 extending through the upper end of the lever and fixed in the link 133. The levers 134 at their lower ends are provided with cam follower rolls 137 which bear against the rotating cams 138 mounted on a common shaft 139 which is driven either intermittently or continuously by any suitable means, such as that described hereinbelow. Springs 134a are connected between levers 134 and loose collars 134b on shaft 139 and urge the followers 137 on levers 134 against cams 138.

A yoke 140 is fixedly secured to the pair of posts 111 at the right as viewed in Figures 7 and 8 and at an intermediate point it is secured to a link 141 by means of a pin 142. This link at the other end is secured to the upper rack rods 96 by a pin 143. The rods or posts 112 are connected together by a similar yoke 140 and link 141 to lower rods 96 so that when the rods 96 are reciprocated, this reciprocatory motion is transmitted to the heat-sealing shoes 114 and 128 through the posts 111 and 112 and slide blocks 104. During the stroke to the left, as viewed in Figures 7 and 8, of the sealing shoes 114 and 128, the cams 138 are driven in timed relationship so that the shoes 114 and 128 are pressed against the ends of the package being conveyed by the belts 79 and 79a. At the end of the stroke, the cams 138 remove the shoes 114 and 128 from the ends of the package so that they are not in contact during the stroke of the shoes to the right. At the end of the stroke to the right, cams 138 again press the heat-sealing shoes against the ends of the packages.

Driving means

There is specifically shown means for intermittently driving the turret through arcuate steps which correspond to the angle between the eight adjacent stations on the turret. While the turret is stationary, the pamphlet feed rolls 7 and 8, the driving shaft 15 for the pamphlet feeding belt, the pulleys 81 and 81a for driving the article feeding belts 79 and 79a, the gears 95, and the cams 138 are driven through an intermittent step. Vice versa, when the latter elements (7, 8, 15, etc.) are stationary between steps, the turret is rotated through one of its steps. The wrapper feed rolls 26 and 27 and the pulleys 6 for driving the belts 3 and 4 may be driven continuously at a constant rate. The plunger 30 and the knife 28 are reciprocated forwardly and then back through a single cycle by solenoids 32 and 145 respectively (Fig. 4), each of which is connected in series with a normally open switch disposed along the path of one of the belts 9 and comprising a stationary contact element 37 and a spring contact element 37a (Fig. 3). The solenoids may be in parallel or in series with each other but are in series with the switch 37, 37a and a source of electric energy 36. Normally, contact 37a is open but it is adapted to be closed by each of the projecting lugs 12 near the end of the stroke of the pamphlet feeding belts 9. Closure by a lug 12 energizes the solenoids 32 and 145 causing the plunger 30 to push the article and pamphlet into the recess provided by slots 41 at the receiving station of the turret. Simultaneously, the knife 28 is reciprocated to cut the wrapper. This is effected by the attached rod 146 which passes through suitable stationary guides 147 and 148 and is normally urged to the right (as viewed in Fig. 4) by the spring 149 bearing between stationary guide 147 and the collar 150 secured to the rod 146. The rod 146 terminates in an enlarged core or armature 146a which is actuated by the solenoid 145. The switch 37, 37a is so disposed that each projection 12 passes just beyond the switch at the end of each intermittent step of the belts 9 so that plunger 30 and knife 28 are retracted before the turret starts to rotate. When the pamphlet feeding means is omitted, lateral projections disposed at

spaced intervals on belt 3 or belt 4 may be used to actuate switch 37, 37a.

The turret is rigidly secured to the hub of a bevel gear 155 (Fig. 10) which is rotatable on the shaft 38. This gear 155 is driven by motor 156 through a reducer 157, the output shaft 158 of which is suitably supported for rotation on its axis and carries a bevel gear 159 and the pinwheel 160 of a Geneva intermittent gear. This pin gear 160 cooperates with the slotted star wheel 161 of the Geneva gear which is fixed upon the shaft 162 which is suitably supported for rotation on its axis and carries secured fixedly thereto a bevel gear 163 in mesh with the gear 155. The Geneva gear and ratio between gears 163 and 155 are selected to rotate the turret through steps of $\frac{1}{8}$ the revolution.

In order to provide alternate intermittent motion between the turret and the steps of the other mechanisms mentioned hereinabove, the constantly driven shaft 158 also drives another Geneva mechanism comprising a pinwheel 164 and the grooved star wheel 165 through a bevel gear 166 which is secured to the shaft 167 mounted for rotation on its axis and having the pinwheel 164 rigidly fastened thereto. The grooved star wheel 165 is fixedly secured on shaft 168 which is suitably supported for rotation on its axis and carries a sprocket 169 which operates a chain 170 which in turn drives a sprocket 171 fixed on a shaft 172 which extends through a bearing 173 and carries fixedly thereto the pulley 81 which drives belt 79. The Geneva gears and the ratio between sprockets 169 and 171 are selected to rotate shaft 172 through half a revolution at each step which is effected while the turret is stationary assuming gears 159 and 166 to have the same diameter and number of teeth, and both Geneva gears to provide two intermittent steps and two "still" stages, all of equal duration, in a single revolution of shaft 158, the ratio of 169 to 171 may be 1:2 (diameter).

Shaft 172 also is provided with a sprocket 174 which drives a chain 175 and a sprocket 176 fixedly secured on a shaft 177 which is supported for rotation on its axis and carries fixed thereon a gear 178 which meshes with gear 179 carried on shaft 180 on which is rigidly secured the pulley 81a associated with belt 79a. The ratios between sprockets 174 and 176 and between gears 178 and 179 are chosen to provide the same speed on pulley 81a as on pulley 81.

Shaft 172 also carries a sprocket 181 which drives a chain 182 which in turn drives sprocket 152 mounted on shaft 15 suitably supported for rotation on its axis. Shaft 15 extends through the pulley 11 and carries therebeneath a sprocket 183 which drives a chain 184 which in turn drives a sprocket 185 fixed on shaft 186 which is suitably mounted for rotation on its axis and carries fixed thereon the pamphlet feed roll 7.

Shaft 180 is suitably mounted for rotation on its axis and extends below pulley 81a and carries at its lower end a bevel gear 185 which meshes with a bevel gear 186 mounted on a shaft 186a for rotation therewith about the axis of the shaft. Gear 186 is one-half the diameter of gear 185 and is provided on one side with an eccentric crank pin 187 connected by a link 190 with an eccentric crank pin 188 on a disk 189 fixedly secured on shaft 86 on which is fixed the lower gear 95. The throw of crank pin 187 is less than that of crank pin 188 so that a complete revolution of gear 186 is converted into a forward and return oscillation of disk 189. Shaft 86 also carries a gear 200 which meshes with the gear 201 which is mounted on a shaft 192 which carries fixedly thereon a sprocket 193 which drives a chain 194 for dividing the sprocket 195 fixedly secured on shaft 85. A sprocket 196 is secured to the shaft 186a and drives a chain 197 which drives the sprocket 198 fixedly secured on the shaft 139 which is suitably supported for rotation on its axis and carries the cams 138.

General sequence of operations

With the driving connections as described hereinabove, the article to be wrapped is fed to the receiving station of the turret between belts 3 and 4, and a pamphlet is fed in intermittent steps by belts 9 into proximity with the article. A wrapper sheet is fed downwardly between the article and receiving station of the turret. Near the end of the pamphlet feeding step, a projection 12 on the belts 9 closes the switch comprising contacts 37 and 37a which energizes solenoids 32 and 145 and thereby causes the plunger 30 to push the pamphlet, article and wrapper into the recess at the receiving station of the turret, the knife 28 being simultaneously actuated to cut the wrapper from the sheet continuously fed by rolls 26 and 27. The plunger 30 and knife 28 are retracted to their inactive positions shown in Figures 1 and 3 at the end of the intermittent stroke of the belts 9 by virtue of the fact that the projection 12 thereon releases the spring blade 37a to open the switch. Since the Geneva intermittent mechanism comprising pinwheel 160 and star wheel 161 (which drives the turret) is 90° out of phase with the intermittent mechanism comprising pinwheel 164 and star wheel 165 for driving the other intermittently driven devices including the belts 9 for feeding the pamphlet, the turret is stationary while the pamphlet is being fed to the receiving station and until after the article and pamphlet with the wrapper thereabout are pushed into the recess of the turret. After the article has been received in the recess of the turret, it is rotated through the successive stations shown, the cam 66 serving to actuate shoes 70 to overlap the projecting edges of the wrapper and to hold them overlapped until the heating and pressing is effected at station 3 by the sealing tongue or shoe 76. During these operations, the lugs 47 hold the article in position in the recesses in the turret.

At station #7, the rods 96 are moved to the left from the normal stationary position shown in Figures 1 and 2, thereby folding a portion of the ends of the wrapper and transferring the article into the nip of the conveyor belts 79 and 79a which are driven intermittently in synchronism with the rods 96. The articles pass between the folder plates 91 and 92 and then into the guiding plates having the folding edges 97a and 98a. As the articles with the ends of the wrappers folded against the ends of the articles proceed within the channel-shaped guides 100 and 101, the edges 99 hold the folded ends of the wrapper against the ends of the article and the heat-sealing shoes 114 and 128 are urged into contact with the ends of the wrappers and seal them. As stated hereinabove, the shoes 114 and 128 are brought into contact with the wrappers at the beginning of the forward stroke and the shoes 114 and 128 are moved simultaneously with the articles at the same speed and in the same direction during this stroke after which the shoes are elevated and returned to their initial position while out of contact with the articles. The articles thus wrapped and sealed proceed through the passageway between belts 79 and 79a and may be sent to the next stage such as packaging.

The turret may be used for side sealing articles proceeding from any suitable feeding means including other types of feeding means than the belts 3 and 4 and furthermore, the turret may deliver or discharge the side-sealed articles to other systems for completing the end wrapping or if it is not desired to fold and seal the ends of the wrapper, such folding and sealing means may be omitted. For example, the turret may be used for wrapping an article in a wrapper which does not extend beyond the ends of the article but is merely lapped around the side walls thereof, the overlapped edges being then heat-sealed as by the shoe 76. In this case, the wrapper may correspond in width to the dimension of the article in the direction parallel to the axis of the turret or the width of the wrapper may be less than this dimension, if desired. Again, the end-folding and sealing unit to which the articles dis-

charged by the turret proceed may be used for folding and sealing the ends of any article provided with a sleeve-like or tubular wrapper, whether seamless or provided with a joint, such as the heat-sealed, overlapped joint produced in the turret of this invention, and such an article may be prepared in any suitable way and by any suitable mechanism and delivered to the end-sealing and folding unit of the present invention.

It is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. Apparatus for wrapping articles comprising means for conveying an article through a path, a pair of rods reciprocable in a direction generally parallel to the direction of travel of the conveying means for folding end portions of a wrapper surrounding the lateral surfaces of the article, means for reciprocating the rods, each of said rods having a lateral extension projecting toward that of the other and having a recess adapted to fit over an end corner of the article whereby to simultaneously fold an end portion of the wrapper against the end of the article and to transfer the article to the conveying means during the forward stroke of the reciprocation of the rods, said portions extending endwise from the article and transversely of the path, guide means along the path beyond the folding means having portions extending partially over the ends of the article for reducing the tendency of the folded ends to re-open, and means along the guide means for heating and pressing the folded ends to seal them.

2. Apparatus as defined in claim 1 in which the heating and pressing means comprises a pair of shoes on opposite sides of the path, and means for reciprocating the shoes into and out of engagement with wrapped articles and means for reciprocating the shoes in a direction generally parallel to the path, the strokes of the last-mentioned reciprocation intervening between the strokes of the next-to-last mentioned reciprocation whereby the shoes move with the wrapped article when they are in engagement therewith.

3. Apparatus for end-sealing an article disposed in a sleeve-like wrapper comprising a pair of endless belts for conveying an article therebetween, a pair of channel-shaped guide members extending around the belts with their flanges engaging marginal portions of the ends of an article carried by the belt, the flanges adjacent the entrance between the belts being curved to fold projecting ends of a wrapper against the ends of the article.

4. Apparatus as defined in claim 3 comprising stationary supporting members extending longitudinally of the guides on the sides thereof away from the belts, a carriage comprising a pair of rigid members supported by said supporting members for reciprocation relative thereto, heated pressing shoes on opposite sides of the article each disposed between adjacent flanges of the guides, a plate secured to each shoe on its side away from the belts, a plurality of rigid posts projecting from opposite sides of each of the rigid members and extending through bores in the plates, reciprocable racks for reciprocating the plates relative to the posts, gear means for engaging the racks, and cam and lever means for oscillating the gear means.

5. Apparatus as defined in claim 4 comprising a pair of plates fixed adjacent the entrance of the path for folding portions of the wrapper ends in advance of the guides.

6. Apparatus as defined in claim 5 comprising a pair of rods reciprocable in a direction generally parallel to the direction of travel of the belts, means for reciprocating the rods, each of said rods having a lateral extension projecting toward that of the other and having a recess adapted to fit over an end corner of the article whereby to simultaneously fold an end portion of the wrapper against the end of the article and to transfer the article to the belts during the forward stroke of the reciprocation

11

of the rods, and means for connecting the posts to the rods
to effect reciprocation of the carriage with the rods.

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