Feb. 26, 1929. 1,703,641

W. A. SOWDEN

WRAPPING MACHINE

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Fig. 1.

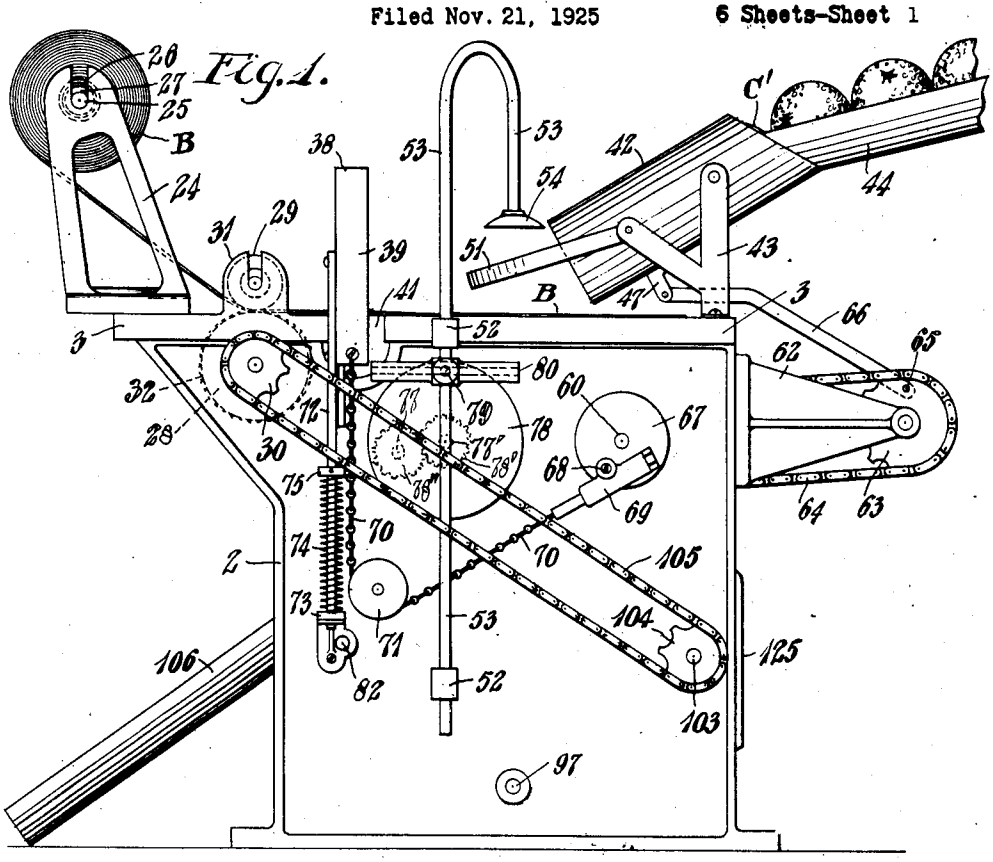


Fig. 3.

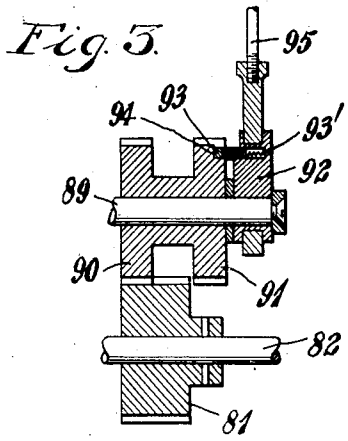
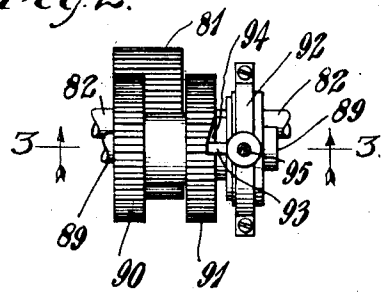


Fig. 2.



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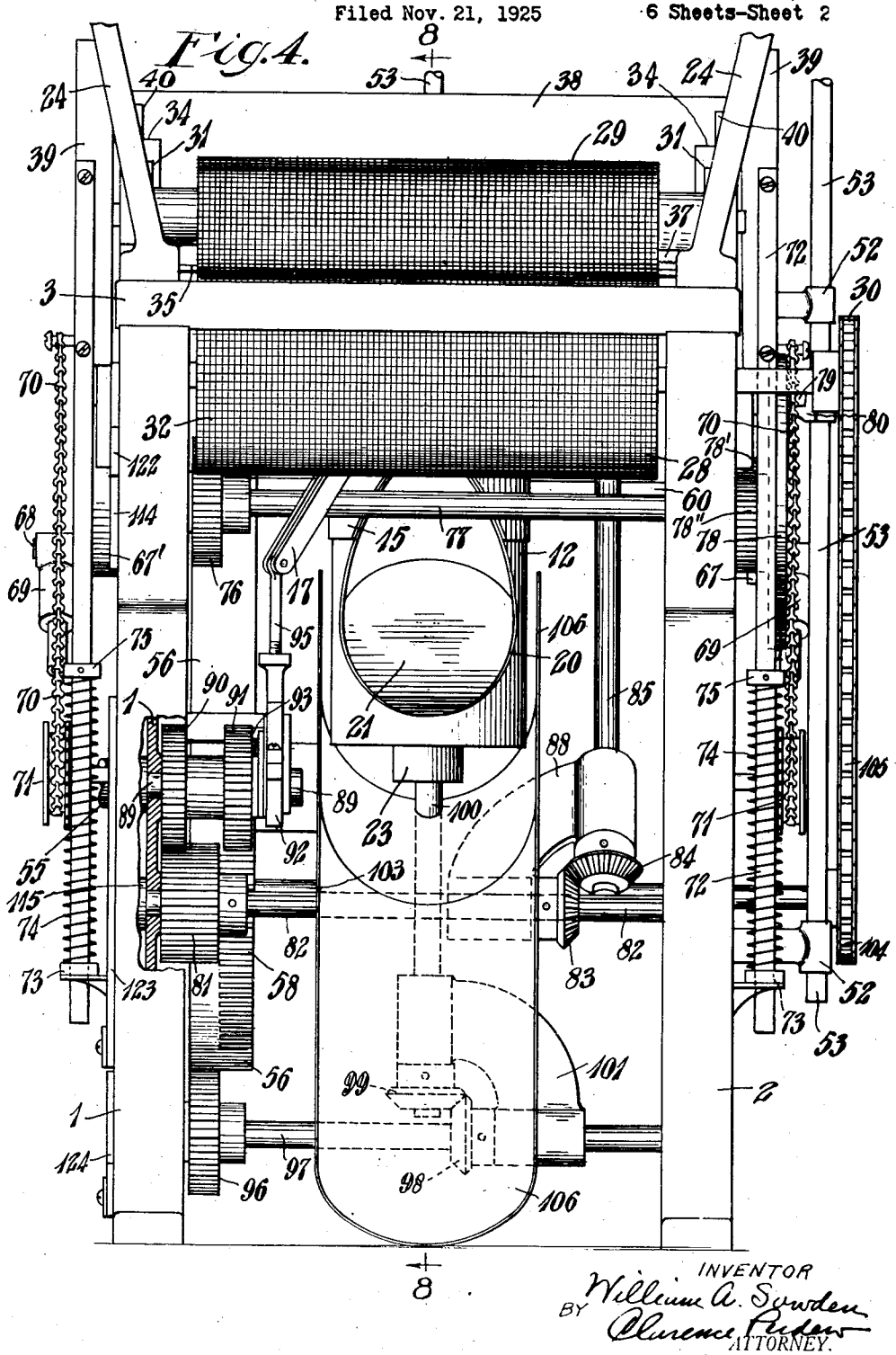
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W. A. SOWDEN

WRAPPING MACHINE

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Fig. 4.



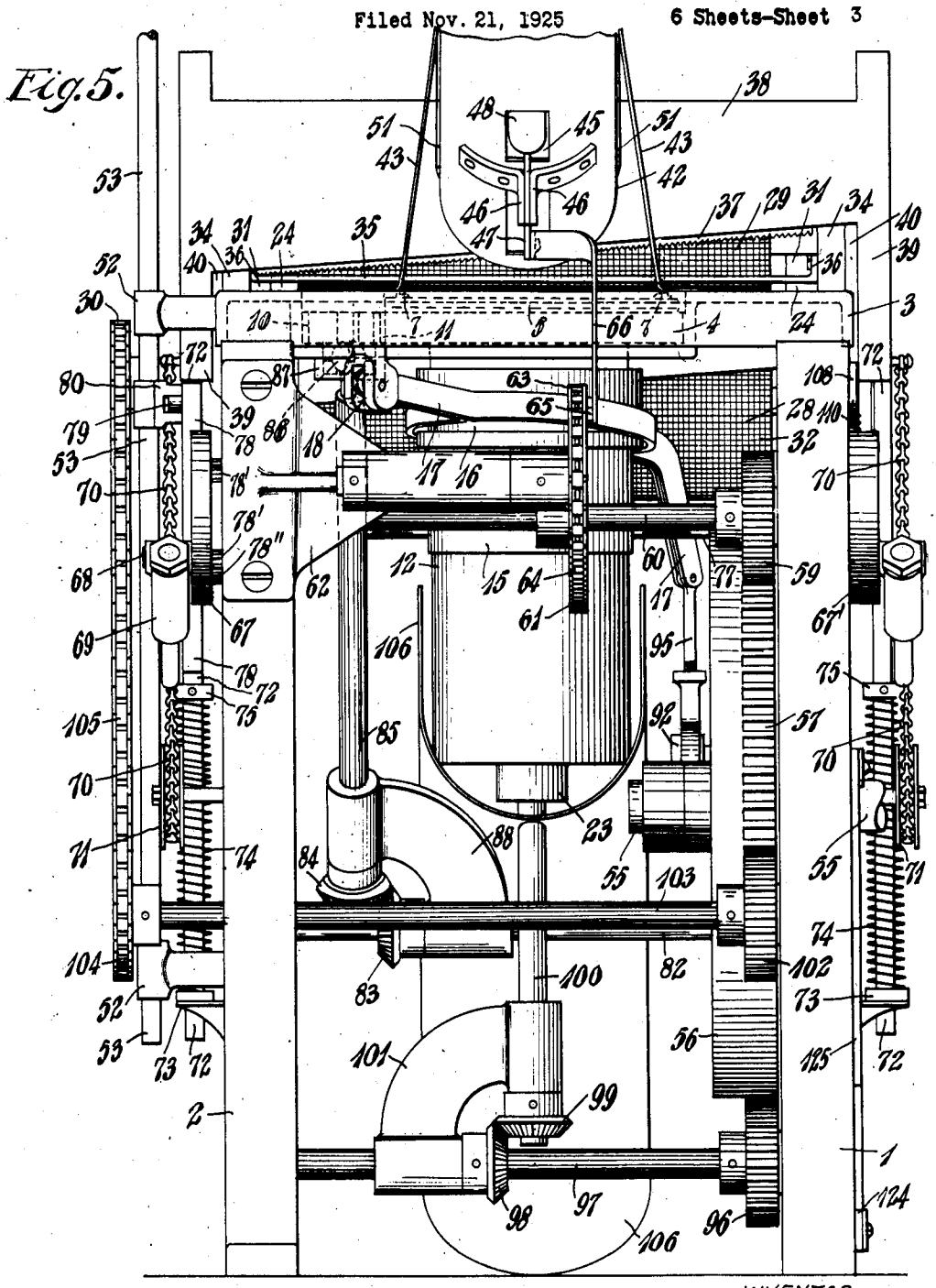
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Fig. 5.



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WRAPPING MACHINE

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Fig. 6.

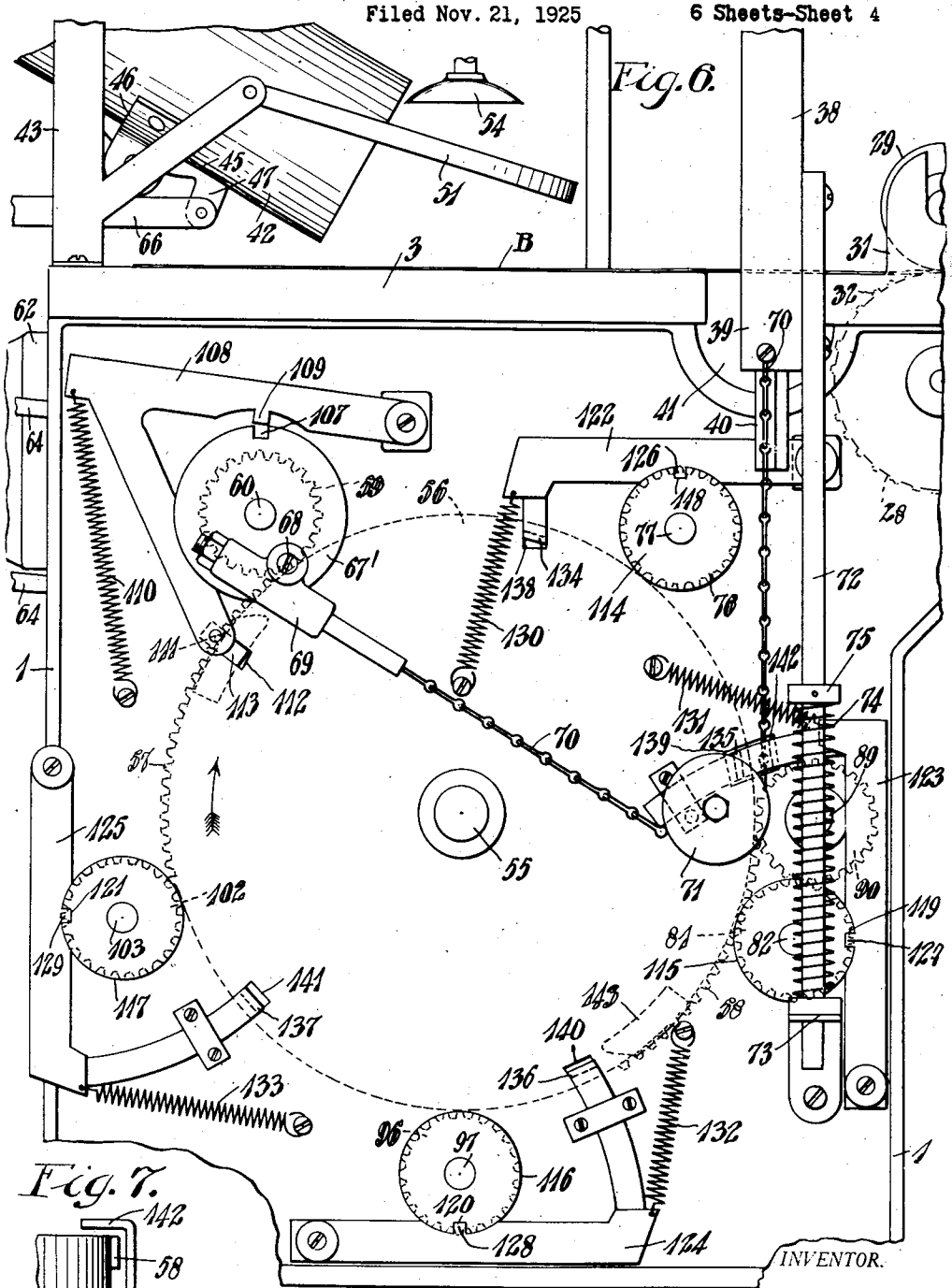
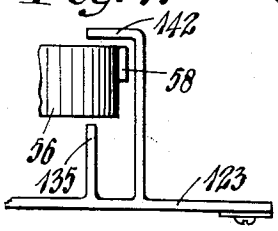


Fig. 7.



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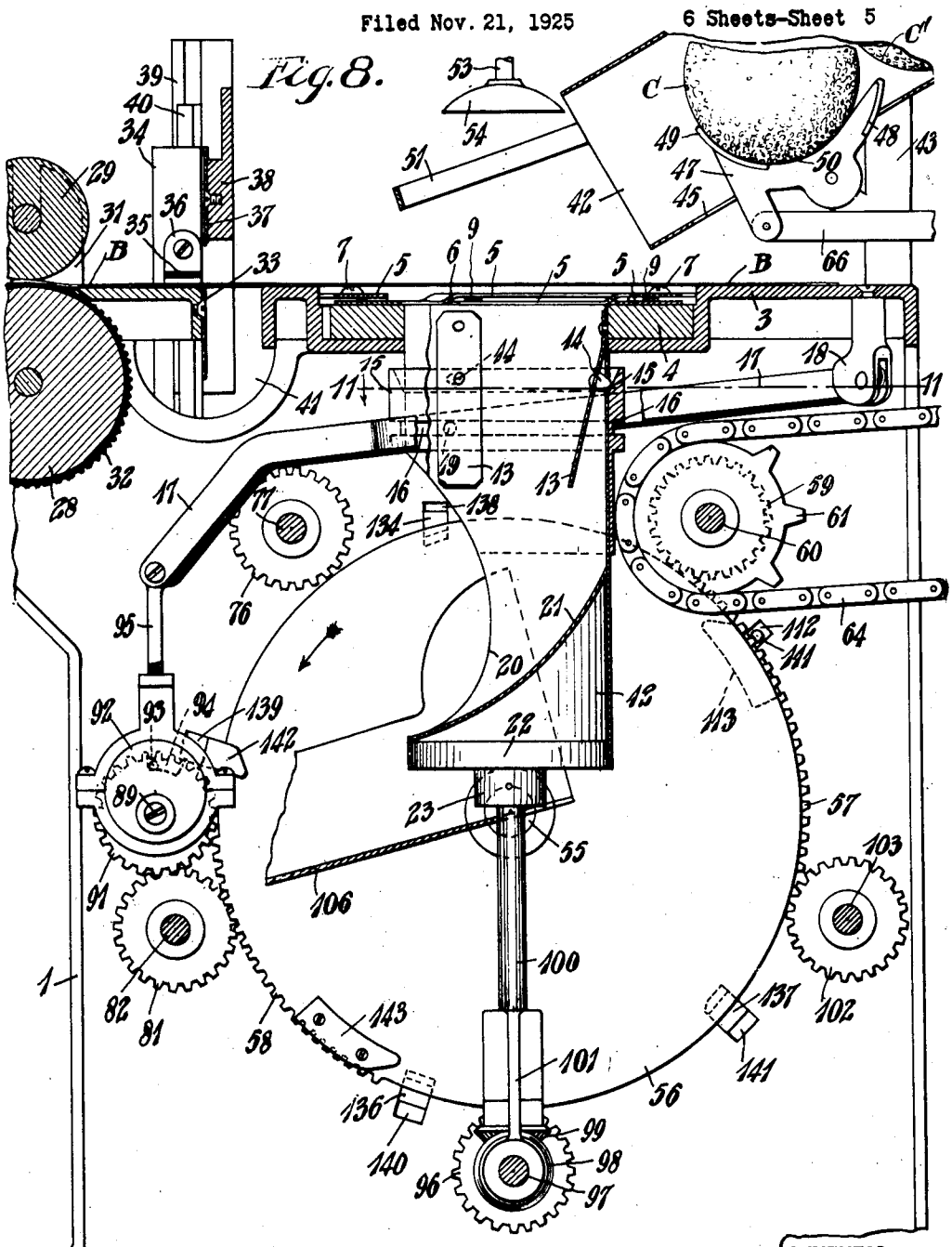
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Fig. 8.



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Fig. 9.

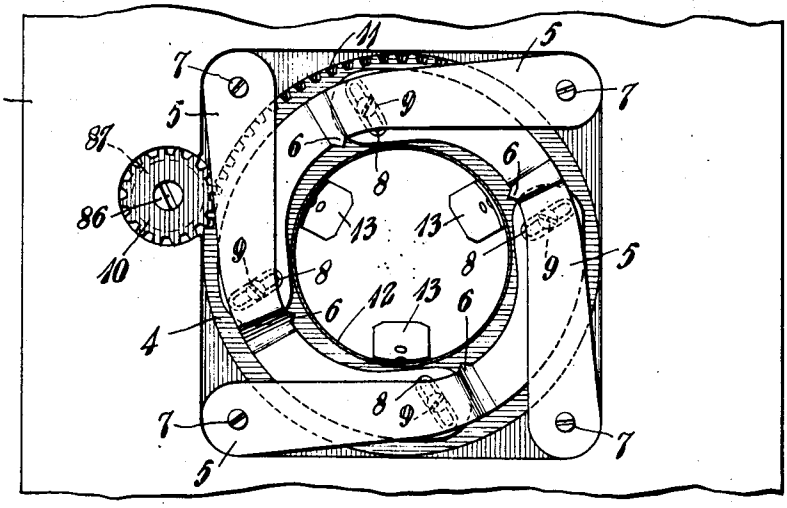


Fig. 10.

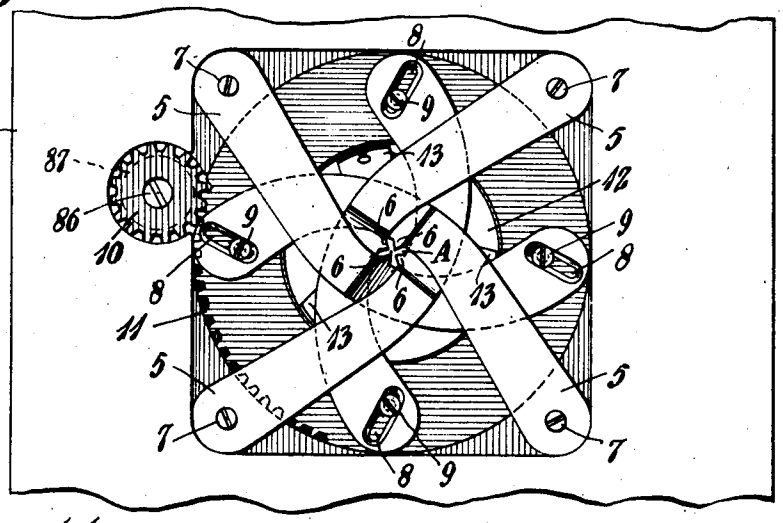


Fig. 11.

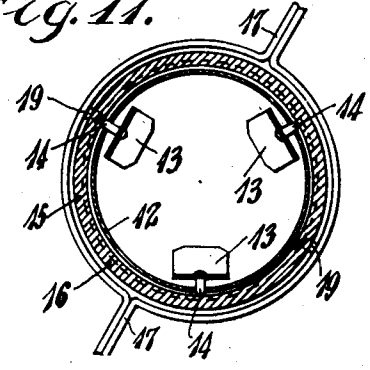
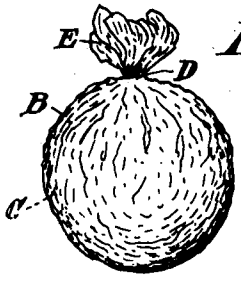


Fig. 12.



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Patented Feb. 26, 1929. 1,703,641

UNITED STATES PATENT OFFICE.

WILLIAM A. SOWDEN, OF COVINGTON, KENTUCKY.

WRAPPING MACHINE.

Application filed November 21, 1925. Serial No. 70,595.

My invention relates to wrapping machines, and its object is to wrap articles of spherical or approximately spherical shape, especially fruits, such as oranges, grapefruit, lemons and the like, or apples and similar fruits, or vegetables or other similar articles to which it is desired to apply wrappers rapidly and inexpensively, yet smoothly and uniformly.

I attain these objects by the machine illustrated, for example, in the accompanying drawings, in which—

Figure 1 is a rear side elevation of the entire machine;

Fig. 2 is a detail plan view of the gearing for operating the grippers and the holders;

Fig. 3 is a horizontal cross-section of the same on the plane of the line 3—3 of Fig. 2;

Fig. 4 is an elevation of the wrapper-feed end of the machine, or right-hand end as seen in Fig. 1, upper parts being broken away for lack of space;

Fig. 5 is a similar elevation of the article-feed end of the machine, or left-hand end as seen in Fig. 1;

Fig. 6 is a partial front elevation of the machine, showing the stop devices;

Fig. 7 is a detail plan view of part of the stop-device operating means for the gripper and holder gearing shown in Figs. 2 and 3;

Fig. 8 is a vertical longitudinal section of the machine on the plane of the line 8—8 of Fig. 4, upper and right-hand and left-hand parts being omitted for lack of space;

Fig. 9 is a partial plan view showing the grippers and part of their operating mechanism, in open position;

Fig. 10 is a similar view of the same in closed position;

Fig. 11 is a horizontal cross-section through the rotary support chute, on the plane of the line 11—11 of Fig. 8; and

Fig. 12 is a side elevation of one of the wrapped articles.

The frame of the machine consists of the front and rear side walls 1 and 2 and the top 3 extending across from one wall to the other, resting upon the top edges of the walls, and has centrally a circular depression down in which fits the gripper ring 4 with its upper surface far enough below the top surface of the frame top 3 to accommodate the four grippers 5 (Figs. 9 and 10) each comprising a straight part succeeded by a curved part offset downwardly from the straight part and having inside the curve the spur 6. The space in the top 3 above the ring 4 is enlarged into a rectangle; and the grippers 5 have the ends of their straight parts fulcrumed in the respective corners of this space on screws 7. The ends of the curved parts of the grippers 5 have slots 8 radial to the fulcrum screws 7, in which slots 8 engage respective screws 9 carried in the ring 4 at equal intervals therearound. The arrangement is such that at one position of the ring 4 the grippers 5 are swung out as shown in Fig. 9, each with a curved part under the straight part of an adjacent gripper and extending around the ring 4, leaving the central opening of the ring 4 unobstructed; and when the ring 4 is rotated one quarter revolution the grippers 5 are swung in across the ring opening with their spurs 6 close together and defining a small cross-shaped opening A at the center of the ring (Fig. 10). For imparting to this gripper ring 4 its quarter revolution, a pinion 10 is located in a depression in the top 3 which cuts into the depression occupied by the ring 4 so that this pinion 10 can mesh with teeth 11 formed on the adjacent outer edge of the ring.

The rotary support chute 12 is a cylindrical shell with axis vertical and having its upper open end closely fitting in and rotatable relatively to the gripper ring 4. The supports 13, three in number, are resilient strips having their upper ends fixed to the inside of the chute 12 next to its top; these strips bending inwardly in their downward extent, and each having, a short distance below its fixed upper end, a nose 14 projecting out through a respective slot in the side of the chute 12 into engagement with the interiorly conical downwardly inclined upper part of the support-control ring 15 which closely embraces and slides up and down on the exterior of the chute 12. These supports 13 are equally spaced around the chute 12. The control ring 15 has the outwardly opening annular groove 16; and the support lever 17 is fulcrumed at one end on the stirrup 18 depending from the top 3 at the rear near the article-feed end, and extends diagonally across, with a ring-shaped middle part embracing the control ring 15 and having studs 19 extending radially inward and engaging in the control ring groove 16 at opposite sides thereof. The chute 12 has a large opening 20 in one side, the control ring 15 also being cut away at this side so as not to obstruct this opening 20; and the bottom 21 of the

chute inclines down to the lower edge of this opening 20 (Fig. 8). Below this chute bottom 21 the shell has a disk 22 closing its lower end and fixed to its rim and having centrally the downwardly projected hub 23.

The frame walls 1 and 2 and the top 3 are projected out at one end, which is at the left in Fig. 1, to support the standards 24 at front and rear, in the forked upper ends of which the reel 25 has its spindle journaled, with springs 26 around the spindle, pressing conical plugs 27 into respective ends of the roll of wrapping material B, which is fed in strip form from the reel 25 across the top 3 by the lower roll 28 and the upper roll 29. The lower roll 28 has a shaft journaled in the front and rear walls 1 and 2 and projecting out through the rear wall 2 with a sprocket wheel 30 fixed thereon; the top 3 having a slot up through which this lower roll projects to coact with the upper roll 29, which has spindles bearing in upright slots in lugs 31 formed on the top 3 near its front and rear edges. The upper end of this slot preferably is open, permitting ready removal and replacement of the upper roll 29. Also, preferably, the lower roll 28 has a corrugated rubber covering 32, while the upper roll has its surface roughened, so that the two rolls the more effectively grip the wrapping material.

Between the location of these wrapper-feeding rolls 28 and 29 and that of the gripper mechanism before described, the top 3 has a transverse slot; and the lower blade 33 of the wrapper cutter is screwed to the side of this slot next to the rolls, with its upper edge flush with the upper surface of the top 3, which has, at this side of the slot, near its front and rear edges, the upstanding guide lugs 34. The stripper bar 35, with upturned end ears 36 screwed to the inner faces of these lugs 34, extends across only slightly above the top 3 close to the lower blade 33. The upper blade 37 of the wrapper cutter is screwed to the side of the yoke 38 facing toward the rolls; this yoke 38 having upright end parts 39 flanking and guided up and down on outwardly projected vertical guides 40 on the outer faces of the guide lugs 34, so that, the yoke sliding down on these, the upper blade 37 slides closely past the lower blade 33. The walls 1 and 2 have recesses 41 at the ends of the blades, to accommodate the yoke 38 in its lowered position.

The tubular article-feeding chute 42 is flanked and supported by two standards 43 projecting up from the top 3 at the opposite end of the machine, or right-hand end as seen in Fig. 1; this chute 42 inclining down toward the gripper mechanism to discharge an article into this mechanism from the trough 44, which will be understood to lead from the source of supply of the articles being wrapped. The bottom of this chute 42 has a longitudinal slot 45 flanked by downwardly projected ears 46 (Figs. 5 and 6) between which is fulcrumed the section 47 projecting up through the slot 45 into the chute 42 and having an upper outer wing 48 and an inner lower wing 49 and between these a top edge 50; the general formation of this edge 50 and lower wing 49 being concave, to approximately the radius of the article being wrapped. This sector 47, tilted one way or the other, receives and detains an article, or discharges the article to roll out the lower end of the chute while the following article is detained by the upper outer wing 48 until the sector is tilted back to position for receiving this next article. Thus the articles, such as the oranges C, roll along the trough 44 and into the chute 42, by gravity, their feeding being controlled by this sector 47, to feed one article at a time to the gripping mechanism before described. To prevent the article from rolling otherwise than into the gripping mechanism, a guide loop 51 preferably extends from one side of the end of the chute 42 around to the other side, over the mechanism.

The rear wall 2 of the frame has, near the top and bottom, respectively, bearing arms 52 projecting rearward; and a rod 53 slides up and down in these arms with its upper part arched forwardly and then extending downwardly, carrying the positive feeder 54 to descend from a position above the path of the incoming article, as shown, and push the article down through the gripping mechanism into the support chute 12. Preferably this positive feeder is a soft rubber disk, downwardly concave, with a thin edge, so as not to damage the article.

The driving shaft 55 is journaled from front to rear through the front wall 1, centrally thereof; and it will be understood that a motor or the like may be suitably connected to the outer front part of this shaft, to drive the entire machine. The rotor 56 is fixed on the inner end part of this shaft, and has two segments of gear teeth 57 and 58 on circumferentially remote parts of its periphery, and these segments also are offset axially of the rotor so as to have distinct paths upon rotation of the rotor. This rotor 56 is spaced back away from the inside of the front wall 1 a substantial distance. The driving shaft 55, and with it the rotor 56, always are rotated over toward the wrapper-feed end of the machine, as indicated by the arrows in Figs. 6 and 8; and the rotor, with its two segments 57 and 58, is designed to give a single complete rotation to each one of a number of pinions and gears arranged around the rotor in the path of one or the other segment thereof, as presently will be described. For this purpose, all of these gears and pinions are of equal diameter, having the same number of teeth; and each segment 57 and 58 has such slightly less number of teeth as will

cause each pinion or gear to turn exactly one revolution at each passage of the respective segment in mesh therewith. Also, as to those elements termed pinions, it will be understood that the shaft mentioned in connection with each of them is extended horizontally from the front wall 1 to the rear wall 2, and journaled in both walls; all of them being projected out past the front wall, and certain ones of them being also projected out past the rear wall, as will be described.

In the upper part of the article-feed end of the frame is the pinion 59 fixed on the shaft 60, which also has fixed on it slightly to the rear of this pinion 59 a sprocket wheel 61. On a bracket 62 projecting from the edge of the rear wall 2 below the article-feeding chute 42, a sprocket wheel 63 is journaled, of the same size as the wheel 61, and a sprocket chain 64 is passed around these two wheels. The outwardly carried sprocket wheel 63 has a wrist 65 which is connected by a connecting rod 66 with the lower end of the article-feed control sector 47, so as to rock the sector as the wheel 63 rotates. Also, this front shaft 60 just described, extends out through the rear and front walls 2 and 1 and has fixed on its outward extensions the crank disks 67 and 67′, respectively, having wrists 68 which, by suitable adjusting heads 69, are connected to respective chains 70 passing down under sheaves 71 journaled on the walls 1 and 2, and up to the upright parts 39 of the yoke 38, to which these chains are fixed. These cutter-yoke parts 39 have rods 72 extending down and sliding in guides 73 on the walls 1 and 2, and around each rod is a helical spring 74 compressed between the respective guide 73 and a collar 75 fixed on the rod, so that the cutter yoke 38 is yieldingly held up, to be pulled down by the chains on rotation of the disks 67 and 67′.

In the upper part of the wrapper-feed end of the frame the pinion 76 is fixed on a shaft 77 extending out past the rear wall 2. The crank disk 78 is fixed to and journaled coaxially with a gear 78′ on a stud 77′ in the rear wall 2 (Fig. 1). The gear 78′ meshes with a gear 78″ of equal size, fixed on the rear extension of the shaft 77. The disk 78 has a wrist 79 which engages in a horizontal channel bar 80 having its middle fixed to the upright rod 53 of the positive article feeder 54. The gears 78′ and 78″ are used merely because the disk 78 would be in the way of the cutter mechanism if mounted directly on the shaft 77.

The pinion 81, fixed on the shaft 82 in the lower part of the wrapper-feed end of the frame, has a wide face, half of which is in the path of the segment 57, the other half being opposite the space in front of the rotor. Near the rear wall 2 the shaft 82 has fixed on it the miter gear 83 in mesh with the miter gear 84 fixed on the shaft 85 inclining up with its upper end connected by a universal joint 86 (Fig. 5) to the hub 87 of the pinion 10. A bracket 88 embraces the two shafts 83 and 84.

Above the pinion 81, turning loosely on a stud 89 fixed in and projecting rearwardly from the front wall 1, are two integral coaxial gears 90 and 91. The front gear 90 meshes with that portion of the pinion 81 that is opposite the space between the wall 1 and the rotor 56, out of the path of the front segment 57; and the rear gear 91 is spaced back far enough not to mesh with the pinion 81 but to be in the path of the rear rotor segment 58.

Also turning loosely on the stud 89, to the rear of the gears 90 and 91, is the eccentric 92 having a clutch pin 93 (Figs. 2 and 3) pushed forward from a recess in its front side by a small helical spring 93′ behind the pin in the recess. This pin 93 bears against the rear side of the rear gear 91, which has a segmental depression 94 with one end parallel with the pin 93 and the other end inclined; so that as the gears 90 and 91 are rotated by the rear segment 58 meshing with the gear 91, over toward the article-feed end or to the right in Fig. 8, which is the operation that opens the grippers 5, the eccentric will be rotated, but the eccentric will not be rotated when these gears 90 and 91 are rotated in the opposite direction, by the front segment 57 with the pinion 81 acting as the intermediate gear, which is the operation closing the grippers 5. This eccentric 92 has a rod 95 connected to the adjacent end of the support lever 17, and is so positioned relative to the gears 90 and 91 that it holds this lever 17 up when not being rotated.

Beneath the rotor 56 is the pinion 96 fixed on the shaft 97 which also has a miter gear 98 fixed on it, meshing with a miter gear 99 fixed on the lower end of an upright shaft 100 having its upper end fixed in the hub 23 of the rotatable support chute 12. A bracket 101 embraces the two shafts 97 and 100 adjacent to the miter gears 98 and 99.

The pinion 102, in the lower part of the article-feed end of the frame, is fixed on a shaft 103 which projects out past the rear wall 2 and has fixed on it a sprocket wheel 104 the same size as the sprocket wheel 30 of the lower wrapper-feed roll 28, and a sprocket chain 105 passes around these two wheels 30 and 104. The lower roll 28 has its circumference equal to the length of wrapper B used for wrapping each article.

All of the pinions 59, 76, 96 and 102 are in the path of the front rotor segment 57, along with the rear portion of the pinion 81. The only element in the path of the rear rotor segment 58 is the gear 91, as before described.

The meshing of the gearing of the rotatable support chute 12 is such that its side opening 20 is toward the wrapper-feed end of the machine except when the chute is being rotated;

and a delivery trough 106 inclines down from the bottom of the chute 12, out past the end of the machine.

To hold all of the pinions 59, 76, 81, 96 and 102, as well as the gears 90 and 91, exactly at the end of a single revolution after the respective rotor segment 57 or 58 passes out of mesh therewith, detent means are provided on the front side of the front wall 1, comprising disks with notches, and pawls to engage in the respective notches; and to withdraw the pawls from the notches, the rotor 56 has cam lugs in the paths of which the pawls have fingers so that the lugs can push the pawls away from the respective disks, as now will be described.

The front crank disk 67′ serves also as the detent disk for the pinion 59; having the notch 107 in which the pawl 108 engages its detent 109 under tension of the spring 110 stretched from the pawl to a fastening on the wall 1. The finger 111 on this pawl 108 extends in through an opening 112 in the wall 1 close to the front side of the rotor 56, to be engaged by the rotor cam lug 113, which pushes the pawl 108 away from the disk 67 just before the segment 57 begins meshing with the pinion 59.

In like manner, the other four pinions 76, 81, 96 and 102, with their shafts 77, 82, 97 and 103 extended out through the wall 1, have fixed on the shaft extensions the disks 114, 115, 116 and 117, having the notches 118, 119, 120 and 121, respectively. The pawls 122, 123, 124 and 125, with detents 126, 127, 128 and 129 to enter the respective notches under tension of the respective springs 130, 131, 132 and 133, have fingers 134, 135, 136 and 137 extending in through the wall openings 138, 139, 140 and 141, respectively, into the path of said rotor cam lug 113. Also, to disengage the pawl 123 from the disk 115 as the rear rotor segment 58 is about to mesh with the gear 91, with which the pinion 81 is rotated, this pawl 123 has an additional finger 142 extending in through the same wall opening 139 with the finger 135, and extending across the periphery of the rotor 56 and hooking radially inwardly behind the rotor, in the path of the rear rotor cam lug 143.

Operation.—In Fig. 6 is clearly shown the pawl 108 with its detent 109 withdrawn from the notch 107 of the disk 67, by the cam lug 113 engaging with the finger 111 of the pawl 108; and the segment 57 is seen about to begin meshing with the pinion 59. It is this juncture of the operation which is illustrated throughout Figs. 1 to 9 inclusive, and Fig. 11 of the drawings. The other rotor segment 58 is just going out of mesh with the gear 91, which thus, through the eccentric 92, has just finished setting the resilient supports 13 inward across the support chute or holder 12, and has, through the pinion 81, just completed opening of the grippers 5. Thus, the way down into the chute or holder 12 is wide open, and the supports 13 are in position to hold an object coming down into this chute or holder. Also, the segment 57, beginning to mesh with the pinion 59, has just previously gone out of mesh with the pinion 102, by which meshing a wrapper-length of the wrapper strip B was fed out across the top 3 over the opening down into the chute or holder 12, as shown.

Upon further turning of the rotor 56 in the direction of the arrows (Figs. 6 and 8) the sector 47 will be tilted down to release the orange C, and the cutter blade 37 will be pulled down, both through the action of the pinion 59. The orange will drop quickly, but the descent of the cutter 37 is slower, so that the orange, slightly depressing the wrapper into the opening between the grippers 5, is holding the wrapper stretched at the blades 33 and 37, so that these can sever the wrapper cleanly without drawing it down into the slot of the top 3 next to these cutters. This article-releasing and wrapper-severing will be completed in the first half turn of the pinion 59; and in the next half turn the sector 47 will be tilted up again, receiving the next orange C′, and the cutter blade 37 will be raised again to its uppermost position as shown.

The segment 57, upon going out of mesh with the pinion 59, immediately begins meshing with the pinion 76, which, during its first half turn, will pull the positive article feeder 54 down so that this feeder pushes the orange C down past the open grippers 5 into the chute or holder 12, between the resilient supports 13 therein. The wrapper, having been severed, and being under the orange, is crimped up all around the orange between the orange and the sides of the chute or holder 12, into a cup shape the upper crimped rim parts of which extend up between the grippers 5, while the top of the orange is slightly below the horizontal plane of these grippers. The positive feeder 54, by having a definite range of action, stops pushing the orange down at this position just described; and the resilient supports 13, gently but firmly pressing around the lower portions of the orange and the wrapper therearound, prevent the orange from going too far down, as it would if left to the action of gravity. This pushing of the orange downward is completed in the first half turn of the pinion 76; and in the final half turn the positive feeder again is raised to its highest position.

The segment 57, going out of mesh with the pinion 76, at once begins meshing with the wide pinion 81 which, by the complete revolution it thus receives, closes the grippers to the positions shown in Fig. 10. These four grippers 5, swinging in from four sides of the upper parts of the cupped-up wrapper B, draw these upper parts evenly inward around the upper portions of the orange gradually until, having reached their completely closed position, they have compressed

a short neck portion of the wrapper in the cross-shaped space A (Fig. 10) which they then define with their spurs 6, in such manner that this portion cannot turn with the orange and the lower part of the wrapper when these latter receive their rotation with the support chute or holder 12. During this operation the gears 90 and 91 also will be turned, but they will cause no action, as they are turning in the direction in whch they cannot operate the eccentric 92 through its clutch pin 93.

As the segment 57 goes out of mesh with the pinion 81, leaving the grippers 5 closed and gripping the wrapper as just described, it immediately begins meshing with the pinion 96, to give it a complete revolution by which it gives the support or holder 12 a complete revolution. This chute or holder 12, firmly holding the orange and the surrounding lower parts of the wrapper by its resilient support strips 13, gives the orange and these lower parts of the wrapper a complete revolution relative to the upper parts of the wrapper held within the grippers 5, tightly twisting those parts of the wrapper extending from the grippers 5 down to the top of the orange, forming the neck D and leaving the short tuft E above the twist. At the end of this twisting revolution of the chute or holder 12, its opening 20 again will be at the upper end of the delivery through 106.

As the segment 57 unmeshes with the pinion 96, the rear segment 58 at once begins meshing with the gear 91, which now is turned in the opposite direction from that in which it previously was turned, so that it rotates the eccentric 92 by means of the clutch pin 93. The eccentric 92 thus pulls the lever 17 down, withdrawing the control ring 15 downward, retracting the upper interior conical surface of the ring from the noses 14 of the resilient support strips 13, which thus are allowed to spring outward from under the wrapped orange, which, no longer will be supported by these strips. This downward retraction of the control ring 15 occurs in the first half turn of the eccentric 92; and in the final half turn thereof the lever 17 is raised, returning the ring 15 to its upper position, again forcing the strips 13 inward across the chute or holder 12.

This turning of the gear 91, and with it the gear 90, causes also a complete revolution of the wide pinion 81, through its meshing with the gear 90, in direction opposite to that in which it was turned previously when it closed the grippers 5; so that by this present complete turn it opens the grippers 5 again to the position shown in Fig. 9. This opening of the grippers 5 thus begins simultaneously with the beginning of release of the support strips 13 outward; so that by the time these have ceased to support the wrapped orange, as above described, the grippers 5 also have moved to half open position, entirely out of engagement with the upper portion of the wrapper which they had been gripping. Thus, by the simultaneous release of the wrapped orange from these grippers 5 and from the support strips 13, the wrapped orange is allowed to drop down onto the inclined bottom 21 of the chute 12, to roll out through the opening 20 into the delivery trough 106.

Also, as the front segment 57 goes out of mesh with the pinion 96 it immediately begins meshing with the pinion 102, to which it imparts a complete revolution simultaneously with the release of the wrapped orange by the rear segment 58 and gear 91 as just described; and this gives the lower wrapper-feed roll 28 a complete revolution, feeding the next wrapper-length of wrapper strip B out across the top 3, completing the cycle of operations of the machine.

In practice, for wrapping fruit such as oranges or the like, the feed trough 44 may lead from the sizing machine, and the delivery trough 106 may lead directly to the crate or box in which the wrapped fruit is shipped. By having two or more distinct operations effected simultaneously and largely through the same operating elements, as above described, the machine is made simple and compact, of relatively inexpensive construction, and capable of relatively rapid operation with little liability of derangement. The fruits are graded in many different sizes, but the gripper and support parts of my machine need not be of so many different sizes, as the neck D formed by the grippers may be the same size on all sizes of fruit, and the support strips 13, converging as they do, will support any one of several different sizes of fruit. However, a machine for each size of fruit is preferable, although several machines, for several slightly different sizes of fruit, may be identical as to size of gripper and support or holder mechanism; because by having a machine for each size of fruit the direct delivery into the boxes, as above mentioned, is possible, each box being required to contain fruit of only one size.

Various modifications may occur in practice, to meet various conditions, and while I have disclosed my invention rather specifically in order that it may readily be understood, I do not wish to be understood as being limited to such precise disclosure, but having thus fully disclosed my invention as required, what I claim as new and desire to secure by Letters Patent is:

1. In a wrapping machine, an article holder and gripping means relatively rotatable, said holder having an entrance along the axis of rotation, and said gripping means comprising grippers fulcrumed at points spaced around said entrance, and an element rotatable around said entrance and connected to said grippers whereby said

grippers, on rotation of said element, are moved from separated open positions at sides of said entrance to approached gripping positions across said entrance.

2. In a wrapping machine, an article holder and gripping means relatively rotatable, said holder having an entrance along the axis of rotation, and said gripping means comprising grippers fulcrumed at points spaced around said entrance, said grippers being curved around said entrance in open positions and an element rotatable around said entrance and connected to said grippers whereby said grippers, on rotation of said element, are moved from said open positions to approached gripping positions across said entrance.

3. In a wrapping machine, an article holder and gripping means relatively rotatable, said holder having an entrance along the axis of rotation, and said gripping means comprising grippers fulcrumed at points spaced around said entrance, said grippers being curved around said entrance in open positions, and each gripper having a spur directed toward said entrance, and an element rotatable around said entrance and connected to said grippers whereby said grippers, on rotation of said element, are moved from said open positions to positions across said entrance with said spurs closely approached to each other near said axis of rotation.

4. In a wrapping machine, wrapper-gripping means comprising a support, a ring circumferentially rotatable on said support, grippers fulcrumed on said support at spaced points around said ring, each comprising a straight part extending from its fulcrum across and spaced away from said ring and a curved part offset from the straight part toward said ring, curving around the interior opening of the ring under the straight part of the adjacent gripper, and slidable connections between the respective curved parts and said ring.

5. In a wrapping machine, wrapper-gripping means comprising a support, a ring circumferentially rotatable on said support, grippers fulcrumed on said support at spaced points around said rings, each comprising a straight part extending from its fulcrum across and spaced away from said ring and a curved part offset from the straight part toward said ring, curving around the interior opening of the ring under the straight part of the adjacent gripper and having a spur directed from the inner edge of its curved part toward the center of the ring, adjacent to the offset of the gripper, and slidable connections between the respective curved parts and said ring.

6. In a wrapping machine, an article holder and gripping means relatively rotatable, said holder having an entrance along the axis of rotation and comprising expansible means with article-holding sides converging away from said entrance and fixed against movement away from said entrance axially of the holder, for holding an article slightly inward from said entrance, and said gripping means having having an operation from open position aside from said entrance to a closed gripping position across said entrance, and article-feeding means having a definite range of movement through said entrance into said holder axially of the holder.

7. In a wrapping machine, an article holder having a cylindrical interior and rotatable on the axis of said interior, with an open entrace at one end of said interior, support elements connected to the walls of said interior at intervals therearound near said entrance, means for causing said elements to converge from said entrance in varying degrees, and gripping means having an operation from open position aside from said entrance to a closed gripping position across said entrance.

8. In a wrapping machine, an article holder having a cylindrical interior and rotatable on the axis of said interior, with an open entrance at one end of said interior, support elements connected to the walls of said interior at intervals therearound near said entrance, means for causing said elements to converge from said entrance in varying degrees, gripping means having an operation from open position aside from said entrance to a closed gripping position across said entrance, and article-feeding means having a definite range of movement through said entrance into said holder axially thereof.

9. In a wrapping machine, an article holder and gripping means relatively rotatable, said holder having an entrance along the axis of rotation and comprising expansible means with article-holding sides converging away from said entrance and fixed against movement away from said entrance axially of the holder, for holding an article slightly inward from said entrance, and said gripping means having an operation from open position aside from said entrance to a closed gripping position across said entrance, means for spreading a wrapper across said gripping means and said entrance, means for placing an article on said wrapper within the lateral limits of said entrance, and article-feeding means having a definite range of movement from beyond the placed article through said entrance into said holder axially thereof.

10. In a wrapping machine, an article holder and gripping means relatively rotatable, said holder having an entrance along the axis of rotation, and said gripping means having an operation from open position aside from said entrance to a closed gripping position across said entrance, means for spreading one end part of a strip of wrapping ma-

terial across said gripping means and said entrance, means for placing an article on said end part within the lateral limits of said entrance, and means for severing said end part from said strip while said article is in place on said end part.

11. In a wrapping machine, an article holder having a cylindrical interior and rotatable on the axis of said interior, with an open entrance at one end of said interior, resilient support elements having ends fixed to the walls of said interior at intervals thereabout near said entrance, said holder having lateral openings and said elements having noses extending out through the respective openings, and a control ring embracing and slidable axially along said holder and having an interior conical surface engaging said noses for causing said elements to converge from said entrance in varying degrees.

12. In a wrapping machine, an article holder and gripping means relatively rotatable, said holder having an entrance along the axis of rotation, and said gripping means having an operation from open position aside from said entrance to a closed position across said entrance, article feeding means discharging toward said entrance, a loop extending from side to side of said article-feeding means around said entrance, and means acting through said loop into said entrance to force an article into said entrance, said loop being spaced from said entrance to admit a wrapper across said entrance and said gripping means.

13. In a wrapping machine, an article-feeding device, a wrapper-gripping device, a wrapper-feeding device, and a releasable holder receiving articles through said gripping device, and mechanism having repeated cycles of operations to simultaneously first release and then reset the holder, open the gripping device, and operate the wrapper-feeding device to feed a wrapper, then to successively operate the article-feeding device to feed an article and the wrapper through the gripping device into the holder, close the gripping device, and rotate the holder.

14. In a wrapping machine, a first article-feeding device, a second article-feeding device, a wrapper-gripping device, a wrapper-feeding device, and a releasable holder receiving articles and wrappers through the gripping device, and mechanism having repeated cycles of operations to simultaneously first release and then reset the holder, open the gripping device to permit passage of an article and wrapper, and operate the wrapper-feeding device to feed a wrapper, then to successively operate the first article-feeding device to supply an article, operate the second article-feeding device to feed the article and the wrapper through the gripping device into the holder, close the gripping device, and rotate the holder.

15. In a wrapping machine, a rotor having projecting means, and devices successively engaged by said means upon rotation of said rotor to successively supply a wrapper, supply an article to the wrapper, draw and hold the wrapper around the article with part of the wrapper extended from the article, grip the extended part of the wrapper, rotate the article and the article-surrounding part of the wrapper relatively to the gripped part, and then ungrip the wrapper part and release the article and wrapper together.

16. In a wrapping machine, a rotor having projecting means, article-feeding mechanism, wrapper-gripping mechanism, article-and-wrapper holding and rotating mechanism, and wrapper-feeding mechanism, said mechanisms being successively engaged and operated by said projecting means, in the order mentioned, upon rotation of said rotor.

17. In a wrapping machine, a rotor having projecting means, a first article-feeding mechanism, a second article-feeding mechanism, wrapper-gripping mechanism, article-and-wrapper holding and rotating mechanism, and wrapper-feeding mechanism, said mechanisms being successively engaged and operated by said projecting means, in the order mentioned, upon rotation of said rotor.

18. In a wrapping machine, a rotor having two circumferentially and axially spaced projecting means, article-feeding mechanism, wrapper-gripping mechanism, releasable article-and-wrapper holding and rotating mechanism, and wrapper-feeding mechanism, said mechanisms being successively engaged and operated by one projecting means, in the order mentioned, upon rotation of said rotor, the operation of the wrapper-gripping mechanism being to grip the wrapper, and releasing means for the holding mechanism, said releasing means being engaged by the second projecting means and engaging the gripping mechanism, simultaneously releasing and resetting said holding mechanism and releasing the wrapper from the gripping mechanism, after the holder-rotating operation.

19. In a wrapping machine, a rotor having projecting means, article-feeding and wrapper-strip-severing mechanism, a second article-feeding mechanism, wrapper-gripping mechanism, article-and-wrapper holding and rotating mechanism, and wrapper-strip-feeding mechanism, said mechanisms being successively engaged and operated by said projecting means, in the order mentioned, upon rotation of said rotor.

20. In a wrapping machine, a rotor having two circumferentially and axially spaced toothed segments, pinions successively meshed with one of said segments on rotation of said rotor, whereby said pinions re successively rotated in direction opposite to that of the rotor rotation, two unitary coaxial gears, out of the path of the one segment, one

gear meshing with one of said pinions on rotation of said rotor, whereby, when this pinion is meshed by the one segment, said gears are rotated in the same direction as that of the rotor rotation, and the other gear meshing with the other segment on rotation of said rotor, whereby said gears are rotated in direction opposite to that of rotation of the rotor and said one pinion is rotated in the same direction as that of the rotor rotation, mechanisms operatively connected to the respective pinions and actuated by the rotations of the pinions, the mechanism connected to the one pinion being actuated by both rotations of said pinion, and mechanism comprising ratchet means by which it is operatively connected to said gears to be actuated only by the rotation of said gears in direction opposite to that of the rotation of the rotor, said mechanisms being adapted, when so actuated, to perform various operations upon an article and a wrapper, to wrap the article.

21. In a wrapping machine, a rotor having a plurality of projections, a plurality of mechanisms adapted, when actuated, to perform various operations upon an article and a wrapper, to wrap the article, means comprised in respective certain ones of said mechanisms, successively engaged by one of said rotor projections, to actuate said mechanisms, means comprised in another one of said mechanisms, engaged by the other rotor projection, this means also engaging one of the first mentioned mechanisms so that this mechanism is actuated first one way and then the other by one or the other projection, but this means having a ratchet relation to said other one of said mechanism, so that this other mechanism is actuated one way only, by only one of said rotor projections.

22. In a wrapping machine, a rotor having a projection, a plurality of mechanisms adapted, when actuated, to perform various operations upon an article and a wrapper, to wrap the article, means comprised in the respective mechanisms, successively engaged by said rotor projections, to actuate said mechanism, said rotor having an additional projection, and means whereby each mechanism is held stationary between actuations, under the control of said additional projection so as to release the respective mechanism for actuation when about to be engaged by the first mentioned rotor projection.

23. In a wrapping machine, a rotor having a toothed segment, pinions successively meshed with said segment on rotation of said rotor, whereby said pinions are successively rotated, detent elements rotating with the respective pinions, pawls yieldingly engaging the respective detent elements to hold the pinions stationary, and engaging means rotating with said rotor to disengage each pawl from the detent element as the respective pinion is meshed by said segment, and mechanisms operatively connected to the respective pinions, each actuated by rotation of the respective pinion to perform a distinct operation comprised in the process of wrapping an article.

24. In a wrapping machine, a rotor having two circumferentially and axially spaced toothed segments, a plurality of toothed wheels, certain ones of which are successively meshed with one segment on rotation of the rotor, and another one of which toothed wheels is meshed with the other segment as said rotor rotates and also is in mesh with one of the first mentioned toothed wheels, which thus receives an opposite rotation, detent elements rotating with respective ones of the first mentioned toothed wheels, pawls yieldingly engaged with the respective detent elements to hold the pinions stationary, and two circumferentially and axially spaced engaging means rotating with said rotor, all of said pawls having means engageable by one of said rotor engaging means and the pawl of the toothed wheel receiving rotations in both directions also having means engageable by the other one of said rotor projections, to disengage each pawl from its detent means when the respective toothed wheel is rotated, and mechanisms operatively connected to the respective toothed wheels, each actuated by rotation of the respective toothed wheel to perform a distinct operation in the process of wrapping an article.

25. In a wrapping machine, a rotary article holder having an open end, and a plurality of wrapper-gripping elements each having a spur closing together across said end and bringing said spurs close together near the center of said open end.

26. In a wrapping machine, gripping elements approaching from various directions to hold a wrapper around an article while twisting the wrapper together at one side of the article, and relatively rotatable members both connected to each of said elements to cause approach of said elements by the relative rotation of said members.

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