Apr. 24, 1923. 1,452,604

A. E. HOPKINS

WRAPPING MACHINE

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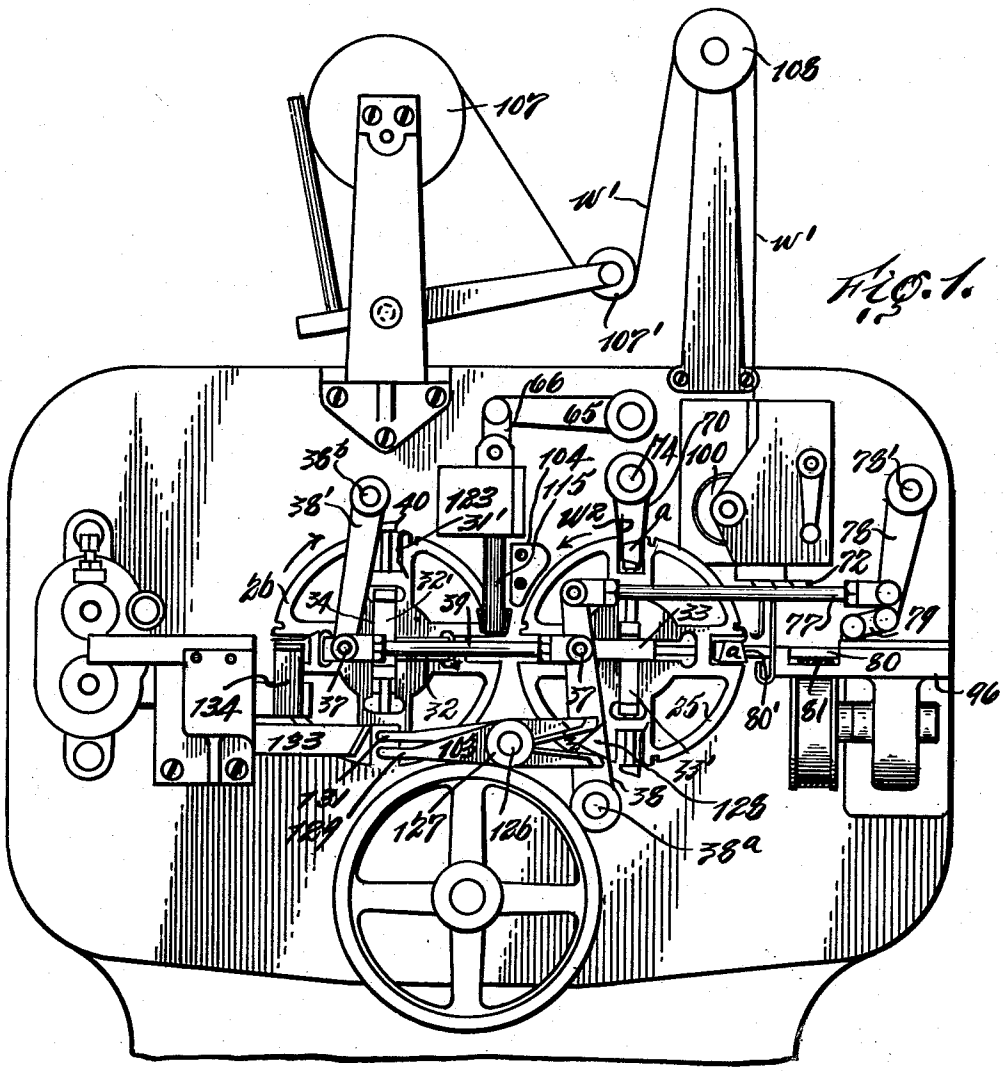


FIG. 1.

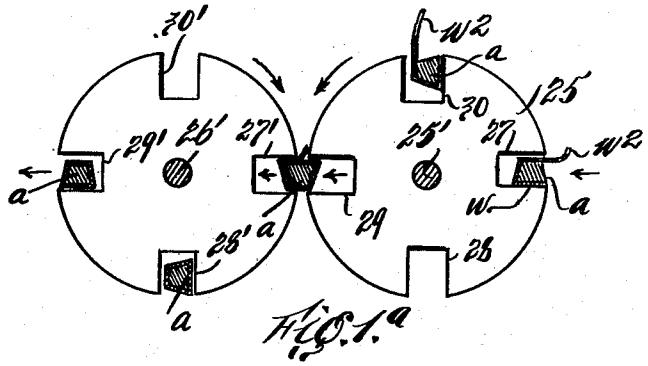


FIG. 1a.

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By his Attorney
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A. E. HOPKINS

WRAPPING MACHINE

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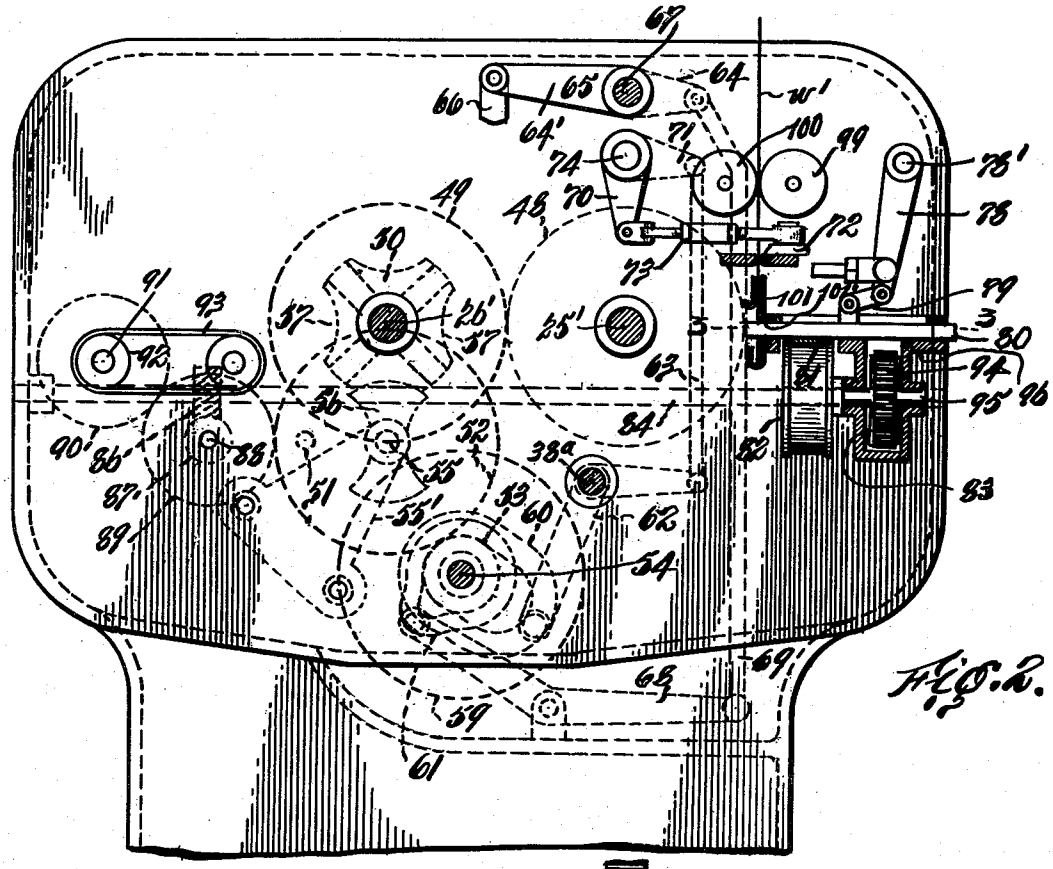


Fig. 2.

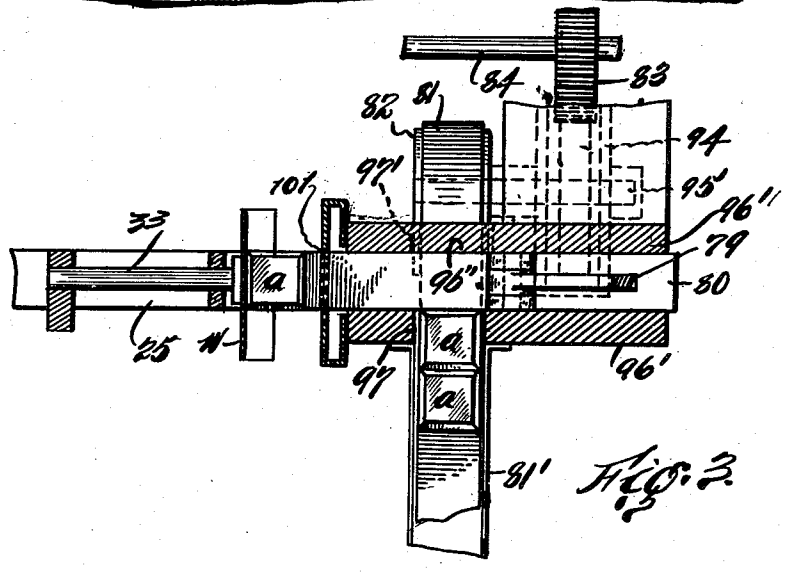


Fig. 3.

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Apr. 24, 1923. 1,452,604

A. E. HOPKINS

WRAPPING MACHINE

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Fig. 4.

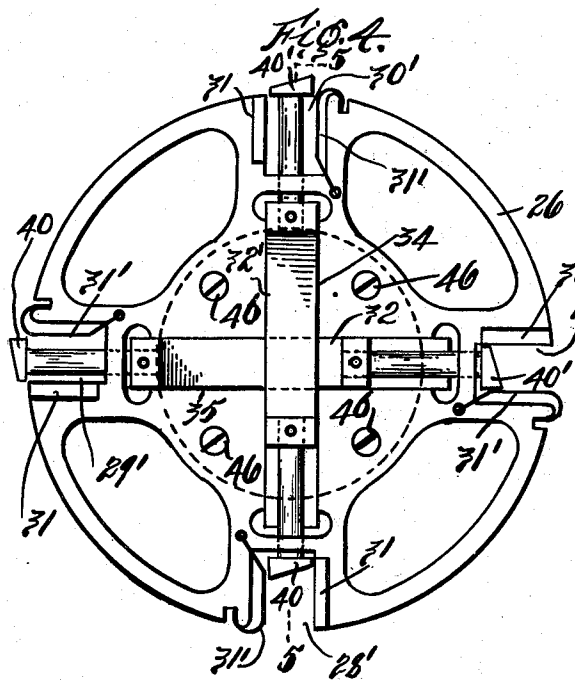


Fig. 5.

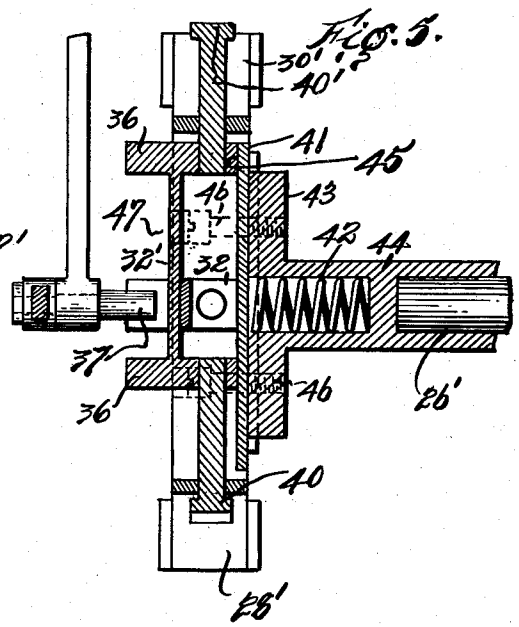


Fig. 6.

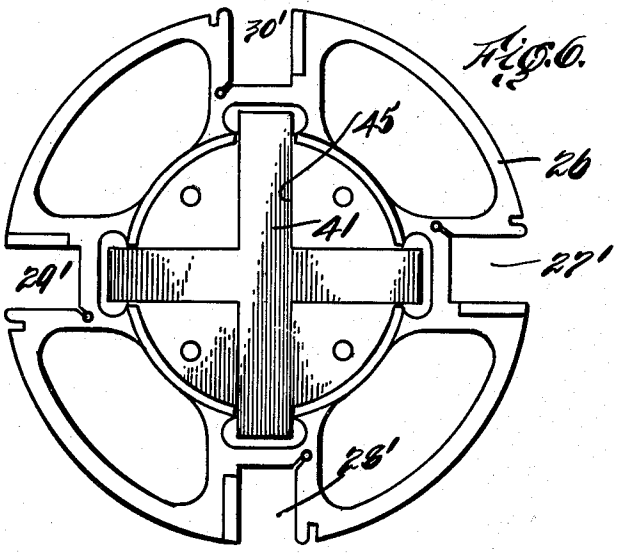


Fig. 7.

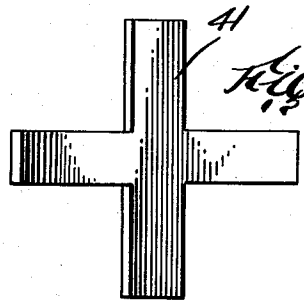
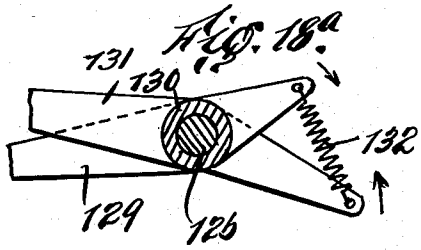


Fig. 18a.



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A. E. HOPKINS

WRAPPING MACHINE

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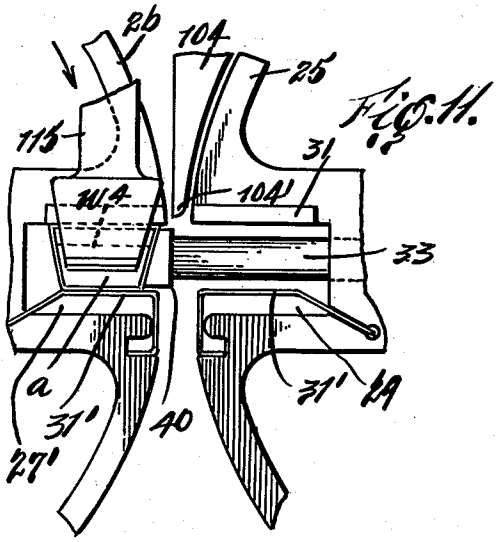


Fig. 11.

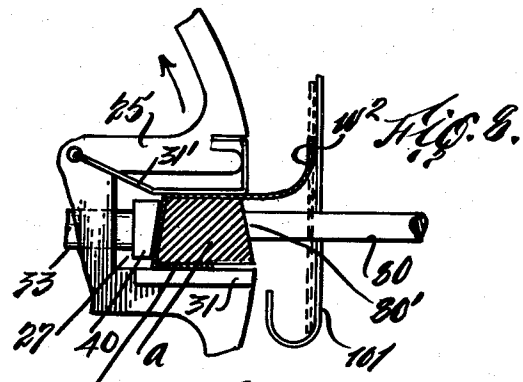


Fig. 8.

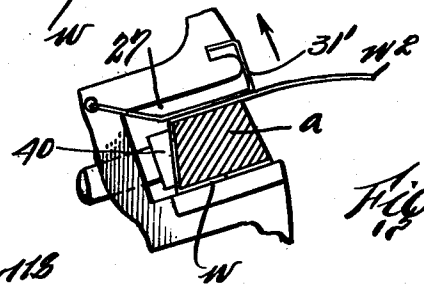


Fig. 9.

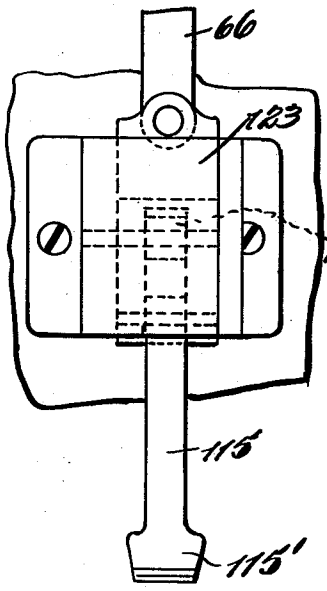


Fig. 12.

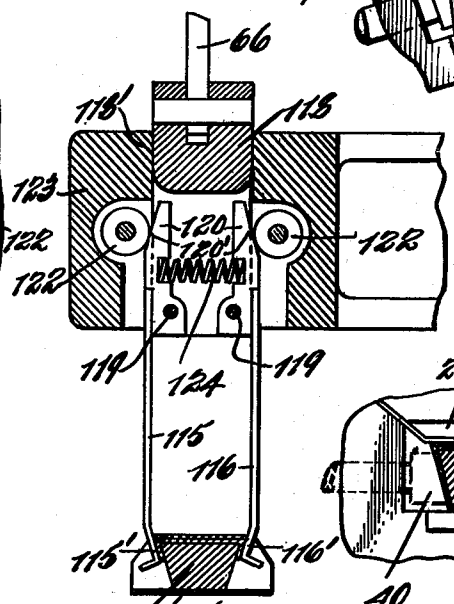


Fig. 13.

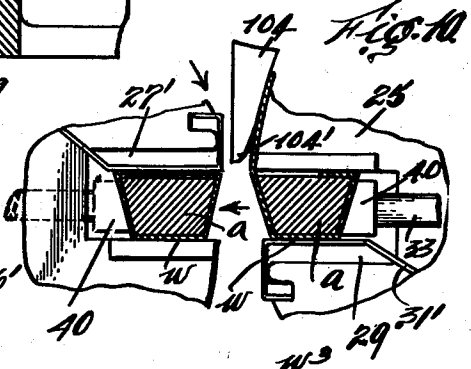


Fig. 10.

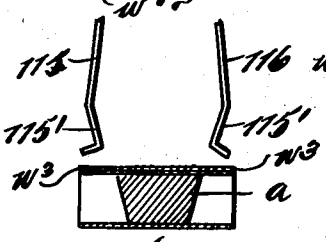


Fig. 14.

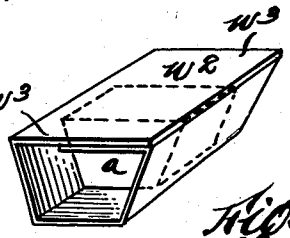


Fig. 15.

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A. E. HOPKINS

WRAPPING MACHINE

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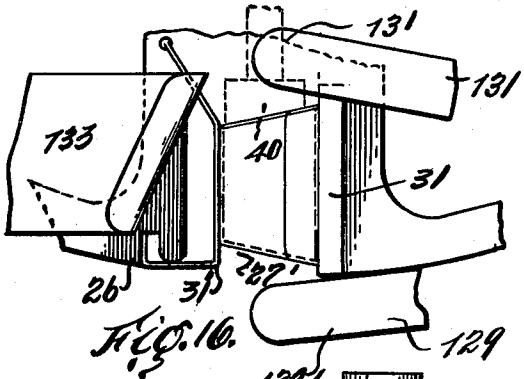


Fig. 16.

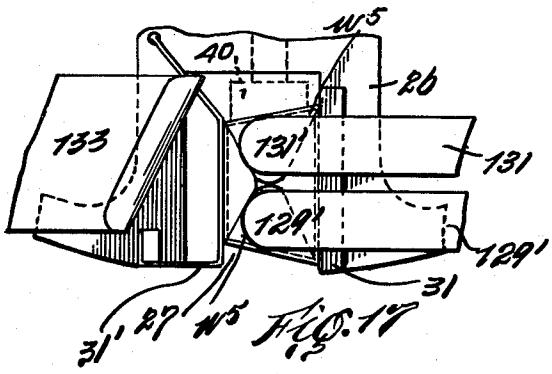


Fig. 17.

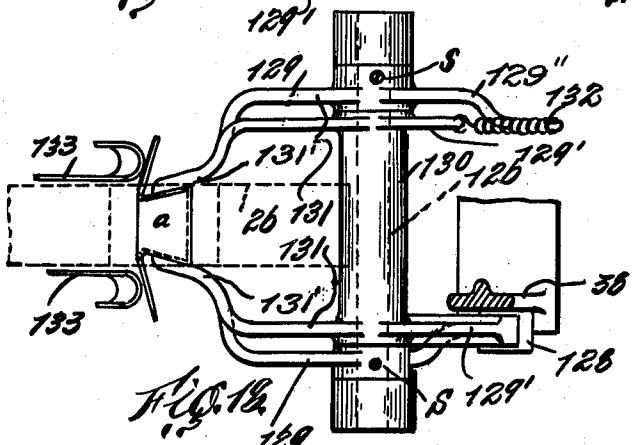


Fig. 18.

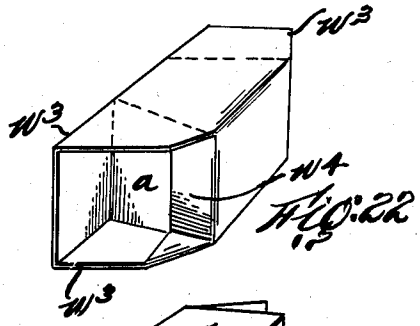


Fig. 22.

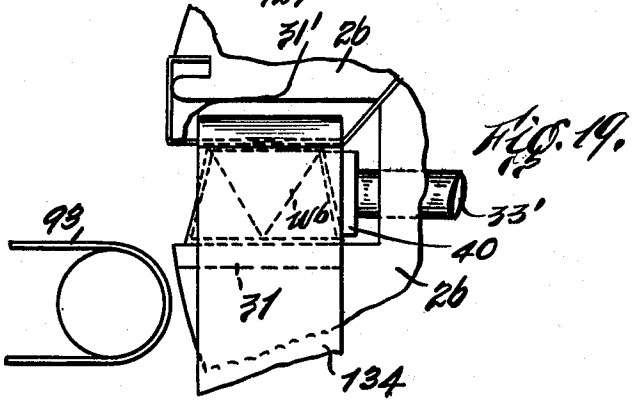


Fig. 19.

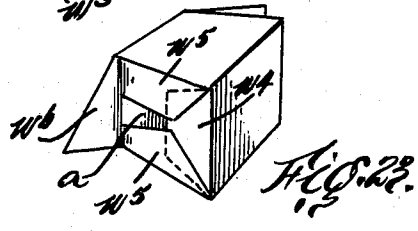


Fig. 23.

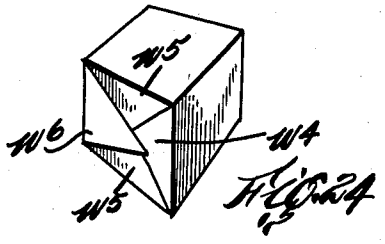


Fig. 24.

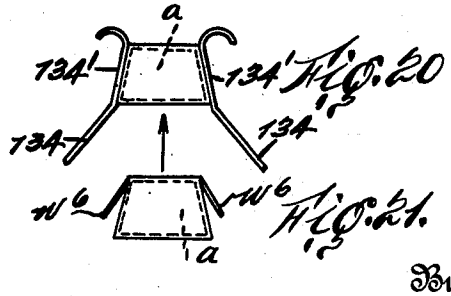


Fig. 20.

Fig. 21.

Inventor
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By his Attorney
Walter D. Edmonds.

Patented Apr. 24, 1923. 1,452,604

UNITED STATES PATENT OFFICE.

ARCHIBALD E. HOPKINS, OF MIDDLETOWN, NEW YORK, ASSIGNOR TO THE BORDEN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

WRAPPING MACHINE.

Application filed April 2, 1920. Serial No. 370,738.

To all whom it may concern:

Be it known that I, ARCHIBALD E. HOPKINS, a citizen of the United States, and a resident of Middletown, county of Orange, and State of New York, have invented a certain new and useful Wrapping Machine, of which the following is a specification.

My invention relates to that class of well known machines by aid of which various articles are automatically and relatively smoothly and stably enfolded in wrappers of paper, foil, or other appropriate materials. The objects of my invention comprise particularly provision of novel means whereby such machines are, for the first time as I believe, enabled to so operate on articles which are in the form of a truncated pyramid, such for example as those well, but but geometrically inaccurately, known in the market as "chocolate cubes," these articles bing bounded by a square major-surface, or base, by a therewith parallel square minor surface, or truncated end, and by four intervening sides, two of each of which are mutually inclined towards each other.

I attain the above, and other useful objects, by aid of my mechanisms as illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the machine, some few parts being shown in vertical cross section;

Figure 1ª is a diagrammatic sketch indicative of the turrets and their pockets and of the relative positions, at different stages, of the articles and parts of their wrappers, the latter being indicated in central vertical cross section;

Figure 2 is a front, largely diagrammatic, view illustrative of most of the devices and means employed in actuating the operative elements of the machine, some elements being shown in vertical section, owing to the parts thereof, and of other elements, intervening between the section and the observer being omitted;

Figure 3 is, on enlarged scale, a fragmentary sectional view, taken on line 3—3 of Figure 2, illustrative more particularly of the feed belt and of the plunger which advances the article from said belt into the first turret wheel;

Figure 4 is, on enlarged scale, a detail view of the second turret wheel showing the front thereof as per its presentation in Figure 1;

Figure 5 is a cross section of Figure 4 taken on the line 5—5 of the latter, and also diagrammatically showing a part of one of the slide actuating arms;

Figure 6 is a rear view of the turret wheel shown in Figure 4;

Figure 7 is a detail view of the brake plate shown in Figure 6;

Figure 8 is, on still more enlarged scale, a diagrammatic detail view indicative of the respective positions of the article, parts of its wrapper, the pocket and other adjacent elements immediately after the article and its wrapper have been fed into the first turret wheel, the part of the wrapper and the article being shown in central vertical section;

Figure 9 shows similarly the same article and part of its wrapper as they appear shortly after the turret wheel begins to rotate from its temporary stationary position indicated in Figure 8;

Figure 10 indicates the relative positions at the moment when the first turret wheel pauses, after it has rotated 180° from the position shown in Figure 8, and also indicating at the left of the figure, the relative positions of the article and parts of its wrapper after they have been fed from the first into the second turret wheel;

Figure 11 similarly indicates the relative positions at the stage when the folding fingers have descended to make the first end-folds of the wrapper and before the second turret wheel has begun to rotate from its position shown in Figure 10.

Figure 12 is, on reduced scale compared to that of Figure 11, a detail front view illustrative of one member of the pair of the first-end-fold making fingers and of the connections with actuating parts.

Figure 13 is, on same scale as Figure 12, a detail view of the fingers and their connections illustrated in that figure, but viewed at right angles to the latter, and showing some of the parts in vertical section, including an article and parts of its wrapper.

Figure 14 is a diagrammatic fragmentary detail view illustrating, and partly in cross section, the partly wrapped article and its wrapper just prior to the descent thereon of the first-end-fold making fingers as shown

in Figure 11, and also showing the disposition of the operative ends of the fingers just prior to their descent.

Figure 15 is on much enlarged scale a perspective view of the article and its wrapper as they appear after being fed into the pocket of the second turret wheel, i. e. into the position in which they will be operated upon by the first actuating pair of first-end-fold making fingers.

Figure 16 is, on similar scale, a detail, largely diagrammatic, front view of the operative ends of one member of each of the two pairs of coacting pairs of second-end-fold making fingers just prior to their being actuated toward each other to make those folds and showing also an elevation of an article and its wrapper at this stage of the operation; also parts of elements constituting the article and wrapper holding pocket;

Figure 17 illustrates the same parts as in Figure 16 after the fingers have been actuated toward each other;

Figure 18 is, on somewhat reduced scale, a top plan view of the parts as shown in Figure 17 and also of the rock shaft and thereon mountings of the fingers and of the means for maintaining their operative ends normally apart and for intermittently actuating them towards each other, the actuating arm being shown partly in cross section.

Figure 18ª, is a diagrammatic detail view illustrating the means whereby the operative ends of the second-end-fold making fingers are normally held apart.

Figure 19 is, on enlarged scale, a detail, diagrammatic view illustrating the then completely wrapped article and adjacent parts just prior to its transference by an ejector from a pocket of the second turret wheel to the removal belt.

Figure 20 is a diagrammatic end view of the operative ends of the spring tensioned plates in the act of finally pressing to ultimate place the end folds of the wrapper as shown in Figure 19.

Figure 21 is a similar view of an article and the final end folds just prior to their compression as shown in Figure 20.

Figure 22 is, on enlarged scale, a perspective view of an article and its wrapper after the first end folds have been made as per what is shown in Figure 13.

Figure 23 is a similar view after the second end folds have been made as per what is shown in Figures 16, 17 and 18.

Figure 24 is a similar view after the final end folds have been made and the wrapping has been completed.

The rapid automatic wrapping of an article which is, specifically, in the form of a truncated pyramid, or the frustum, of a pyramid, and in such manner that the wrapper, often fragile, shall be, and remain, in its final disposition, smoothly and intactly folded upon, and in conformity with, the exterior surfaces of the article, has long involved hitherto, I believe, insurmountable difficulties due to its above specified shape and it is to the overcoming of these that my hereinafter described novel automatic treatments of the article and wrapper, and my utilizations and remodellings of old instrumentalities, and my combinations of the latter with my novel devices, has been especially, and successfully, addressed as hereafter claimed.

To the end that my improvements may be described in such full, clear and exact terms as to enable those skilled in the art to construct and use my invention, I embrace in this specification and the above referred to drawings a description of one substantially complete type of organized machine utilizable for the purpose.

This machine comprises a pair of closely approximated article-carrying wheels, 25, 26, hereinafter referred to as "turrets", and rotatable in the same vertical plane, and in opposite directions (as indicated by the arrows in Figure 1), by aid of thereto secured mutually parallel shafts, 25′, 26′, respectively. Each of these turrets contains not less than a pair, in this instance two pairs, i. e. four, alike, receptacles, or pockets, 27, 28, 29, 30 in turret 25, and 27′, 28′, 29′ and 30′ in turret 26, for reception therein of an article, *a*, and its wrapper, *w*. The pockets of each pair are oppositely disposed and each of these pockets is open toward the periphery of the turret as shown in Figure 4, and each comprises, as a constituent thereof, a relatively rigid side, i. e. a plate, 31, and opposite thereto a resilient, or relatively yielding, side, i. e., a spring plate, 31′. Between these plates the article and its wrapper are, automatically inserted, as hereinafter described, and thereafter sufficiently held by the thereagainst yielding pressure of the spring plate, 31′. The units of each pair of mutually oppositely disposed pockets of each turret are, of course, constantly in alignment with each other at locations 180° apart, and four of said pockets, i. e. two in each of the turrets, are, when the turrets are normally stationary, also in alignment with each other, as indicated in Figure 1ª. The turrets carry longitudinally extended ejectors 32, 33, which are reciprocatable between oppositely disposed pockets of their respective turrets, in paths extending across the axes of rotation of the turrets. In the present instance each turret carries a pair of these ejectors which are therein radially so slidable at right angles to each other, i. e. turret 26 carries two ejectors, 32 and 32′, and turret 25 two ejectors, 33, 33′. The ejectors are thus slidably carried in suitable slots, or guideways, 34, 35, as indi-

cated in Figure 4, and are so conformed relatively to each other, as by one of them being cut away as indicated at 47 (Fig. 5), that they remain in mutual sliding contact with each other during their respective reriprocations. Each ejector carries, equidistantly from its longitudinal center a pair of alike lugs, 36, 36, (Fig. 5), engageable in turn by one of a pair of alike pins, 37, one of which, (to serve the ejectors of turret 25) is carried by an actuating arm, 38, carried by a rock shaft, 38^a, (Figs. 1 and 2) suitably mounted in stationary parts, and the other, 38′, (to serve the ejectors in turret 26) is oscillatably mounted on a shaft, or pivot, 38^b, carried by a stationary part. The arms, 38 and 38′, are so oscillatable in unison, being mutually conected by a therewith pivotally connected link 39. Each ejector has two alike, oppositely disposed operative ends, or heads, 40, 40′, (Fig. 1) transversely bevelled, as is important, at an angle corresponding with that of the inclined sides of the article to be wrapped. The said ends of each ejector are insertable into the respectively proximate pocket, and the beveled surfaces thereof are similarly inclined, that is to say, in the same direction in the one turret; but said inclinations of the ends of the ejectors in one of the turrets are the reverse of those in the other turret. The length of the ejectors is such that when at the limit of their outward stroke one end enters a pocket sufficiently to eject therefrom a therein contained article, and the opposite end is simultaneously proportionately withdrawn from the opposite pocket, and vice versa, at each reciprocation of the ejector. It follows from the above described construction that, in the present instance, the ejectors are not reciprocatable until four of the pockets, i. e. two in each turret, have been rotated into alignment (in this instance horiontal as indicated in Figs. 1 and 2), and that during such alignment of the pockets the two ejectors, i. e. one in each turret, which are then also in alignment can be simultaneously advanced, the one into a pocket of its own turret so as to eject therefrom an article, and insert it into a pocket of the other turret, and the other ejector can be simultaneously withdrawn from said last mentioned pocket and eject an article from an opposite pocket of its own turret by aid of means hereafter described for so imparting through said pins and actuating arms reciprocation to the ejectors.

The above described opposite inclinations of the operative ends of the ejectors result in their underlying, and upholding the article during its transit from a pocket in one turret to a pocket in the other as indicated in Figure 1^a.

I provide means for unabruptly, as is important, constantly restraining momentum imparted to the ejectors by the strokes of the pins 37, and thereby ensure regulated movement of the ejectors without jar to the article, and without undesirable centrifugal or other displacement of the latter, or of the ejectors, during rotation of the turrets. To this end, 41 is a constantly spring-impelled plate, or brake, member, movably carried by each turret in frictional contact with one, preferably a plane, side of the ejectors, one or more, carried in such turret. This brake plate is in the rear of its turret held in place by aid of an annular plate 43, carried by a hub 44, carried by the shaft (25′ or 26′ as the case may be) on which the turret is rotated. An expansile spring 42 contained in a recess countersunk in the hub and shaft, bears against the brake plate 41 to constantly yieldingly force it against the therewith contacting ejector or ejectors, the pressure being sufficient to prevent the ejectors from moving except while being positively pushed by the pins 37.

As shown in the drawings, and as is important, the plate extends radially from opposite sides of the axis of rotation of the turret and in parallelism with the above refererd to paths in which the ejectors reciprocate across said axis; also the spring is disposed so as to bear against the plate in proximity to the latter's centre. It follows that the ejectors are, during all of their reciprocations, constantly subjected to a uniform yielding friction, or drag, applied to each on either side of its centre whereby the ejectors are moved and held in required position during all stages of the operation.

The plate 41 is, when two ejectors are employed, preferably, in the form of a cross as shown in Figure 7, the four radially, quadrentially, extending arms of which are positioned in parallelism with the paths of the ejectors during their reciprocation, it being thereby rendered more operative when most needed, and it is located in recesses 45, of corresponding shape, countersunk in the rear of the turret (Fig. 5). It will be understood that the plate 43 does not, normally, bear against the brake plate 43. The turrets are removably secured to their respective plates 41 by set-screws 46. I provide means for imparting to the turrets simultaneous intermittent rotation through arcs of 90° at each advance, as follows: Their respective shafts 25′, 26′, carry respectively one of the intermeshed gears 48, 49, (Fig. 2). The shaft 26′ carries also a Geneva star wheel 50, actuated by a pin 51, carried by a gear disc 52, with which meshes a pinion 53 carried by the main driven shaft 54 of the machine. The gear-disc 52 is carried by a rotatory shaft 55 which also carries a Geneva lock 56, which engages in turn the concavities 57 in the periphery of the Geneva star wheel 50.

The main driving shaft 54 also carries a

disc, 59, containing in one face thereof a cam race 60, and in the other a cam race 61. By aid of the cam race 60 I rock a therewith cooperating bell-crank lever 62, carried by the rock shaft, 38ª. The operative end of this lever is connected by a link 63 with one arm 71 of a rock lever 65, mounted on a shaft, or pivot, 67, carried by a stationary part. The opposite arm, 64′, of the lever carries a link 66 connecting with my devices for making the first end folds of the wrapper, as hereafter described.

By aid of the cam race 61, I rock a therewith cooperating bell-crank lever 68, connected by a link 69, with one of the arms 64 of a bell crank lever mounted on a shaft, or pivot, 74, carried by a stationary part, and the other arm 70 of which is operatively connected by aid of an adjustable link 73, with any convenient type of wrapper-cutting devices (diagrammatically indicated by 72, Fig. 2), these being, I believe, too well known to require further description here.

I provide means for charging an article together with its wrapper into a pocket of the turret 25 synchronously with the withdrawal of an ejector from such pocket, viz: I connect the actuating arm, 38, by a link, 77, to an arm, 78, oscillatably mounted on a shaft, or pivot, 78′, carried by a stationary part, and pivotally connected by a link, 79, with a reciprocatory plunger, 80, the operative end, 80′, of the plunger being, as is important, bevelled to correspond with the incline, or bevel, of the thereto opposed side of the article. The plunger is advanceable in alignment with the opening of the pocket so far as to enable it to push the article from off a feed belt, 81, and, thereafter, together with the wrapper, into the pocket (Fig. 8).

The endless feed belt, 81, mounted on a pair of usual pulleys, one of which is not shown, is continuously propelled transversely of the direction of reciprocation of the plunger by aid of the other of said pulleys, 82, carried by a shaft, 95, carrying a gear, 94, meshing with a gear, 83, carried by a shaft, 84, carrying a spiral gear, 86, meshing with a spiral pinion, 87, carried by a shaft, 88, carrying a gear 89, meshing with the gear disc, 52, (Fig. 2). I provide another endless belt, to remove the completely wrapped articles after their ejection from the turret 26. This belt, 93, likewise mounted on a usual pair of pulleys, is propelled continuously by aid of a gear, 90, intermeshed with the gear, 89, and carried by the rotatory shaft, 91, of the other of said last mentioned pair of pulleys, 92.

The plunger, 80, is, as usual, reciprocated in a slideway comprising a bottom, 96, and vertical sides, 96′, 96″ (Figs. 2 and 3). The side 96′ is cut away at 97 to afford an opening for passage therethrough of the feed belt, 81, and of the thereon carried articles, *a*, *a*, (Fig. 3) and in the side, 96″ (Figs. 2 and 3) is a slot, 97′, of aperture such as to afford passage therethrough of the feed belt only, from which it follows that an article, when it has been carried into the path of the plunger in the slideway, is stopped there by the side 96″, or before that by the plunger when the latter has been advanced as shown in Fig. 3, while, during such stoppage, the belt slipping under the article continues its advance.

The articles are restrained from being dislodged from the feed belt by usual lateral guide rails, 81′, (Fig. 3).

The wrapper, *w*, composed, as usual, of appropriate material such as paper, or tinfoil, etc., is fed in a continuous strip of appropriate width, by any of the preferred known means, to a location in which it hangs broadside over the opening of the pocket, and thus in the article's path theretowards, and is, therefore, forced into the pocket by, and simultaneously with, the article, while by its progressive contact with the plates, or sides, 31, 31′, and the constant uniform pressure thereon of the bevelled face of the withdrawing ejector, and simultaneous pressure on the article of the bevelled face of the plunger, the wrapper is folded and pressed into position required for it to smoothly envelop a portion of the base, also all of the truncated top, and one, (the then inmost) of the inclined sides of the article by the time the latter has arrived at its ultimate position in the pocket. It will be understood that coincidently with inception of its entry into the pocket, the strip of wrapper material is automatically severed, by the usual means referred to, and at such distance above the pocket as to provide enough wrapper to somewhat more than cover the three last referred to surfaces of the article, and also one more of its inclined sides. The means for so automatically feeding the strip, like those for cutting it, are, I believe, too well known to require other explanation than that 99 and 100 (Fig. 2) are usual rollers, which, as per well known actuating devices, intermittently feed the as yet unsevered continuous strip of wrapper material, *w*′, downwardly and beyond the above referred to usual cutter, or knife, 72, to, as above described, hang at the appropriate moment, in front of the mouth of the pocket,—the maintenance of required position of the wrapper strip during its said descent being assisted by a usual guide plate, 101, though which, in this instance however, is cut an opening, 101′, (Fig. 3) to admit passage therethrough of the article and of the operative end of the plunger, 80. The strip of wrapper material is, as usual, drawn from a reel, 107, from thence under an adjusting pulley, 107′, and from thence over another pulley, 108, to pass between the feed rolls, 99, 100 (Fig. 1).

The construction, operation and timing of the respective parts and devices above described is such that the turrets will, intermittently, be simultaneously rotated in opposite directions through arcs of 90°, and intermediate each such rotation will remain stationary in presentations in which four of the pockets are in alignment with each other, and also with the plunger and the article-removing belt. During each such pause the plunger will push an article and its wrapper into the then therewith aligned pocket, and, simultaneously, the two then therewith aligned ejectors will be synchronously advanced in the same direction as is the plunger, thereby moving an ejector from the pocket then facing the plunger into the opposite pocket of the one turret and similarly moving another ejector as regards two of the pockets of the other turret, thereby transferring an article from one of the turrets to the other, and ejecting another article from a pocket onto the removal belt shown in Figure 1. Soon after the ejectors have been thus advanced, and while they and the turrets continue stationary, my respective end-folding devices will simultaneously begin and complete their respective operations as will now be described.

The above described charging by the plunger, 80, of an article and its accompanying modicum of wrapper material into a pocket, 27, of the turret, 25, wraps the material smoothly and in its final position upon a portion of the base, also upon the whole of the frustrated top, and also upon the whole of one of the inclined sides, of the article, as plainly shown in Figure 8, this successful application of the wrapper to said inclined side being due to the above noted bevel of the operative end of the simultaneously withdrawing ejector, 32, and also, in part, to the corresponding bevel of the plunger, and the yielding property of the side 31′ of the pocket. It will be understood that the width of the strip of wrapper is such as to provide sufficient material to ultimately enfold two other mutually opposite inclined sides of the article hereafter referred to as the ends, and the length of the strip is such as to provide material sufficient to cover the remaining, fourth, inclined side and also substantially all of the base of the article, thus overlapping the thereon already folded part of the wrapper.

At this stage, as shown in Figure 8, an as yet unfolded part of the wrapper w^2, (Fig. 8) is left projecting from the truncated top of the article, and also, laterally therefrom, such parts of the wrapper as will be required to therewith enfold the as yet uncovered ends of the article. The turrets are then rotated 90° in opposite directions, as indicated by the arrows in Figures 1 and 1ª, pause for purposes hereafter described, and are then further similarly rotated another 90°. During the first of said rotations the part w^2 of the wrapper remains unfolded and projecting from the periphery of the turret 25 as indicated in Figures 1ª and 9; but, during the second of said rotations said part, w^2, is bent down towards the thereto opposed inclined side of the article by aid of a shoe, 104, the interior surface of which is concavely curved concentrically, in conformity with, and disposed adjacent to, the periphery of the turret and there carried by a stationary part of the machine, the lower end 104′ of said shoe being, as indicated in Figures 10, 11, etc., convexly curved, this being important in order to, under the conditions, avoid unduly straining the wrapper during transference of the article from one to the other turret as hereafter described. At this stage the article and wrapper will, by their above described rotations through an arc of 180°, have been turned upside down, i. e. the base of the article will be uppermost, as indicated in Figure 10. During this last mentioned pause, the ejectors then in alignment will be simultaneously advanced toward the left as viewed in Figure 10, whereby the ejector 33′ will be withdrawn from the pocket 27′ in turret 26 to the position shown by dotted lines in Figure 10, and, during this withdrawal, the article and wrapper will be ejected from the pocket 27 in the turret, 25, and charged into the pocket 27′ by the said advance of the ejector 33. During this transfer of the article and its wrapper from the pocket 27 to the pocket 27′ it will be noted that, as is important, the bevelled, then operative, ends of both ejectors simultaneously exert a positive restraining and smoothing pressure against those parts of the wrapper which, by then, are in contact with two of the mutually opposite, oppositely inclined, or bevelled, sides of the article, and that the hitherto unfolded end, w^2, of the wrapper is by aid of said pressures and of its progressive contact with the spring plate 31′, folded smoothly backwards into its final position upon the base of the article and a thereon, as it were, ironing pressure exerted on it by the said plate. As regards the wrapping of an article of the truncated pyramidal form described, I am satisfied that the thus perfectly smooth enwrapping of its base, top and two oppositely inclined sides cannot as well, if at all, be thus automatically effected without my, thus organized, novel combination of the bevels on the operative ends of the ejectors, the reversal in presentation of the article during its wrapping, and the action of the yielding plates referred to.

It now remains to fold the wrapper over the hitherto remaining unwrapped mutually opposite inclined sides, or ends, of the ar-

ticle. This I accomplish as follows: After the article and wrapper have been, as above described, positioned in the pocket, 27′ of the turret 26, those parts, w^3, of the wrapper, designed to ultimately enfold the said ends, extend transversely outwardly therefrom as indicated in the central vertical sectional diagrammatic view thereof shown in Figure 14. While the turrets still remain stationary, I impart to these parts, w^3, what I term the first end fold w^4, (Fig. 22). To that end I provide means as follows: The lower end of the link, 66, carries a vertically reciprocable block, 118, (Figs. 12, 13) slidable in a guideway, 118′ therefor in a bracket, 123, carried by a stationary part. The block 118 carries a pair of pivots, 119, on which respectively are oscillatably mounted one of my alike pair of simultaneously cooperating first-end-fold forming members, 115, 116. Each of these members comprises, above its said pivotal connection with the block, 118, one of a pair of alike extensions or shoes, 120, a straight edge of each of which normally bears against a thereto opposed stop, or roller, 122, carried by the bracket and by reason of which engagement the operative lower ends, or fold-forming fingers, 115′, 116′ of said members are normally held apart, in their inoperative position against the stress of an expansile spring, 124, carried by and between the said shoes. The shoes also comprise inwardly inclined prolongations, 120′, of their above referred to roller-contacting edges which thus act as passive cams, the inclination of said prolongations being in correspondence with that of the sides of the article. The fingers, 115′, 116′, are, as is important, provided with inwardly inclined operative surfaces disposed in planes the angles of which are complementary to those of the bevels of the inclined sides, or ends, of the article with relation to which these fingers function. From this construction it follows that when the arm 64′ of the lever 65 is rocked (in the present instance downwardly) the said end-folding members are correspondingly moved towards the article (in the present instance lowered), and that when this has progressed so far as to carry the straight edges of the shoes beyond (in this instance below) contact with the rollers, the spring 124 yieldingly forces the fingers 115′ and 116′ toward each other; the above referred to cam-like portions of the edges of the shoes meanwhile bearing progressively against the rollers whereby the angle of inclination of said cam edges being appropriately plotted, the stress of the spring is constantly controlled, jars and irregular, or untimely, movements of the fingers are prevented, and there is imparted to the latter during their operations on the wrapper, due to their said reciprocations and oscillations, movements in directions parallel with the inclinations of the said sides of the article.

Before the downward stroke of the lever arm, 64′, begins, the wrapper, as follows from the foregoing, will have been disposed to cover the upward base of the article and will have two therefrom laterally extending, as yet unfolded, portions. When the limit of said downward stroke has been reached, the said portions will, by the fingers 115′, 116′ have been pressed down against two mutually opposite inclined sides of the article as indicated in Figure 13, thus making the fold indicated by w^4 in Figure 22.

The lever arm 64′ then rises and the fingers are withdrawn from contact with the wrapper and free and clear of the article. It will be noted that during their withdrawal from, as well as during their application to, the wrapper, the fingers are, by virtue of the construction described, both yieldingly impelled and positively prevented from unduly pressing against the wrapper and its underlying article, and thereby, as it were, smoothly iron the fold w^4 into place.

After the fold w^4 has thus been made, the unfolded parts of the wrapper will each comprise two parallel, therefrom transversely projecting, alike portions applicable to the making therefrom of what I term the second end folds and, connecting these, a therefrom angularly extending portion, applicable to the making of the final end fold. I provide means for folding the second end folds, w^5, w^5 (Fig. 23) as follows: Immediately after completion of the first end fold, w^4, as above described, the turrets are rotated another 90°, thereby bringing the pocket, 27′, and its therein contained article and partly folded wrapper, in position for operation on the latter, of my device, comprehensively designated at 103 (Fig. 1), for making the second end folds. This device comprises a rock shaft, 126, (Fig. 18) suitably journaled in stationary parts of the machine, 127, and carrying thereto suitably secured, as per set screws, s, s, (Fig. 18), a pair of alike members, 129, each comprising at the front end thereof, projecting substantially radially from one side of the shaft, a second-flap-folding finger 129′, the operative surface of which is, as shown in Figure 18, inclined at an angle corresponding with that of the inclined side of the article, to which the finger will be addressed. Each member, 129, comprises also an extension, or arm, thereof, 129″, extending rearwardly and substantially radially from the other side of the shaft 126. The shaft also carries a thereon partially rotatable sleeve, 130, carrying another pair of alike members, 131, each comprising, at the front end thereof to one side of the shaft a second-flap-forming fin-

ger, 131, having an operative surface similar to that of the fingers 129′, and each member, 131, comprises also an extension, or arm, thereof, 131″, projecting rearwardly and substantially radially from the opposite side of the shaft, and in the general direction of, and relatively proximate to, the aforesaid arms, 129″ of the members 129. The respective pairs of members, 129 and 131, are so shaped and disposed that the operative fingers of the one are thus at all times oscillatable towards and from the corresponding fingers of the other in substantially the same planes, as indicated in Figure 18, their action, in this regard, being comparable to that of the ends of the blades of a pair of shears. The respectively, to each other, oppositely disposed fingers of the respective pairs are normally held inoperatively apart in the positions indicated in Figure 16 by the tension of a retractile spring, 132, connecting one of the rearwardly extending arms, 129″, of the one pair with one of the similarly extending arms, 131″, of the other pair as indicated in Figures 18 and 25. To impel the respective, mutually oppositely disposed, fingers of each pair of members toward each other to make the second-end-folds (as indicated in Figure 17), I provide a cam, 128, of wedge-like form, carried by the oscillating actuating arm, 38, and disposed so as to, when advanced by its forward movement, intervene between the rearward extensions, 129″ and 131″, other than those connected by the spring 132, and pry them apart against the tension of said spring, thus simultaneously forcing the fingers to approach each other as above described. The respective pairs of fingers of each member are disposed so as to, when thus moved toward each other, straddle the article in its last above described position and in close approximation to two of the inclined sides thereof. The construction and operation are such that this, as it were shearing, action of the fingers operates to fold down, against the said inclined sides of the article, the second folds, w^5, of the wrapper, the position of these at the end of this stage of the operation being as indicated in Figure 23. It will be observed that my construction is such that both of the second end folds on each of the two as yet incompletely wrapped inclined ends of the article are thus simultaneously bent, or folded, into substantially final position during a single forward stroke of the actuating arm, 38, and that the operation is performed with practically no strain upon, or disturbance of, the article, or of other parts of the wrapper, this being due not only to the shearing action of the oppositely coacting fingers, but also to their operating uniformly and simultaneously on both sides of the article and to their inclination in parallelism with the thereto proximate inclined sides thereof.

It now remains only to bend down and compress into final folds against the said sides those parts of the wrapper which, at this stage, still project laterally from two opposite inclined sides of the truncated top of the article, as indicated by w^6, in Figures 18, 21, 23, etc. This I accomplish, during rotation of the turrets another 90°, and as is important, progressively, i. e. initially, or to a certain extent, by aid of a pair of relatively rigid oppositely disposed plates, 133, each relatively proximate to one side of the path of the article and mounted on a stationary part of the machine. The entrance ends of these plates with which the remaining laterally projecting portions, w^6, of the wrapper are first brought into contact by the rotation of the turret, are curved outwardly so as to project convexly into the path of said portions, as indicated in Figure 18, the result being that during the advance of the latter they are, as they round the curves, gradually folded backward towards the article, thus guarding, at this stage, in which there are several underlying folds against rupture of the wrapper. As the rotation progresses the final folds thus bent down to about the positions indicated in Figure 21 are gradually settled by their progressive frictional contact with the straight inner sides, or surfaces, of the plates 133, and thus prepared to better resist the strains incident to their subsequent more forceful compression into the final and permanent position, by the next pair of plates, 134. These plates, or compressors, are also suitably mounted upon stationary parts of the machine, one on each side of the path of the, by now, almost finally wrapped article, and each presenting an integrally relatively rigid part, 134′, having its operative surface normally impinging into the path of the article during rotation of the turret, this surface being, as is important, disposed at an inclination corresponding with that of the inclined side of the article to which it is addressed. These parts of the plates are spring-tensioned in any convenient manner so as to bear yieldingly, though forcibly, upon the final fold, w^6, and thus exert required pressure not only thereon but also upon the plurality of underlying previously made folds, w^4, w^5, w^5. I obtain this yielding pressure by making the plates out of resilient material, such as sheet steel, and extending the same between each operative surface, 134′, and its point of mounting sufficiently to thus provide a part of the element, 134, capable of performing functions akin to those of a leaf spring.

The operation of my second end folding device, 103, having been completed as above

described, the turrets are again rotated 90°. During this rotation the final folds, w^6 are, by the plates, 133, initially bent in as above described, and thereafter the article and its wrapper are forced by the turret to pass between the plates, 134, and the final folds, w^6, are thereby from their position as indicated in Figure 21, firmly, though yieldingly, pressed home into their ultimate permanent places, as indicated in Figure 24. At the end of the last referred to rotation of 90°, the turrets again pause. At this stage the now completely wrapped article will be in alignment with the unloading belt, 93, (as indicated in Figure 19), and during this pause the ejector, 33′, being advanced as usual, the article is thereby pushed out of the pocket, 27′, onto said belt, and the wrapping operation is thus, as above described, completed.

It will be understood, from the foregoing, that in the present instance there being four pockets in the periphery of each turret, during each pause in the quadrential rotation of the turrets four pockets, i. e. two in each turret, will be in alignment with each other and with the plunger and the removal belt, and also with two of the ejectors, and that during each such pause the plunger, and said ejectors, will be simultaneously advanced in the same direction, and also that during such pause the first and second end folding devices will be operated, the result being that my machine can, as long as the supply of wrapper and of articles holds out, have four of the latter at the same time in progress of being wrapped. It is also notable that my construction is such that the ejectors have to be actuated, or pushed, always and only in one and the same direction, the semi-rotation of the turret through an arc of 180° bringing each ejector after its such actuation, into a reversed position in which repetition of the actuation in the same direction as at first enables it to perform all of its above described functions, this being of importance, and economy, on several accounts.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is the following viz:

1. In a machine for wrapping an article of truncated-pyramidal form, a pair of alike oppositely disposed pivoted tucking fingers; means to reciprocate them relatively to the article, and means to simultaneously, progressively, impart to their operative ends movements in paths inclined to the direction of reciprocation, and in parallelism with respectively adjacent inclined opposite sides of the article.

2. In a machine for wrapping an article of truncated-pyramidal form, a pair of alike oppositely disposed pivoted tucking fingers; means to reciprocate them relatively to the article, and means to simultaneously, progressively, impart to their operative ends movements in paths inclined to the direction of reciprocation, and in parallelism with respectively adjacent inclined opposite sides of the article, said last mentioned means comprising a spring and a thereto counteracting cam.

3. In a machine for wrapping an article of truncated-pyramidal form, means to hold the article stationary, a pair of alike oppositely disposed pivoted tucking fingers, means to synchronously reciprocate said fingers transversely of the base of the article so held and respectively alongside of one of the opposite inclined sides thereof, and means to move said fingers towards each other while advancing, and from each other while retracting, in paths respectively parallel with the respective inclinations of said sides.

4. In a machine for wrapping an article of truncated-pyramidal form, a pair of alike oppositely disposed pivoted coacting tucking fingers having inwardly inclined operative surfaces disposed in planes, the angles of which are respectively complimentary to those of opposite inclined sides of the article; means to reciprocate said fingers relatively to said sides, and means to move said fingers inwardly towards said sides while advancing, and from each other while retracting.

5. In an article-wrapping machine a rotatory member, or turret, containing adjacent its periphery a pair of oppositely disposed pockets for articles, and carrying an article-ejector reciprocable between said pockets in a path extending across the axis of rotation of the turret, and also carrying a plate extending radially from opposite sides of said axis in parallelism with said path, and means to constantly yieldingly press said plate into simultaneous frictional contacts with surfaces of the ejector which are located on opposite sides of said axis.

6. In an article-wrapping machine a rotatory member, or turret, containing adjacent its periphery two pairs of equally spaced-apart pockets for articles, and carrying two article ejectors each reciprocatable in sliding contact with each other and between oppositely disposed pockets in paths extending angularly to each other across the axis of rotation of the turret, and also movably carrying a plate also extending across said axis and contacting with each of said ejectors on opposite sides of said axis; and means to constantly yieldingly impel the plate towards said contact, whereby an identical, or uniform, retarding, or braking, pressure is simultaneously applied through the

plate to both ejectors and to each upon surfaces thereof located on opposite sides of said axis.

7. In a machine for wrapping an article of truncated pyramidal form having oppositely inclined sides, a pair of turrets rotatable proximately to each other in the same vertical plane and each containing for said articles a pair of oppositely disposed pockets opening towards its periphery; a longitudinally extended reciprocatory article-ejector carried by each turret and having bevelled pocket-insertable operative ends similarly inclined, the inclinations of said ends of the one ejector being the reverse of the inclinations of said ends of the other ejector; means to rotate said turrets in opposite directions; means to hold them stationary when all of their said respective pockets are in mutual alignment; and means to then simultaneously advance in the same direction both of their ejectors whereby an article contained in a pocket of the one is therefrom transferred into the proximate pocket of the other turret and meanwhile upheld between the underlying oppositely bevelled ends of the respective ejectors.

8. Means for wrapping an article of truncated pyramidal form, the said means comprising a pair of spaced apart article-receptive pockets having mutually opposite openings for passage therethrough of an article from one pocket into the other; a pair of article-ejectors each respectively reciprocatable within one of said pockets and having oppositely inclined bevelled operative ends and means to simultaneously advance both ejectors in the same direction whereby an article contained in one of the pockets is transferred into the other pocket and meanwhile supported underneath by both said bevelled ends of the ejectors.

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