Nov. 15, 1955 C. J. MALHIOT 2,723,516

HIGH SPEED WRAPPING MACHINE

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FIG. 1

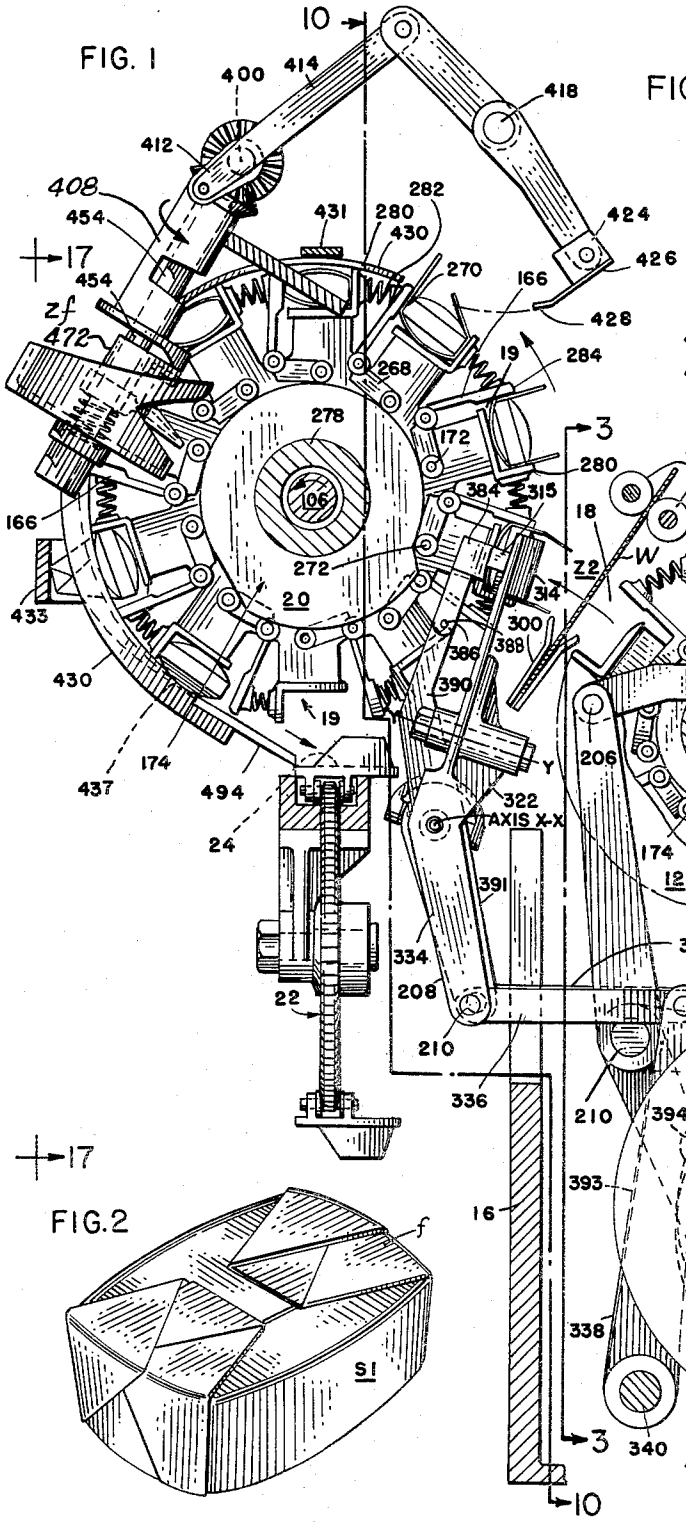
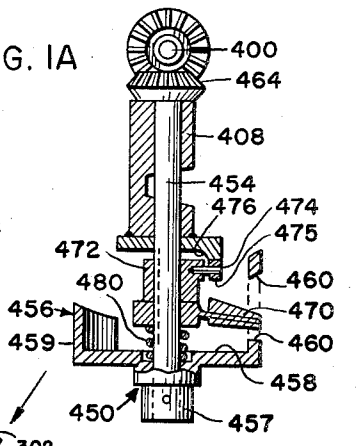


FIG. 1A



17

FIG. 2

INVENTOR:
CLARENCE J. MALHIOT
BY Spencer, Johnston
Cook & Root
ATT'YS

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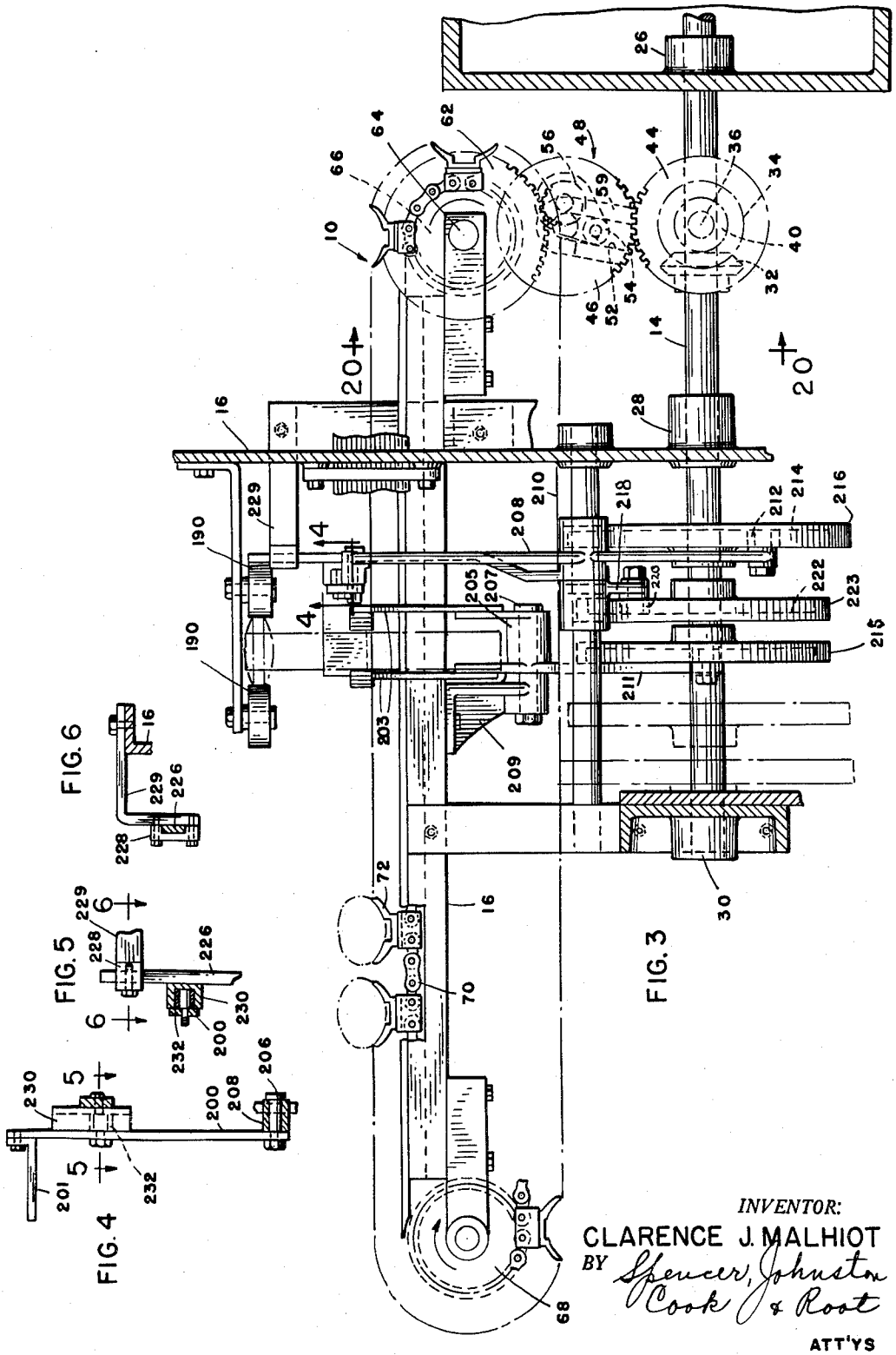


FIG. 3

FIG. 6

FIG. 5

FIG. 4

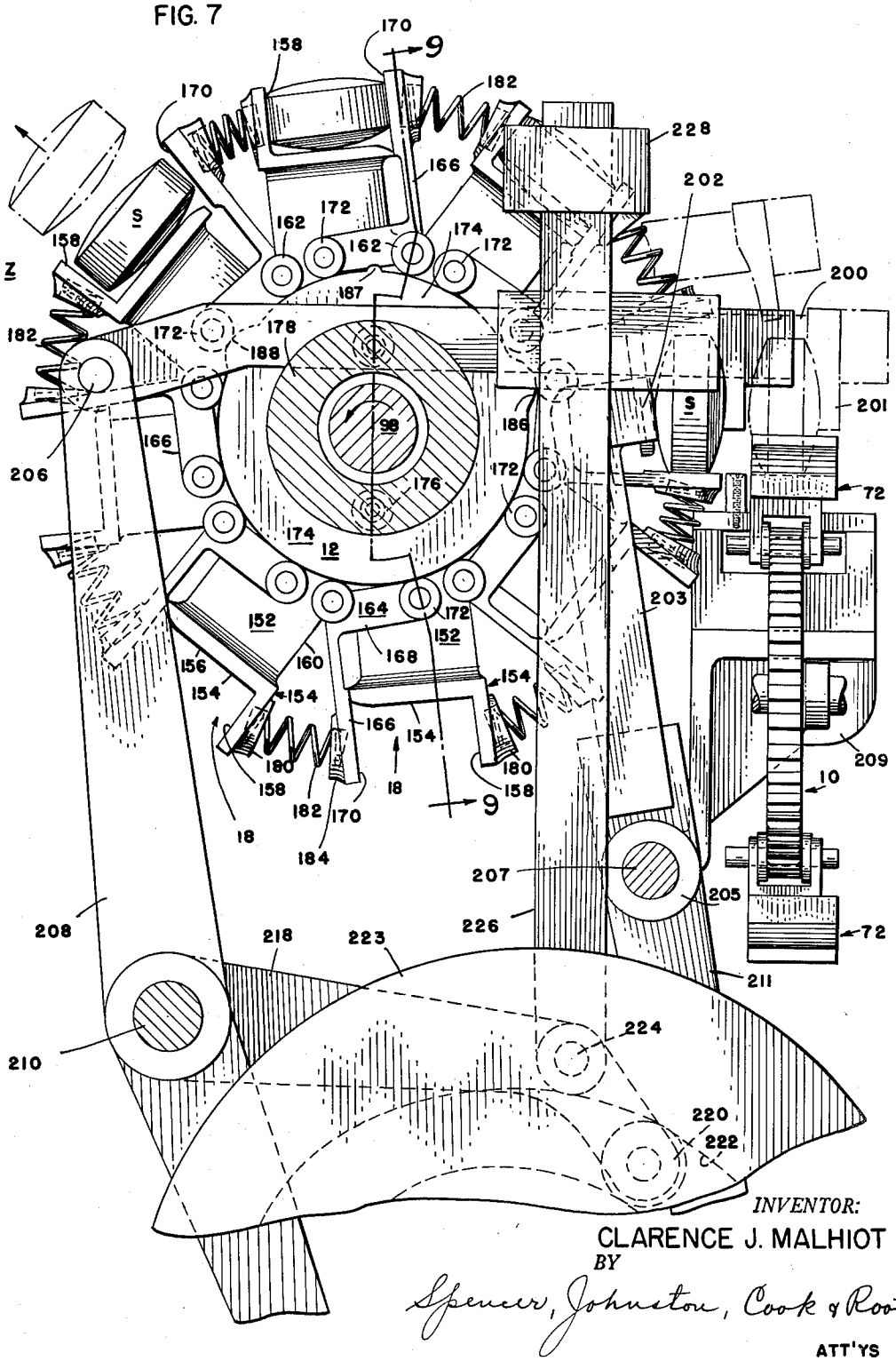
INVENTOR:
CLARENCE J. MALHIOT
BY Spencer, Johnston Cook & Root
ATT'YS

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HIGH SPEED WRAPPING MACHINE

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FIG. 7



INVENTOR:
CLARENCE J. MALHIOT
BY
Spencer, Johnston, Cook & Root
ATT'YS

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HIGH SPEED WRAPPING MACHINE

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FIG. 8

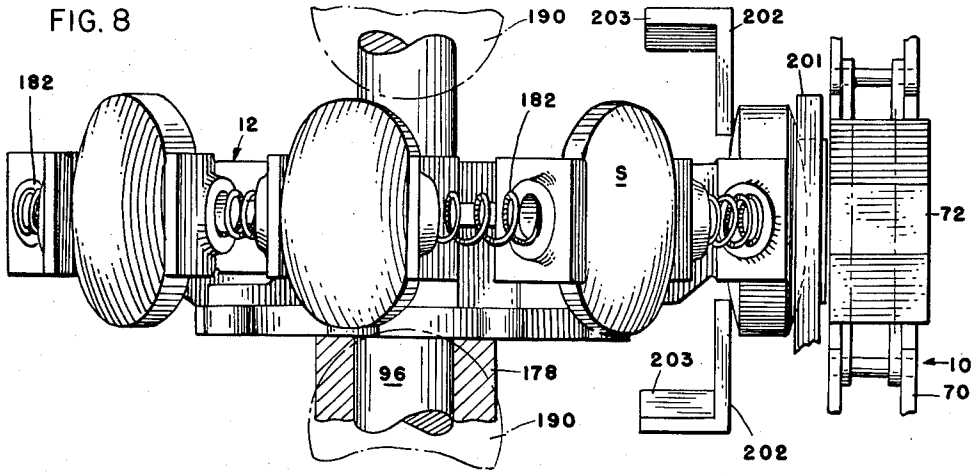
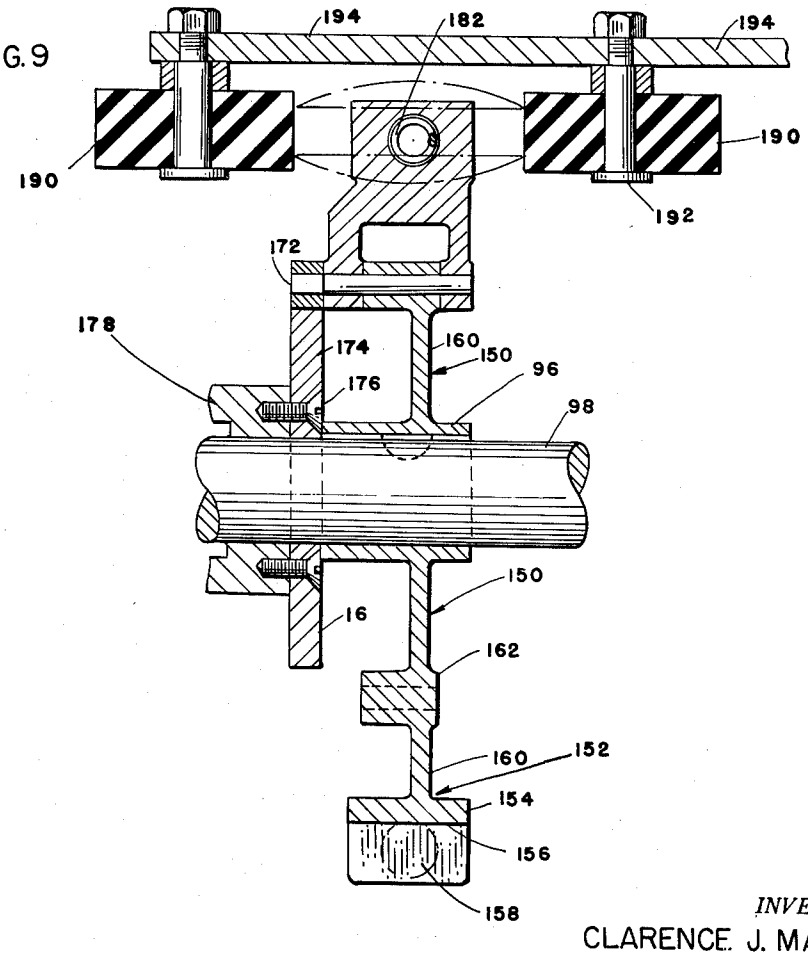


FIG. 9



INVENTOR:
CLARENCE J. MALHIOT
BY
Spencer, Johnston, Cook & Root
ATT'YS

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HIGH SPEED WRAPPING MACHINE

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FIG. 10

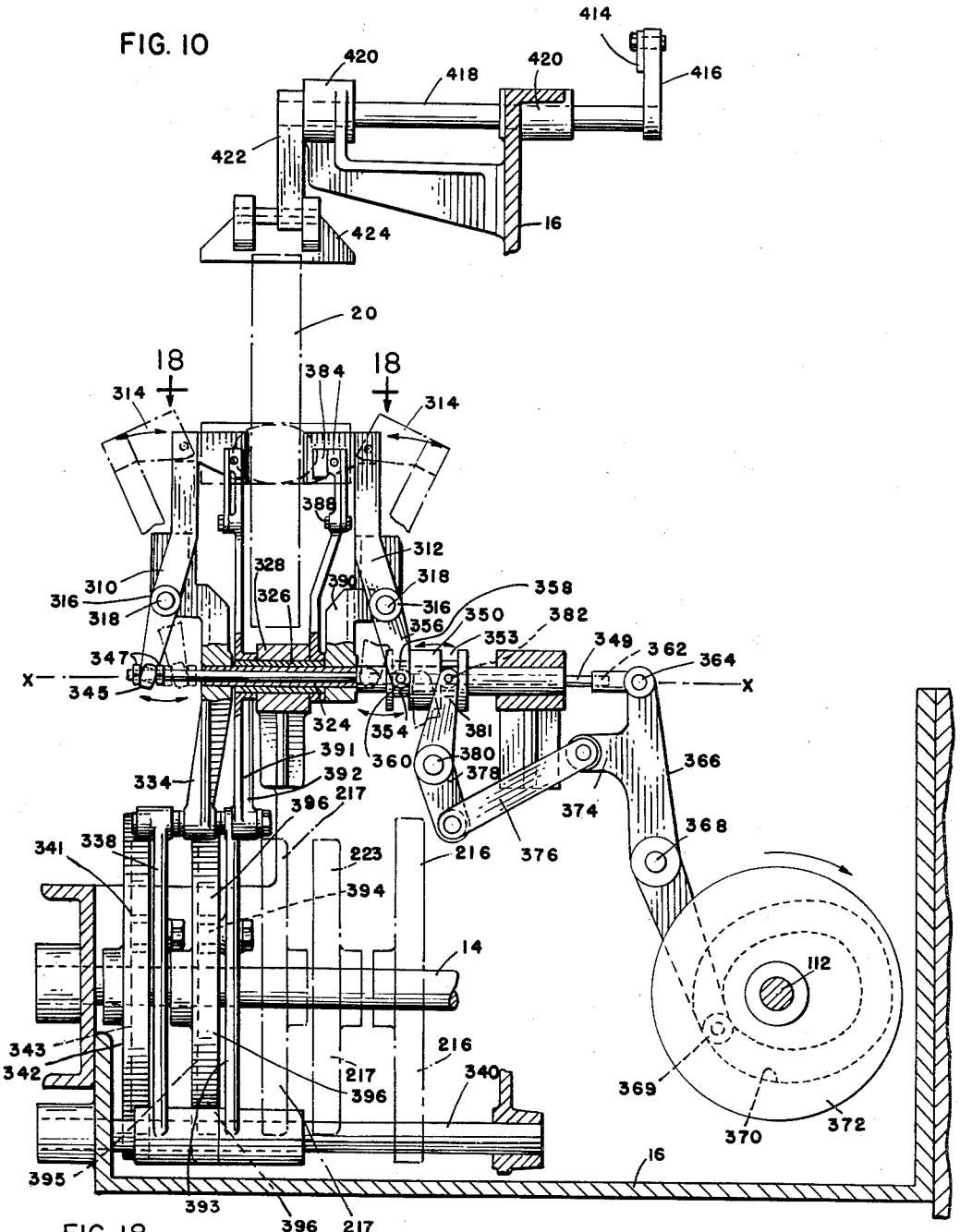
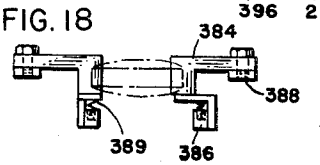


FIG. 18

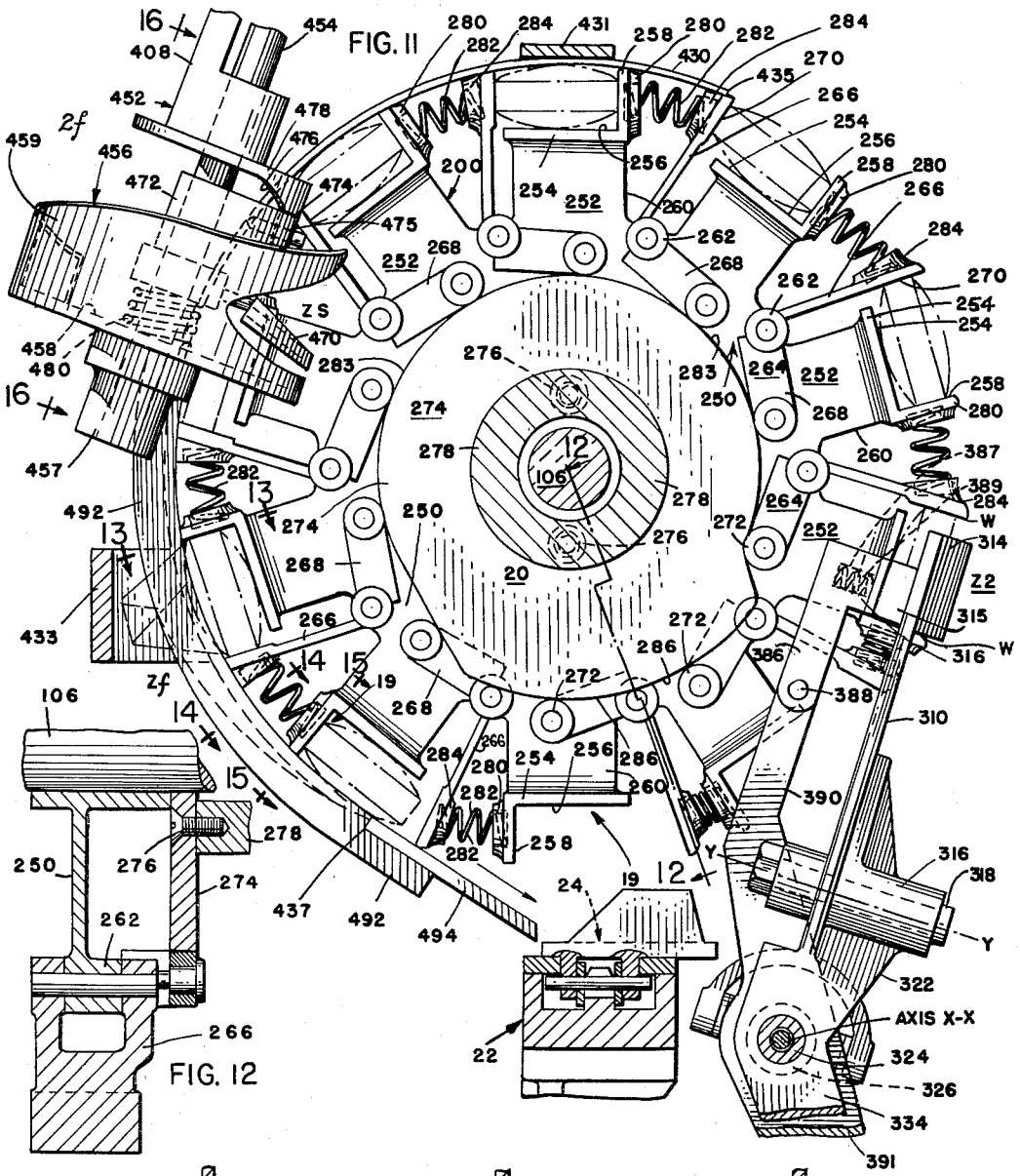


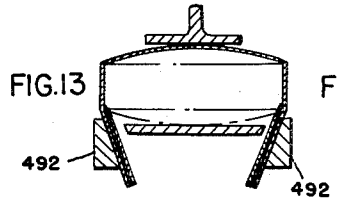
INVENTOR:
CLARENCE J. MALHIOT
BY
Spencer, Johnston, Cook & Root
ATT'YS

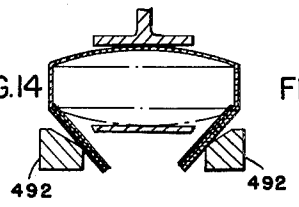
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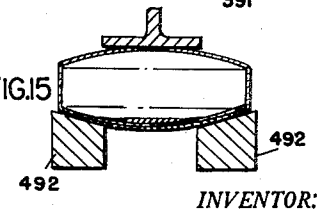
HIGH SPEED WRAPPING MACHINE

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INVENTOR:

CLARENCE J. MALHIOT

BY

Spencer, Johnston, Cook & Root

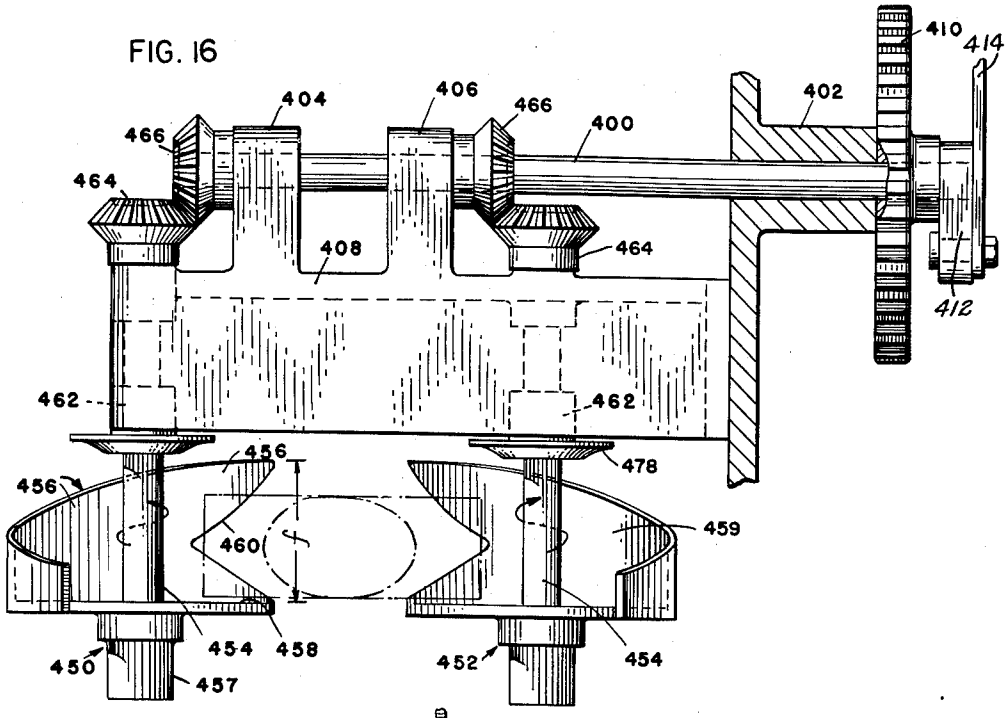
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HIGH SPEED WRAPPING MACHINE

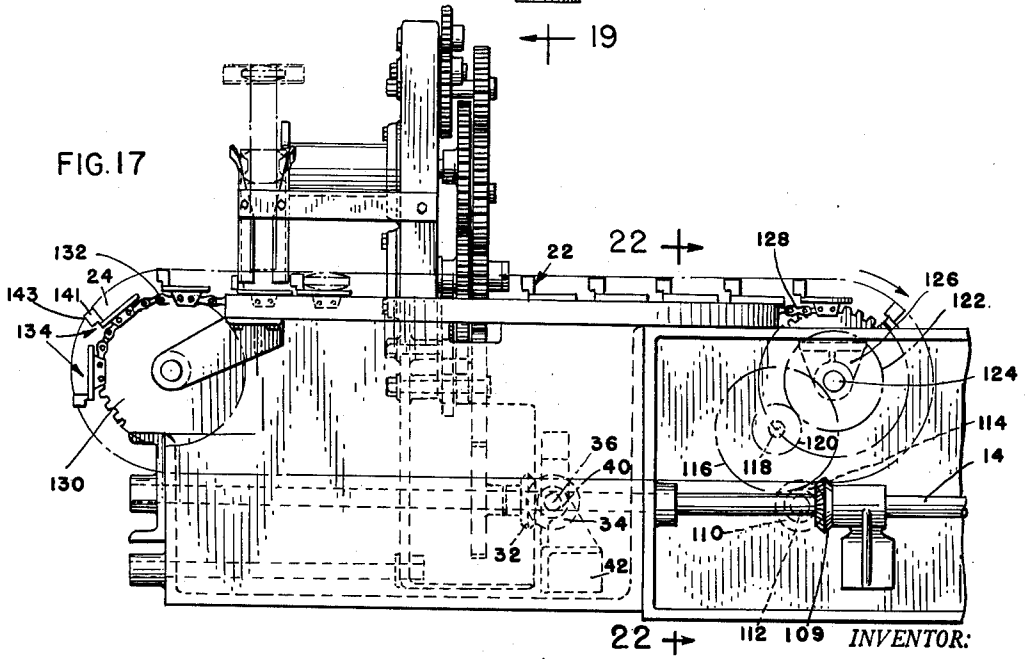
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FIG. 16



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FIG. 17



INVENTOR:
CLARENCE J. MALHIOT
BY
Spencer, Johnston, Cook & Root
ATT'YS

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HIGH SPEED WRAPPING MACHINE

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FIG. 19

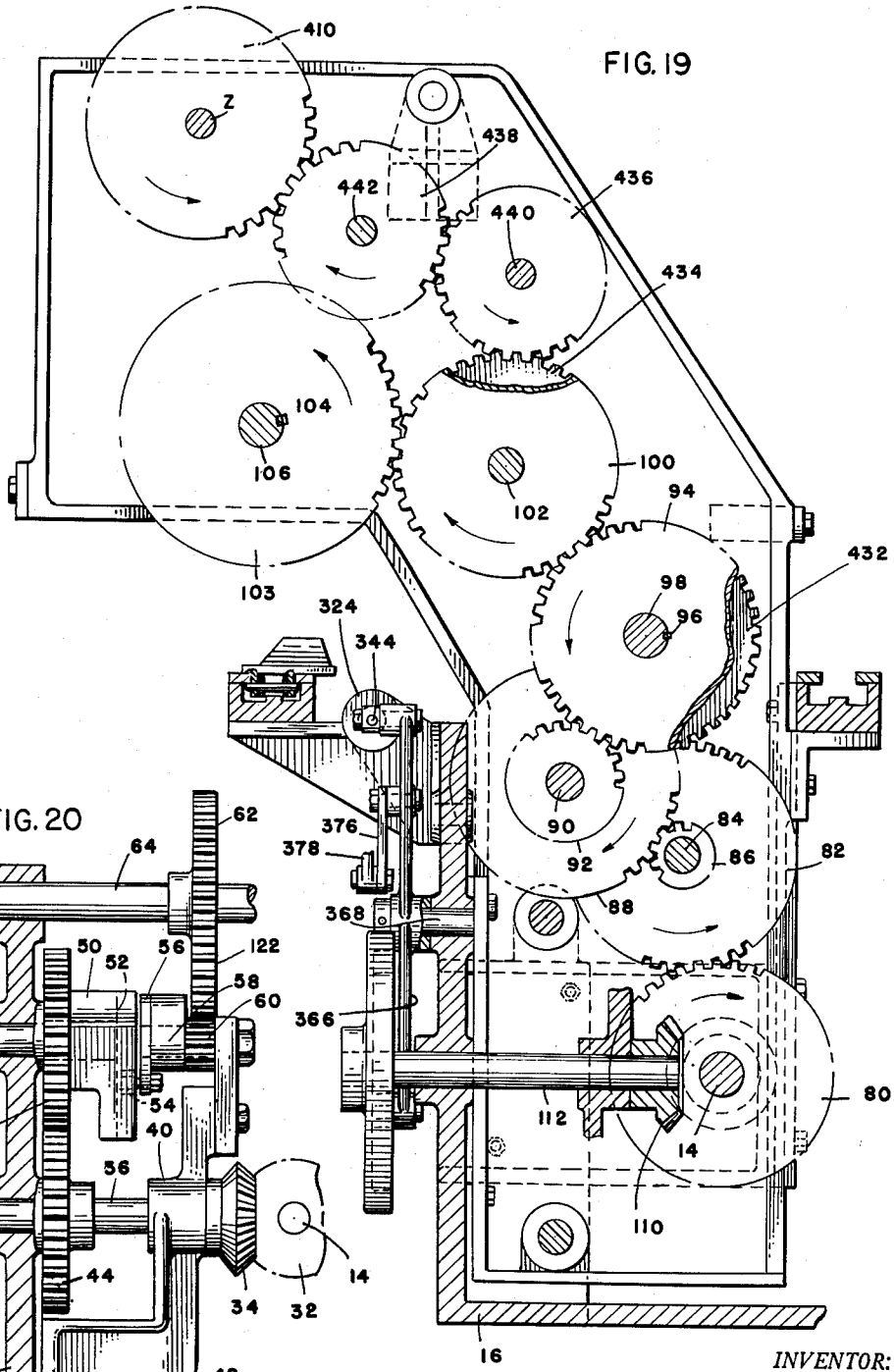


FIG. 20

INVENTOR:

CLARENCE J. MALHIOT

BY

Spencer, Johnston, Cook & Root

ATT'YS

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HIGH SPEED WRAPPING MACHINE

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FIG. 21

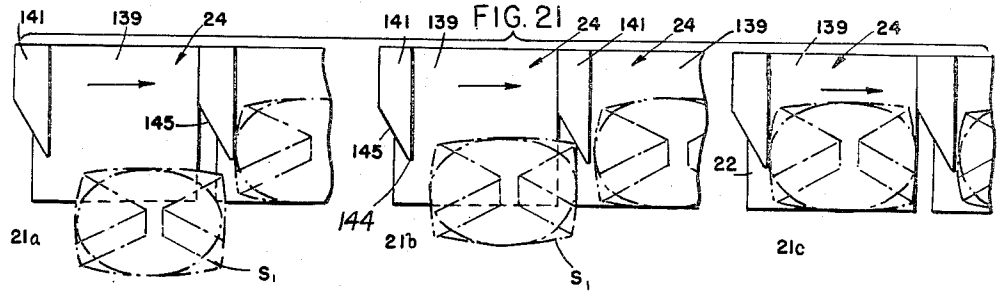
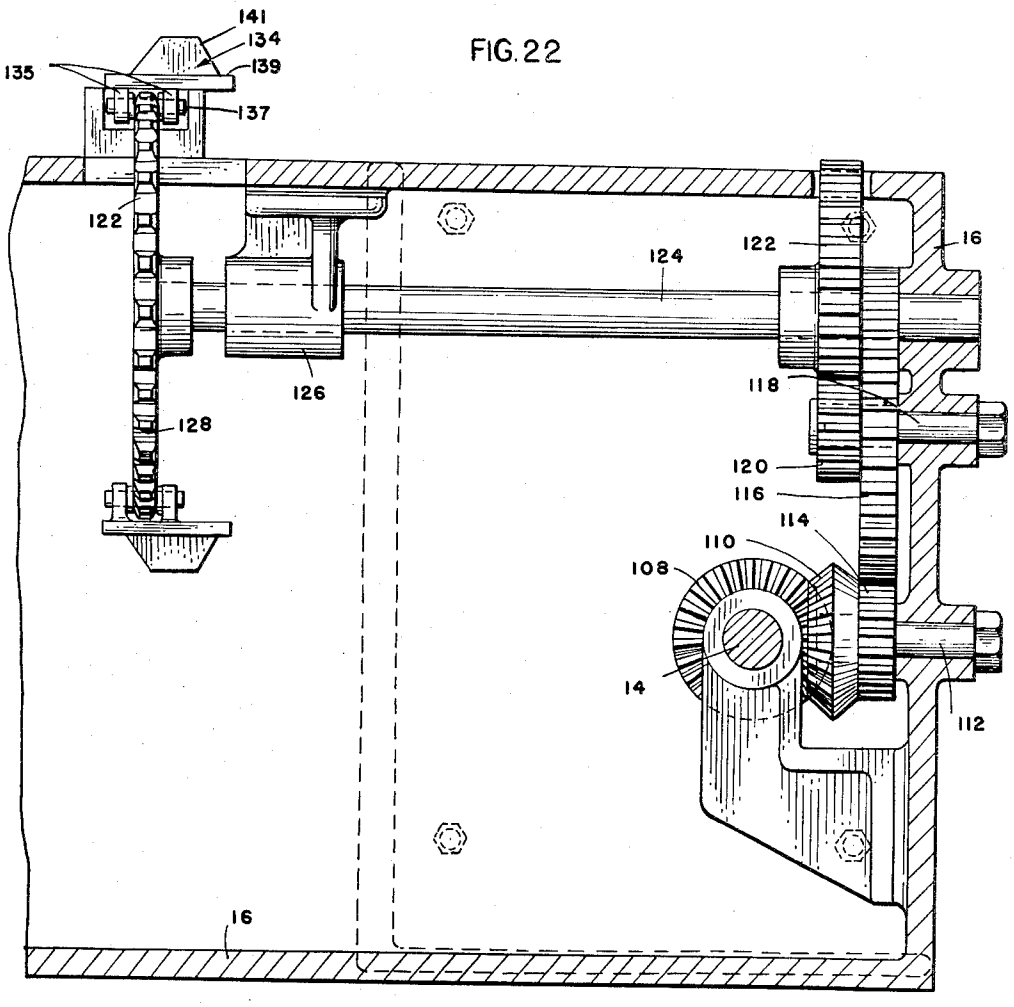


FIG. 22



INVENTOR:

CLARENCE J. MALHIOT

BY

Spencer, Johnston, Cook & Root

ATT'YS

United States Patent Office 2,723,516
Patented Nov. 15, 1955

2,723,516

HIGH SPEED WRAPPING MACHINE

Clarence Joseph Malhiot, Oak Park, Ill., assignor to F. B. Redington Co., Chicago, Ill., a corporation of Delaware

Application June 21, 1950, Serial No. 169,432

37 Claims. (Cl. 53—134)

The present invention relates to wrapping machines for enclosing an article, as, for example, a cake of soap, in an outer wrapper by a series of folding operations whereby the wrapper is loosely disposed about the article preparatory to insertion of the article, together with its enclosing wrapper in an outer carton.

It is among the principal objects of the invention to provide a wrapping machine of this character in which the articles are transferred from a transfer wheel to a wrapping wheel in succession, with the transfer operation, in itself, serving to effect a partial wrapping of the articles, and in which the partially wrapped articles are thereafter conducted by a continuous motion of the wrapping wheel through a series of folding zones during which passage through the folding zones, successive folding steps are performed upon the wrapper until the articles are completely encased or wrapped in the various wrappers and are placed upon a continuously moving discharge conveyor.

Another object of the invention, in a machine of the character outlined above, is to provide a continuously operable folding mechanism having a relatively few number of parts, many of which are of simple construction and which operate upon successive articles moving continuously through the machine to fold an enclosing wrapper about each article.

Another object of the invention is to provide a wrapping mechanism having associated therewith an end folding mechanism including a rotary end folding member which rotates continuously about an axis which is substantially tangential to the circular path of movement of the articles undergoing wrapping and having substantially spiral contours which follow the movement of the articles undergoing wrapping so as to effect the necessary end folding operation while the articles remain in motion.

A similar and related object of the invention is to provide a rotary end folding mechanism having associated therewith a moving tucking finger which follows the movement of the articles through the end folding zone so as to efficiently perform its tucking operation.

A still further object of the invention is to provide a wrapping machine having associated therewith means for transferring an article from a continuously moving conveyor to a continuously moving transfer wheel by means of which the article is located relative to a sheet of wrapping paper preparatory to commencement of the wrapping and folding operations.

Yet another object of the invention is to provide a wrapping machine including a transfer wheel for receiving the articles from a continuously moving conveyor and transferring them to a wrapping and folding wheel wherein the articles become encased in an outer wrapper, together with a series of locating jaws on the transfer wheel and a pair of fixed locating rollers which serve, in combination, to fix the position of the article undergoing wrapping relative to the sheet of wrapping paper as the article is transferred from the tranferred wheel to the wrapping wheel.

A further object of the invention is to provide a wrapping machine of the character outlined above, including a transfer wheel for transferring the unwrapped articles to a wrapping wheel, and a receiving conveyor for delivering the articles to the transfer wheel together with means whereby the articles are delivered to the transfer wheel from the receiving conveyor in accurate timed relationship to the passage of the articles through the receiving zone wherein they are transferred to the transfer wheel.

A still further object of the invention is to provide a wrapping machine including a wrapping wheel by means of which certain wrapping and folding operations are performed upon the articles, together with means whereby the wrapped articles are transferred to a continuously moving discharge conveyor in accurate timed relationship to the passage of the article receiving pockets of the discharge conveyor past the discharge zone of the wrapping wheel.

Other objects and advantages of the invention, not at this time enumerated, will become readily apparent as the nature of the invention is better understood.

The accompanying drawings illustrate a selected embodiment of the invention and the views thereof are as follows:

Fig. 1 is a fragmentary transverse sectional view taken through a wrapping machine constructed in accordance with the principles of the present invention.

Fig. 1A is a detail fragmentary elevational view, partly in section, showing some of the folding mechanism which appears at the upper left-hand corners of Figs. 1 and 11.

Fig. 2 is a perspective view of an article which has been wrapped by the machine comprising the present invention and showing the wrapper completely folded about the article.

Fig. 3 is a sectional view taken substantially along the line **3—3** of Fig. 1.

Fig. 4 is a sectional view taken substantially along the line **4—4** of Fig. 3.

Fig. 5 is a sectional view taken substantially along the line **5—5** of Fig. 4.

Fig. 6 is a sectional view taken substantially along the line **6—6** of Fig. 5.

Fig. 7 is a fragmentary, enlarged, side elevational view, partly in section, of a transfer wheel employed in connection with the present invention.

Fig. 8 is a top plan view of the structure shown in Fig. 7.

Fig. 9 is a sectional view taken substantially along the line **9—9** of Fig. 7.

Fig. 10 is a sectional view taken substantially along the line **10—10** of Fig. 1.

Fig. 11 is an enlarged side elevational view of a wrapping wheel employed in connection with the present invention.

Fig. 12 is a sectional view taken substantially along the line **12—12** of Fig. 11.

Figs. 13, 14 and 15 are fragmentary sectional views taken along radial planes through the wrapping wheel of Fig. 11 as indicated by the lines **13—13**, **14—14** and **15—15**, respectively, and showing progressive steps which are involved in the wrapping operation.

Fig. 16 is a fragmentary side elevational view of a portion of the structure shown in Fig. 11 as viewed from the plane indicated by the arrows **16—16** of Fig. 11.

Fig. 17 is a side elevational view of the structure shown in Fig. 1.

Fig. 18 is a sectional view taken substantially along the line **18—18** of Fig. 10.

Fig. 19 is an enlarged sectional view taken substantially along the line **19—19** of Fig. 17.

Fig. 20 is a sectional view taken substantially along the line 20—20 of Fig. 3.

Fig. 21 is a top plan view, schematical in its representation, and illustrating the manner in which the fully wrapped articles are discharged from the transfer wheel into the pockets of the discharge zone, and

Fig. 22 is a sectional view taken substantially along the line 22—22 of Fig. 17.

General description

In general, the present invention contemplates the provision of a folding machine including a receiving conveyor which transports a series of articles about which individual wrappers are to be folded to a wrapping and folding mechanism which receives them, performs the necessary wrapping and folding operations upon the articles, and delivers the same in fully wrapped condition to a discharge conveyor by means of which they are conducted from the wrapping or folding mechanism.

The wrapping mechanism by means of which the wrappers are folded about the articles includes a transfer wheel which receives the articles in succession from the receiving conveyor and transfers them to the wrapping wheel which, in turn, performs the necessary wrapping or folding operations and delivers the wrapped articles to the discharge conveyor. Both the transfer wheel and the wrapping wheel are operated in a continuous manner with the transfer of the articles from the transfer wheel to the wrapping wheel being made at a transfer zone and with both the transfer wheel and the wrapping wheel rotating in the same direction. The transfer of the articles from the wrapping wheel to the discharge conveyor is also made with both mechanisms moving continuously.

Heretofore it has been customary to transfer the articles directly from the receiving conveyor to the wrapping or folding wheel with a step-by-step motion of both instrumentalities taking place so that the transfer may be made at a moment in the machine cycle where both of them are stationary. Likewise, it has been customary to effect the transfer of the wrapped articles from the wrapping wheel to the discharge conveyor at a moment when both devices are stationary. By means of the present invention where both transfer operations are made when the wrapping wheel is in continuous motion, a greater number of articles may be wrapped with greater rapidity than has heretofore been possible. The present wrapping and folding machine has been found to be capable of delivering 200 wrapped articles per minute to the discharge conveyor whereas with machines which operate intermittently, as distinguished from continuously, delivery of 100 wrapped articles per minute to the discharge conveyor has been considered the average output of the machine.

The present machine has been designed for use and illustrated in connection with the wrapping of a series of oval shaped objects which may be cakes of soap which, when passed through the present wrapping machine, emerge therefrom with individual wrappers which are loosely folded therearound preparatory to inserting the thus wrapped articles in an outer carton which may be of rectilinear design. Obviously, however, the invention may, with or without modification, be converted to use in the wrapping of numerous other articles having various shapes.

Referring now to Figs. 1, 2 and 3, the unwrapped articles S which, in the present embodiment of the invention, have been illustrated as being in the form of cakes of soap having a generally oval contour, are conducted along an endless receiving conveyor 10 to a transfer zone Z1 (hereinafter referred to as the first transfer zone or receiving zone) from whence they are successively transferred from the conveyor 10 to a transfer wheel 12.

As will be described presently, the conveyor 10 and transfer wheel 12 move continuously and each is driven from a common drive shaft 14 suitably journalled in the stationary machine framework 16 with the transfer wheel 12 rotating about its axis of rotation at a constant speed and with the receiving conveyor 10 having a variable speed drive. The transfer wheel is provided with a series of circumferentially spaced pockets 18 for reception therein of the successive articles S and for conduction thereof to a second transfer zone Z2 at which the articles are transferred to a series of similar pockets 19 provided in a rotary wrapping wheel 20. During movement of the individual articles S from the first transfer zone to the second transfer zone, means are provided for bringing the articles into proper register with a wrapper *w* which is adapted to be folded about the article during its travel with the wrapping wheel 20. Transfer of the articles to the wrapping wheel from the transfer wheel at the second transfer zone Z2 results in a bodily movement of the article against the wrapper in such a manner that the wrapper is carried with the article through the original place of the wrapper into one of a plurality of receiving pockets 19 provided on the wrapping wheel so that the article immediately becomes partially wrapped as it enters the pocket. Thereafter, during the progressive movements of the article bodily with the wrapping wheel, a seam fold, followed by a tucking and end folding operation on the ends of the partially wrapped articles, is performed and the completely wrapped articles are discharged at a third transfer or discharge zone Z3 onto a continuously moving discharge conveyor 22 having a series of receiving pockets 24 associated therewith. One of the completely wrapped articles is shown in Fig. 2 and has been designated at S1.

Receiving conveyor driving mechanism

Referring now to Figs. 1, 3 and 20, the main drive shaft 14 extends across the machine framework 16 and is journalled in bearing supports 26, 28 and 30. The shaft 14 carries thereon a bevel gear 32 which meshes with a similar bevel gear 34, the latter being mounted on a shaft 36 suitably journalled in a bearing 38 provided on the machine framework and in a bearing 40 formed in a bracket 42 carried by the machine framework. The shaft 36 has secured thereto a gear 44 which meshes with a gear 46 forming a part of a speed-change drive mechanism 48. The mechanism 48, in addition to the gear 46, includes a block member 50 secured to and rotatable with the gear 46 and provided with a channel or guideway 52 therein. A roller 54 is disposed in the guideway 52 and is carried on an arm 56 mounted on a stud 58 mounted on the bracket 42. A relatively small gear 60 is fixedly mounted on the arm 56 and is adapted to mesh with a relatively large gear 62 which constitutes the driving gear for the conveyor 10. The gear 62 is mounted upon a shaft 64 suitably journalled in the machine framework 16 and carries the driving sprocket 66 of the conveyor 10.

The conveyor 10 includes, in addition to the driving sprocket 66, a driven sprocket 68 and a chain 70 which passes over the two sprockets 66 and 68. A series of spaced article supports 72 are mounted on and travel with the chain in endless fashion past the first transfer zone Z1. The supports 72 are so designed that the oval articles S, or cakes of soap, are supported on one longitudinal edge thereof preparatory to being transferred at the transfer zone Z1 directly into the pockets provided in the transfer wheel.

From the above description of parts, it will be seen that the main drive shaft 14 rotating at a constant rate of speed will apply motion to the gear 46 at a constant rate of speed. Rotation of the gear 46, however, will cause rotation of the block 50 and, because the roller 54 revolves about an axis which is eccentrically disposed with respect to the axis of the gear 46, the roller will

traverse the groove 52 in the block 50 and, in so traversing, will vary the rate of turning movement of the relatively small gear 60 relative to the rate of turning movement of the gear 46 and such change in the rate of rotation of the gear 60 will be imparted to the gear 62 which constitutes the driving gear for the driving sprocket 66 of the conveyor 10.

The speed-change mechanism 48 is of conventional design and no claim is made herein to any novelty associated therewith. The mechanism, however, is so designed that the motion of the conveyor chain 70 is continuous, but varies in its rate of travel. During that portion of each machine cycle when no transfer operations are taking place between the conveyor 10 and the transfer wheel 12, a relatively high speed of linear movement in the straightaway or run portion of the conveyor obtains, whereas during transfer operations when an article is undergoing transfer from the conveyor 10 to the transfer wheel 12, a relatively low rate of linear travel of the chain 70 takes place.

Transfer wheel driving mechanism

The driving mechanism for the transfer wheel 12 is best illustrated in Figs. 17 and 19 and comprises a gear 80 mounted on the main shaft 14 and meshing with a gear 82 mounted on a stud 84 suitably journalled in the machine framework. The gear 82 has formed therewith a relatively small gear 86 which meshes with a larger gear 88 carried on a stud 90 and having formed therewith a small gear 92 which, in turn, meshes with a gear 94 which is keyed as at 96 to the supporting shaft 98 for the transfer wheel 12. The arrangement of compound gearing just described is designed according to engineering exigencies so that one revolution of the main driving shaft 14 will result in one-eighth of a revolution of the transfer wheel for purposes that will appear presently.

Wrapping wheel driving mechanism

The driving mechanism for the wrapping wheel 20 is likewise illustrated in Figs. 17 and 19 and includes the train of gearing described above leading from the main driving shaft 14 through gears 80, 82, 86, 88, 92 and 94. The gear 94 meshes with a gear 100 mounted on a stud 102 suitably carried in the machine framework and the gear 100, in turn, meshes with a relatively large gear 103 which is keyed as at 104 to a shaft 106 (see also Fig. 1) upon which the wrapping wheel 20 is mounted and to which it is secured.

Discharge conveyor driving mechanism

The driving mechanism for the discharge conveyor 22 which conducts the wrapped articles from the wrapping wheel 20 is illustrated in Figs. 17 and 21 and comprises a bevel gear 109 mounted on the main driving shaft 14 and meshing with a similar bevel gear 110 carried on a stub shaft 112 journalled in the machine framework. A gear 114 formed with the gear 110 meshes with a larger gear 116 mounted on a stub shaft 118 and having formed therewith a small gear 120 which meshes with a gear 122 mounted on a shaft 124 suitably journalled in a bearing block 126 and which also has mounted thereon the driving sprocket 128 of the conveyor 22. The conveyor 22 also includes a driven sprocket 130 and a conveyor chain 132 passes over the two sprockets 128 and 130. A series of soap supporting elements 134 are mounted on the chain 132 in spaced relationship and are adapted to pass through the third transfer zone Z3 to receive the wrapped articles thereat and conduct them from the wrapping wheel 20 to a point of discharge.

The transfer wheel

Referring now to Figs. 1, 7 and 9, wherein the transfer wheel 12 is illustrated in detail, the wheel comprises a generally circular disc-like body portion 150 having

formed thereon a series of radially extending article supporting members 152 each including an article receiving tray 154 including a flat bed plate 156 and an end wall 158 integrally formed therewith and extending radially outwardly thereon. Each bed plate 156 is adapted to receive thereon the face surface of one of the articles S which is transferred to the transfer wheel from the receiving conveyor 10 with an end surface of the oval-shaped article bearing against the end wall 158. The article receiving tray 154 is connected to the main body 150 of the transfer wheel by means of a web 160. Each web 160 is formed with a boss 162 adjacent its base to which boss there is pivotally connected an L-shape clamping member 164 (Fig. 7) having a clamping arm 166 and a cam follower arm 168, the clamping member 164 being pivoted to the boss adjacent its medial region so that the clamping arm 166 extends generally radially outwardly and provides an end wall or surface 170 which normally bears against one end of the bed plate 156 to form in conjunction therewith and in conjunction with the end wall 158 an open sided article receiving pocket of dimensions which are commensurate with the length, width and depth of the article. Each arm 168 is provided with a follower roller 172 at its free end adapted to ride upon a stationary cam plate 174 which surrounds the shaft 98 and which is secured by means of screws 176 to a flanged bearing 178 forming a part of the stationary machine framework 16 and through which the shaft 98 extends.

Each of the end walls 158 is provided with a circular boss 180 adapted to receive therein one end of a compression spring 182, the other end of the compression spring being received in a similar boss 184 formed in one of the arms 166 of the clamping member 164. Each spring 182 serves to urge its respective clamping member to its closed soap-engaging position. The stationary cam 174 is of substantially circular design and is provided with a pair of eccentric portions 186 and 188, the former being positioned in the general neighborhood of the transfer zone Z1 wherein the cakes of soap are transferred from the conveyor 10 to the transfer wheel 12, and the latter being positioned in the general neighborhood of the transfer zone Z2 wherein the cakes of soap are transferred from the transfer wheel 12 to the wrapping wheel 20.

It will be seen from the above description of parts that as the transfer wheel 12 is continuously rotated in a counterclockwise direction as indicated by the arrow in Fig. 7, the various cam rollers 172 ride upon the outer peripheral region of the cam 174 and, during the passage of the article receiving pockets from the transfer zone Z1 to the transfer zone Z2, the rollers will ride upon the smooth circular arcuate land portion of the cam thus permitting the various springs 182 to maintain the clamping arms 166 in their closed position with the article or cake of soap S engaged between one of the clamping arms and the side wall of the article receiving pocket. The length of the bed portion of the pocket is substantially equal to or very slightly less than the width of the article at its transverse or minor axis and thus the article is lightly engaged by the ends of the pocket and is not subject to damage as the rollers 172 approach the cam protuberance 186 and ride outwardly upon the same. The respective clamping arms 166 are forcibly rotated or tilted in a clockwise direction or, in other words, about the axis of the pivotal connection between the clamping arm and the transfer wheel. The clamping arm may thus be said to open or move away from the opposed inner wall of the pocket to effectively widen the mouth of the pocket to permit easy reception of the article therein. As soon as the roller 172 has moved off the cam protuberance 186, the clamping arm 166 is moved under the action of the spring 182, in a counterclockwise direction and the clamping arm 166 bears against the article and clamps the same between the clamping surface 170 of the clamping arm 166 and the inner surface of the end wall 158. The arti-

cles S are thus aligned on the transfer wheel along their minor axes for subsequent alignment with the article receiving pockets **19** of the wrapping wheel subsequently to be described. In order to align the articles longitudinally along their major axes, a pair of aligning rollers **190** (Fig. 9) are carried upon a pair of studs **192** which depend from an overlying bracket **194** suitably secured to the framework **16**. These aligning rollers **190** may be formed of a resilient material as, for example, soft rubber, and they are spaced apart substantially equal to the major axes of the articles. The rollers **190** are positioned in the path of movement of the articles as they approach the transfer zone Z2 and their function is to provide a gate or opening through which the articles must pass in traversing the transfer wheel from the first transfer zone to the second transfer zone so that they will be aligned both longitudinally and transversely for accurate registration with the pockets of the wrapping wheel **20**.

In order to release the articles S at the time when they pass between the rollers **190** means are provided for discontinuing the clamping action of the clamping arms **166** and toward this end a small cam protuberance **187** is formed on the cam plate **174** adjacent the top thereof, which protuberance is designed for engagement with the rollers **172** as they pass this region of the cam plate so that the clamping arms **166** will have imparted thereto a slight tilting motion in a clockwise direction as viewed in Fig. 7 to release the articles momentarily until they have passed through the gate provided by the aligning rollers **190**. After the articles have passed through the gate and thus become subject to adjustment by the rollers **190**, the rollers **172** move off of the cam protuberance **187** and the articles are again effectively clamped by the clamping arms **166** until such time as they arrive at the second transfer zone Z2.

As the articles approach the second transfer zone Z2 the cam rollers **172** ride outwardly on the cam protuberance **188** thus opening the pockets by moving the clamping arms **166** away from the end wall **158** to release the articles for transfer to the wrapping wheel **20** in a manner that will be made clear presently.

The first transfer zone mechanism

Referring now to Figs. 1, 3 and 7, the articles S which are conducted successively to the first transfer zone Z1 by the receiving conveyor **10** are momentarily aligned with one of the receiving pockets **18** of the transfer wheel **12** passing through the zone and are, by mechanism about to be described, shifted laterally or inwardly of the transfer wheel into the pocket which, at the first transfer zone, has been opened, so to speak, as previously described, to receive the article.

Toward this end, a cam operated mechanism including a reach bar **200** having what amounts, in effect, to a hooked end **201** passes over the article in the pocket of the conveyor **10** and then, by a transverse motion, slides the article from the article supports **72** on the conveyor without disturbing the relative vertical alignment of the article. In order to prevent tilting of the article to a point of unstable equilibrium or, in other words, to prevent tumbling of the article, a pair of retaining members or pads **202** move outwardly toward the vicinity of the periphery of the transfer wheel and bear against the article during the actual transfer operation. The reach bar **200** and the retaining members **202** are cyclically operable under the control of suitable cam mechanism subsequently to be described. Although the transfer wheel **12** rotates continuously so that the various pockets pass through the transfer zone Z1 at a constant rate of speed, the bucket-like article supports **72** on the receiving conveyor **10** are momentarily slowed down as they reach the transfer zone by virtue of the variable speed mechanism **48** (Fig. 3), as previously described, in order to permit the reach bar to remove the article and effect a transfer which results at least in approximate alignment of the articles along their major axes with the respective pockets in which they are received.

Referring now particularly to Figs. 1 and 3 to 7, inclusive, the reach bar mechanism includes the reach bar **200** which is in the form of an elongated arm which passes across one face of the transfer wheel and which has a downwardly extending offset portion **201** at its free or forward end. The rear end of the reach bar **200** is pivoted as at **206** (Figs. 1 and 7) to a connecting rod **208** pivoted on a shaft **210** which is fixedly supported in the machine framework **16**. The connecting rod **208** carries at its lower end a cam follower roller **212** (Fig. 3) adapted to ride in a closed cam groove **214**, the groove being formed in a rotary cam wheel **216** mounted on the main driving shaft **14**.

Also pivoted on the shaft **210** is a lifting cam lever **218** carrying a roller **220** at its free end which is adapted to ride in a cam groove **222** and which is formed in a cam wheel **223** fixed to the shaft **14**. The lifting cam lever **218** has pivoted thereto medially of its ends as at **224**, a lifting bar **226**, the upper end of which passes through a guide member **228** carried on a bracket **229** (see also Figs. 5 and 6) suitably mounted in the machine framework **16**. The lifting bar **226** has secured thereto adjacent its upper end a channel member **230** which receives therein a roller **232** which rides in the channel member **230** between the opposite sides thereof and which is mounted on the reach bar **200**.

The retaining members or pads **202** (Figs. 1, 3 and 7) are carried at the outer ends of a pair of yoke arms **203** which straddle the transfer wheel **12** and which extend outwardly from a sleeve **205** which is mounted for oscillation on a shaft **207** fixedly held in a bracket **209** secured to the machine framework **16** A cam follower arm **211** projects downwardly from the sleeve **205** and carries at its free end a cam follower roller **213** which travels in a closed arcuate cam groove **215** provided in a cam wheel **217** mounted on the shaft **14** in axial alignment with the cam wheels **216** and **223**.

The cam grooves **214**, **222** and **215** are designed so that as their respective cam wheels **216**, **223** and **217** rotate in unison, a cyclic movement of the reach bar **200** and of the retaining pads **202** is effected during each one-eighth revolution of the transfer wheel **12** so as to withdraw an article from the receiving conveyor **10** and place the same in one of the eight pockets which are equally spaced about the periphery of the transfer wheel **12**.

In effecting transfer of an article from the conveyor **10** to the transfer wheel **12** at the transfer zone Z1, it will be seen that upon rotation of the main shaft **14**, the cam wheels **216** and **223** (Figs. 1 and 3) will rotate in a clockwise direction as viewed in Fig. 1. The nature of the cam groove **214** is such as to impart an oscillatory movement to the connecting rod **208** about the axis of the fixed shaft **210** and, because the upper end of the connecting rod **208** is pivoted at **206** to the reach bar, a reciprocable to and fro motion will be applied to the latter. However, such reciprocation of the reach bar **200** is modified by the action of the lifting arm **226** which imparts a vertical component of movement to the reach bar **200** through its pivotal association with the lifting lever **218**. The nature of the cam groove **222** is such as to impart an oscillatory movement to the lifting lever **218** as the cam wheel **223** rotates with the driving shaft **14**. As the reach bar **200** is reciprocated, it is periodically moved to an elevated position so as to cause the hooked end **201** thereof to clear the article which has arrived at the transfer zone Z1 for transfer to the transfer wheel. The movements of the connecting rod **208** and lifting bar **226** are so correlated that as the reach bar **200** moves forwardly, i. e., to the right as viewed in Fig. 1, the lifting bar **226** moves upwardly and by virtue of the roller and slot connection **232**, **230** existing between the lifting bar **226** and the reach bar **200**, the free end of the reach bar is elevated so that the

hooked end **201** clears the article on the conveyor **10**. When the oscillating connecting rod **208** reaches its extreme position with the reach bar **201** overlying an article S on the conveyor **10**, the free end of the reach bar is lowered to bring the hook portion **201** thereof below the level of the upper edge of the article S, as shown in broken lines in Fig. 7, so that the hook portion **201** engages the outer side of the article. During movement of the reach bar to the left, as viewed in Fig. 7, no vertical component of movement is applied thereto by the lift bar **226** and the article S is slid transversely from the conveyor **10** to the left as viewed in Fig. 7 and transferred from the conveyor to one of the pockets of the transfer wheel **12** which, at that time, has become opened in the manner previously described for reception of the article.

During actual movement of the article laterally from the conveyor **10** into the pocket of the transfer wheel, the retaining members or pads **202**, operating under the influence of the cam roller **213** riding in the cam groove **215**, bear against the inner surface of the article and move bodily therewith to prevent tumbling or tilting of the article. After the article has been delivered into a pocket in the transfer wheel, the retaining pads **202** return to their advanced position preparatory to reception of the next succeeding article S at the first transfer zone during the next succeeding machine cycle.

The wrapping wheel

Referring now to Figs. 1, 10, 11 and 17 the wrapping wheel **20** is somewhat similar in its design to the transfer wheel **12**. The wrapping wheel comprises a generally circular disc-like body portion **250** having formed therein a series of radially extending article supporting members **252**, each including an article receiving tray **254** including a flat bed plate **256** and an end wall **258** integrally formed therewith and extending radially outwardly therefrom. Each bed plate **256** is adapted to receive thereon the face surface of one of the partially wrapped articles which is transferred from the transfer wheel **12** into engagement with a sheet of wrapping paper in such a manner that the sheet of wrapping paper is bodily carried by the article and placed against the flat bed plate **256** in a manner that will be described presently. The article receiving tray **254** is connected to the main body **250** of the wrapping wheel by means of a web **260**. Each web **260** is formed with a boss **262** adjacent its base, to which boss there is pivotally connected an L-shaped clamping member **264** having a clamping arm **266** and a cam follower arm **268**, the clamping member **264** being pivoted to the boss adjacent its medial region so that the clamping arm **266** extends generally radially outwardly and provides an end wall or surface **270** which normally bears against one end of the bed plate **256** to form in conjunction therewith and in conjunction with the end wall **258** an open-sided article receiving pocket of dimensions which are commensurate with the length, width and depth of the partially wrapped article. Each arm **268** is provided with a follower roller **272** at its free end which is adapted to ride upon a stationary cam plate **274** which surrounds the shaft **106** and which is secured by means of screws **276** to a flanged bearing **278** forming a part of the stationary machine framework **16** and through which the shaft **106** extends.

Each of the end walls **258** is provided with a circular boss **280** which receives therein one end of a compression spring **282** while the other end of the spring is received in a boss **284** formed in one of the clamping arms **266** of the clamping member **264** next adjacent the end wall **258**. Each spring **282** serves to urge its respective clamping member to its closed article-engaging position with the surface or end wall **270** of the member bearing against one end of the bed plate **256** of an adjacent article receiving tray **254**.

The stationary cam plate **274** is provided with a substantially circular arcuate land region **283** and an eccentric circular arcuate portion **286**, the latter being positioned in the general neighborhood of the transfer zone Z2 wherein articles are transferred from the transfer wheel **12** to the wrapping wheel **20**, and also being positioned in the neighborhood of the transfer zone Z3 wherein the articles are discharged from the wrapping wheel to the discharge conveyor **22**. From the above description of parts, it will be seen that as the wrapping wheel is rotated in a counterclockwise direction as viewed in Fig. 11, the various pockets thereof will pass through the second transfer zone Z2 in succession, at which zone they will receive therein the partially wrapped articles. From the second transfer zone the pockets, containing the partially wrapped articles, pass through a seam folding zone Zs wherein a seam folding operation is performed in a manner subsequently to be described, and from thence the pockets move through a flap forming and tucking zone Zt, and finally through a flap folding zone Zf prior to being discharged to the conveyor **22** at the third transfer zone Z3.

The wrapper feeding instrumentalities

The wrapper feeding mechanism disclosed in Fig. 1 serves to apply a sheet of paper, otherwise known and hereinafter referred to as the wrapper *w*, to the article S during the transfer of the latter at the second transfer zone Z2 from the transfer wheel **12** to the wrapping wheel **20**. The article S is removed from a pocket of the transfer wheel and "forced through," so to speak, the wrapper so that the wrapper is carried along with the article and both the article and wrapper are deposited in a pocket of the transfer wheel with a partial wrapping operation taking place by virtue of the article being partially surrounded by the wrapper as the article carries the wrapper into the bottom regions of the pocket.

The wrapper feeding mechanism disclosed herein may be of any suitable type and no claim is made herein to any novelty associated therewith as various means may be employed for initially applying the wrappers to the articles. As shown in Fig. 1, an individual wrapper *w* is projected in the form of a flat sheet of paper between a guide member **300** and a pair of rollers **302** so that the plane of the wrapper traverses the second transfer zone Z2 and so that the wrapper *w* positioned substantially directly and centrally in the path of movement of the articles S as they move from the pockets of the transfer wheel **12** to the pockets of the wrapping wheel **20**. If desired the wrappers may be continuously fed from a suitable roll to a position traversing the zone Z2 and a suitable cut-off knife employed to sever the individual wrappers from the roll.

The second transfer zone mechanism

Referring now to Figs. 1, 10 and 11, the mechanism for removing the articles S from the pockets of the transfer wheel **12** and transferring them "through" the wrapper *w* and placing them, together with the wrapper, in partially wrapped condition in the pockets of the wrapping wheel **20**, includes a pair of transfer arms **310** and **312**, respectively, having transfer or lifting pads **314** mounted on their free ends and designed to engage the articles in the pockets of the transfer wheel and lift the same bodily from the pocket and deposit the same in a pocket of the wrapping wheel, the transfer operation taking place during approximate register of the two pockets with each other at the second transfer zone Z2. It has previously been explained during the description of the driving mechanism for the transfer wheel **12** and of the driving mechanism for the wrapping wheel **20** that the transfer wheel is provided with eight article receiving pockets, while the wrapping wheel is provided with ten article receiving pockets and with the transfer wheel rotating in the same direction as the wrapping

wheel at a five-to-four driving ratio. Thus, during the cyclic operation of the machine as a whole, the successive pockets of the transfer wheel **12** will periodically be brought into register with the successive pockets of the wrapping wheel at the transfer zone Z2 with a transfer operation taking place during each successive registry of pockets. The transfer arms **310** and **312** straddle the transfer wheel **20** (Fig. 10) and the arms are capable of swinging movement about the axis designated at X—X in Fig. 1 so that the transfer pads **314** may move from the vicinity of the transfer wheel **12** to the vicinity of the wrapping wheel **20** and vice versa to perform an operative transfer stroke wherein the article is carried from the former to the latter or to perform a return stroke preparatory to receiving the next succeeding article and effecting transfer thereof. The transfer arms **310** and **312** are also capable of swinging movement about an axis Y—Y (Figs. 1, 10 and 11) in order that the transfer pads **314** may be moved toward and away from each other so that during the return stroke of the transfer arms **312** about the axes X—X, the pads will clear the edges of the article just released to the wrapping wheel and also the edges of the next article about to be transferred from the transfer wheel to the wrapping wheel.

Toward the above-mentioned ends, the transfer arms **310** and **312** (Figs. 10 and 11) are each provided with a sleeve portion **316** which is pivotally mounted on a shaft **318** whose axis coincides with the previously described axis Y—Y. The shafts **318** are rotatably mounted in respective brackets **322** which, in turn, are secured to a rock-sleeve **324** (Fig. 11) carried in a surrounding rock sleeve **326**, the latter being rotatably mounted in a bearing **328** suitably secured to a stationary part of the machine framework **16**. The two transfer arms **310** and **312** are thus constrained to move in unison about the axes of their respective shafts **318**.

In order to impart tilting movement to the transfer arms **310** and **312** about their respective axes X—X to move the transfer pads **314** throughout arcuate paths through the transfer zone Z2 so that they may perform their lifting action upon the articles S to transfer them from the transfer wheel to the wrapping wheel, one of the brackets **322** is provided with a depending arm **334** which is pivotally connected to one end of a link **336** (Fig. 1), the other end of the link being connected to a follower arm **338** pivotally mounted on a shaft **340** which extends along the bottom of the machine framework **16** and which is suitably mounted therein. The follower arm **338** carries a cam roller **341** which rides in a closed arcuate groove **342** and which is provided in a cam wheel **343** (Fig. 10). The shape of the groove **342** is such that during each machine cycle, the transfer arms **332** which are secured to the rock sleeve **324**, will have imparted thereto a tilting motion in a counterclockwise direction, as viewed in Fig. 1, representing the transfer stroke of the arms and a tilting motion in the opposite direction representing the return stroke of the arms.

In order to move the transfer arms **310** and **312** about the axes Y—Y to move the transfer pads **314** toward and away from each other to cause the same to engage the article on the transfer wheel at the commencement of the operative transfer stroke of the transfer arms and to clear the edges of the articles during the return stroke of the arms, the arm **310** (Fig. 10) is provided with a depending finger **345** which projects between a pair of spaced collars **347** pinned or otherwise secured to a central rod **349** which extends through the rock sleeve **324**. The rod is capable of axial-shifting movement within the sleeve **324** in a manner that will be made clear presently and thus when the rod **349** is moved to the left, as viewed in Figure 10 to its full line position, the finger **345** and transfer arm **310** are moved in a clockwise direction to bring the transfer pad **314** behind the article S carried in one of the receiving pockets in the transfer wheel at the second transfer zone. When the rod **349** is moved in a counterclockwise direction, the lifting pad **314** is moved to an out-of-the-way position and the same is caused to clear the article during the return stroke of the arm **310**.

The sleeve **324** has slidably disposed therein a laterally shiftable collar **350** having a pair of circumferential grooves **353** and **354** formed therein. The lower end of the transfer arm **312** is provided with a depending finger **356** which is formed with a fork portion **358** provided with inwardly extending rollers **360** adapted to ride in the groove **354** in order that lateral shifting movements of the collar **350** in either direction will impart a degree of tilting movement to the transfer arm **312** to move the pad **314** associated therewith in timed relation to the movement of the pad **314** associated with the arm **310**.

Referring now to Fig. 10, means are provided whereby the rod **349** and the collar **350** may be moved in opposite directions simultaneously to cause the transfer arm **310** to move in a clockwise direction while the transfer arm **312** moves in a counterclockwise direction and vice versa so that the lifting pads will assume their closed or open positions as the case may be. Toward this end one end of the rod **349** is threadedly secured in a socket member **362** which is pivoted as at **364** to one end of a cam follower arm **366** which is provided medially of its ends on a shaft **368** suitably journalled in and extending transversely of the machine framework **16**. The other end of the arm **366** carries a cam follower roller **369** which travels in a closed arcuate cam groove **370** provided in a cam wheel **372** mounted on the transverse shaft **112** previously mentioned in connection with the receiving conveyor driving mechanism shown in Fig. 3. A medial arm **374** formed on the follower arm **366** has pivoted thereto one end of a link **376**, the other end of which is pivoted to one end of a lever **378** which is pivoted medially of its ends on a shaft **380** secured in the machine framework **16**. The other end of the lever **378** is provided with a yoke portion **381** having inwardly extending rollers **382** which are adapted to ride in the groove **353** of the shift collar **350**.

From the above description of parts it will be seen that the movements imparted to the cam follower roller **369** upon rotation of the cam wheel **372** are such that as the follower arm **366** performs its oscillating motion in accordance with the intended cyclic operation of the machine, the rod **349** and shift collar **350** are caused to reciprocate simultaneously with their respective reciprocal movements being at all times opposite in direction.

As previously described, the main shaft **14** which carries the various cam wheels **216, 223, 217, 396** and **343** and which consequently operates in the manner of a cam shaft, as well as of a driving shaft, serves to drive the shaft **112** carrying the cam wheel **372** at a predetermined speed ratio so that all of the cams **216, 223, 217, 396, 343** and **372** are driven in timed relation.

Still referring to Figs. 1, 10 and 11, upon arrival of one of the pockets **18** of the transfer wheel **12** at the second transfer zone and with the consequent arrival at the second transfer zone of one of the pockets **19** of the wrapping wheel, the transfer arms **310** and **312** will assume a retracted position wherein the transfer pads **314** thereof are positioned behind the article in the receiving pocket of the transfer wheel and with the pads occupying a closed position, which is to say that the arms **310** and **312** assume their inner positions wherein the transfer pads extend beyond the edges of the articles to be transferred from the transfer wheel to the wrapping wheel so that swinging movement of the arms about the axes X—X will cause the article to be lifted bodily from the pocket **18** of the transfer wheel **12** and moved bodily toward the adjacent pocket **19** of the wrapping wheel **20**. In such a position, the cam wheels **372** and **343** will assume

the positions shown in Fig. 10, so that the arms **310** and **312** are behind and in register with the article in the pocket at the zone Z2. Continued rotation of the shaft **14** and consequently of the various cam wheels will serve to cause the lifting arms **310** and **312** to move in a counterclockwise direction, as viewed in Fig. 1, with these arms remaining in closed position so that the transfer pads which underlie the article in the pocket of the transfer wheel will engage the article and bodily lift the same from the transfer wheel and pass the same "through" the wrapper *w* and deposit the article and wrapper in a pocket of the transfer wheel. It will be seen that such transfer of the article from one pocket to the other "through" the wrapper will cause the wrapper to partially surround the article and, since there is very little clearance between the end walls of the receiving pocket of the wrapping wheel, the ends of the article will cause the side regions of the wrapping paper to project outwardly, as shown in Fig. 1 to partially wrap the articles immediately upon their reception in the pocket of the wrapping wheel.

The transfer mechanism at the second transfer zone further includes a pair of retaining members **384** (Figs. 1, 10, 11 and 18), the function and operation of which is somewhat similar to the function and operation of the retaining members **202** associated with the transfer mechanism at the first transfer zone. The retaining members or pads **384** are carried at the outer end of a pair of yieldable arms **386** which are pivotally secured as at **388** medially to a pair of arms **390** which straddle the wrapping wheel **20** and which are secured at their inner ends to the rock sleeve **324** which is mounted for turning movement in the bearing **328** (Fig. 10). The outer end of each arm **390** is formed with a socket **387** and a compression spring **389**, disposed in each socket **387**, bears against the pads **384** on the yieldable arms **386** to normally urge the pads **384** against the wrapper *w* and force the same against a pair of extensions **315** provided on the transfer pads **314** to maintain the wrapper *w* in a substantially flat condition as the article and wrapper are moved bodily toward the wrapping wheel.

An arm **391**, secured to and depending from the sleeve **324**, is connected through a link **392** to the upper end of a cam follower arm **393** pivoted on the shaft **340** and carrying medially thereof a cam follower roller **394** adapted to travel in a cam groove **395** formed in a cam wheel **396** mounted upon and secured to the drive shaft **14**.

The nature of the cam groove **395** is such that as the shaft **14** makes each complete revolution during each machine transfer cycle, the rock sleeve **324** is caused to oscillate about the axis of the rod **349** and cause the arms **390**, **386** and retaining members **384** to first travel in a clockwise direction as viewed in Fig. 11 to bring the retaining members or pads **384** into yielding engagement with the wrapper *w* to maintain the latter taut and to thereafter move with the wrapper and article as the same are being transferred by the members or pads **314** to the pocket **19** of the wrapping wheel at the second transfer zone. The arrangement of the transfer mechanism at the second zone Z2 is cyclic and therefore repetitious during each machine cycle or transfer operation which takes place during each one-eighth revolution of the transfer wheel **14** or one-tenth revolution of the wrapping wheel.

The seam folding mechanism

If the rotational movements of the wrapping wheel **20** be considered in terms of machine cycles, one complete revolution of the wrapping wheel will serve to deliver ten fully wrapped articles to the discharge conveyor **22**. If the second transfer zone Z2 is selected as a reference point, the seam folding zone Z*s* is situated at a region approximately 90° removed from the zone Z2 in a counterclockwise direction as viewed in Fig. 1. At this seam folding zone, instrumentalities are provided for effecting a seam fold wherein the substantially radially extending portions of the applied wrapper *w* are folded against the outwardly presented face surface of the article so that one flap slightly overlies the other flap and so that the substantially tubular unfolded open-ended end flap portions project axially beyond the ends of the article. At a region substantially 90° removed from the transfer zone Z*s* instrumentalities are provided for performing a tucking operation on the unfolded end flap and also for folding or wrapping the end flap thus tucked around the article at a flap folding zone Z*f* to produce the finally wrapped article S1 illustrated in Fig. 2.

The seam folding instrumentalities at the zone Zs and the flap folding instrumentalities at the zone Zf are driven from a common driving shaft **400** (Figs. 1, 10 and 16). The shaft **400** is rotatably journalled in a bearing **402** forming a part of the machine framework **16** and in bearings **404** and **406** formed on a bracket **408** secured to the machine framework **16**.

The shaft **400** has mounted thereon a driving wheel **410** which constitutes the driving wheel for both the seam folding instrumentalities at zone Z*s* and for the flap folding instrumentalities at the zone Z*f*. As will be described subsequently, the driving wheel **410** for these instrumentalities (see also Fig. 19) is adapted to be driven from the main driving shaft **14**. The shaft **400** carries thereon a crank arm **412** (Fig. 16) having a link **414** pivoted to its outer end (see also Fig. 10). The link **414** is pivoted to an arm **416** mounted on a shaft **418** suitably journalled in bearings **420** forming a part of the machine framework. An end of the shaft **418** has mounted thereon a seam folding arm **422**, the outer end of which has mounted thereon a seam folding shoe **424** having a heel portion **426** and an inclined toe portion **428**. The seam folding arm **422** is designed for oscillatory movement about the axis of the shaft **418**, in order that the toe portion **428** of the seam folding shoe **424** may engage one of the outstanding wrapper sides and force the same inwardly toward the outer face of an article S in one of the pockets in the zone Z*s*.

A stationary shoe folder **430** (Figs. 1 and 11) of arcuate design is suitably supported in the machine framework by means of brackets **431** and **433** and extends around a portion of the periphery of the wrapping wheel **20** from a point **435** at its upper end adjacent the seam folding zone Z*s*, through the flap tucking and folding zone Z*f*, to a point **437** existing between this latter zone Z*f* and the third transfer zone Z3 where the fully wrapped articles S1 are delivered to the discharge conveyor **22**.

It will be seen that during each machine cycle as a pocket arrives at the folding zone Z*s*, the seam folding arm **422** is moved inwardly toward the transfer wheel so that the toe portion **428** of the seam folding shoe **424** engages one projecting side of the wrapper *w* and folds the same downwardly against the outer surface of the article in the pocket. As the transfer wheel continues to rotate, the other projecting side flap portion is carried beneath the stationary shoe folder **430** and is bent downwardly over the seam folding shoe which is subsequently withdrawn to leave the final seam fold intact. The seam fold is maintained in effect with the inner surface of the shoe folder bearing against the outer or overlying flap of the seam fold until such time as the thus partially wrapped article arrives at the flap tucking and folding zone.

The seam folding driving mechanism

Referring now to Figs. 1, 16 and 19, and particularly to Fig. 19, the driving wheel **410** for both the seam folding instrumentalities and the flap folding and tucking instrumentalities is driven from the main shaft **14** through a train of gears including the gears **80**, **82**, a gear **432** loosely disposed on the shaft **98**, a gear **434** loosely disposed on the shaft **102**, and gears **436** and **438** respectively mounted on shafts **440** and **442**, to the driv-

ing wheel or gear 410. Because of the fact that all of the gears just mentioned are of the peripheral meshing type with no compounding of gears, the shaft 400 upon which the gear 410 is mounted is adapted to rotate in unison with the driving shaft 14 and at a one-to-one speed ratio.

The flap tucking and folding instrumentalities

Referring now to Figs. 1, 11, 16 and 17, the flap tucking and folding instrumentalities include a pair of rotary flap tucking and folding wheel assemblies 450 and 452, respectively, the former being designed for cooperation with one of the end flaps of the partially wrapped articles at the zone Zf and the other being designed for cooperation with the other end flap. The assemblies 450 and 452 are of complementary design as will be explained presently and both operate upon identical principles so that a description of one of them will suffice to a large extent for a description of the other.

Each assembly includes a driven shaft 454 (Fig. 16) having mounted thereon a rotary folder designated in its entirety at 456 including a hub portion 457, a disc-like end wall 458 and an integrally formed arcuate folder element per se 459. The folder element 459 is in the form of an arcuate metal sheet of tapering design having a relatively wide forward or leading end whose transverse dimension is indicated at *f* and a relatively narrow trailing end whose transverse dimension is indicated at *r*. The leading or forward end of the folder 459 is provided with a notch 460, the purpose of which will become clear presently and the edge of the folder 459 remote from the end wall 458 follows a spiral contour extending from the wide leading end of the folder to the narrow trailing end thereof.

The shafts 454 are mounted in bearings 462 provided in the bracket 408 and each shaft has mounted thereon a bevel gear 464, each bevel gear meshing with a similar bevel gear 466 mounted on the driven shaft 400.

The two bevel gears 466 on the shaft 400 face in opposite directions and as a consequence their counterpart gears 464 rotate in opposite directions so that the shafts 454 upon which the two folder assemblies are mounted, rotate in opposite directions as indicated by the arrows in Fig. 16.

The shafts 454 are arranged in parallelism and are spaced from each other a sufficient distance so that the two folder elements 459 are positioned adjacent the flap folding zone Zf on opposite sides of the wrapping wheel 20.

It has previously been explained how the partially wrapped articles passing through the seam folding zone Zs are considered to have their protruding side flaps folded down one upon the other to provide a seam fold, thus leaving at the ends thereof an unfolded flap portion of generally tubular design which projects around the ends of the article S. One of the folding assemblies 456 is designed to operate upon one of the thus extended unfolded ends of the wrapper, while the other assembly 456 is adapted to operate upon the other unfolded end portion of the wrapper.

The notch 460 provided in each folder element 459 provides a pair of folding fingers which are adapted to initiate the flap folding operation on its respective end portion of the wrapper after an initial tucking operation, about to be described, has been performed.

The tucking operation just mentioned is performed under the influence of a tucking finger 470 (Figures 1 and 11) which is associated with each folding assembly 456 and which has been omitted in the disclosure of Fig. 16 for purposes of clarity, but is shown in Fig. 1A. The tucking finger assemblies are substantially identical in design and are actually identical in operation and each includes a shiftable sleeve member 472, Fig. 1A, slidably disposed and splined upon its respective shaft 454. The tucking finger 470 extends outwardly from the sleeve 472 and has a range of vertical movement substantially within the confines of the notched portion 460 of the folder element 459. A roller pin 474 extends outwardly from the sleeve 472 and carries a cam roller 475 which is designed for camming engagement with a cam surface 476 provided on a stationary barrel faced cam 478, suitably secured to the rigid bracket 408, Fig. 1A. The sleeve 472 is normally urged toward the barrel faced cam 478 by means of a compression spring 480 which surrounds the shaft 454 and which has one end thereof bearing against the end wall 458 and at the other end against the sleeve 472. The bracket 408 is rigid, and the shaft 454 is revolubly mounted therein. The sleeve member 472 is keyed to the shaft 454 and rotates therewith, but is slidable along the shaft 454. The sleeve member 472 carries an outstanding pin which rotates along with the arcuate folder element 459. The cam 478 is fixed to the stationary element 408. The end or bottom wall 458 supports a spring 480 which engages the underside of the sleeve 472. Thus, while the rotary folder element 459 rotates, the finger 470 will also rotate, and at the same time will be given vertical reciprocation, because of the cam roller 475 engaging the cam stationary surface 476. From the above description of parts it will be seen that as each of the pockets provided in the transfer wheel 20 passes through the zone Zf, the tubular unfolded end flaps are projected into the rotary path of movement of the rotary folders 456 and a tucking operation is initiated upon each unfolded end flap as the tucking finger 470 engages the inner or underneath side of the extended tubular flap. Since the movement of the transfer wheel is continuous, it is necessary that the tucking finger move or travel in the same direction as the path of movement of the article so that time may be given to effectively make the necessary tuck in the unfolded flap. In other words, a "running tucking operation" may be said to be formed in the unfolded end flap and this is made possible by virtue of the fact that the cam follower roller 475 rides outwardly on the cam surface 476 of the barrel faced cam 478 at an appropriate time as each article arrives at the zone Zf. The tucking finger 470 is inclined relative to the radial plane of the shaft 454, as shown in Figure 11, for the purpose of completing the necessary tucking operation after the sleeve 472 has reached one of its limiting positions with the compression spring 480 fully compressed. In other words, the tucking finger 470 performs an initial running tucking operation on the projected unfolded flap portion of the wrapper during movement of the sleeve 472 away from the face of the barrel faced cam 478. Since it is not expedient to provide a very long sliding motion of the sleeve 472, the fact that the tucking finger 470 is inclined relative to a radial plane of the shaft 454 assures completion of the tucking operation by a sliding operation of the finger 470 on this portion of the wrapper.

After the tucking operation has been completed, the leading portions of the rotary folder element 459 on each side of the notch 460 engage the unfolded end flap portions of the wrapper *w* in which the tuck has already been performed and fold them loosely over the article. The shoe folder 430 which previously served to complete the seam folding operation is carried around the periphery of the transfer wheel and extends completely through the flap folding zone Zf to the point indicated at 437 in Figure 11 and thus the shoe folder 430 not only operates to complete the initial seam fold, but it also operates as a backing element on which the flap folding operations may be performed to protect the relatively delicate article about which the wrapper is being folded. As shown in Figs. 11, 13, 14 and 15, the shoe folder 430, which is extended from the seam folding zone through the flap folding zone to a point adjacent the discharge conveyor 22, becomes narrower towards its point of termination 437 and serves throughout a

major portion of its length to maintain the initial seam fold intact and also serves throughout another portion of its length as a backing bar onto which the final flap fold may be performed. As shown consecutively in Figs. 13, 14 and 15, the width of the shoe folder tapers to the point 437 after which the shoe folder is discontinued and the completely wrapped articles are slidably carried on a pair of plow folders 492 shown in Fig. 11 which extend from a region in the vicinity of the zone Zf to a region near the discharge zone or third transfer zone Z3.

After the partially wrapped articles leave the flap folding zone Zf with the end flaps partially formed by the tucking and folding operations conducted thereupon by the tucking and folding mechanisms, the flaps F remain partially extended as shown in Figs. 11 and 13. In moving away from the folding zone Zf, the partially extended flaps *f* enter between the inner opposed edges of the plough folders 492 and, by a progressive camming action as illustrated in Figs. 13, 14 and 15, the folded flaps are brought inwardly of the articles and are caused to be folded over the extended portion of the shoe folder 430 which gradually diminishes in width and which is discontinued at the point 437 of Fig. 11.

The plough folders 492 however are continued beyond the end of the shoe folder extension and after the articles in their respective pockets have moved away from the shoe folder extension they rest upon the plough folders 492 and are transferred onto a chute plate or member 494 from whence they are conducted to the oncoming pockets provided in the discharge conveyor.

As soon as the wrapped articles leave the vicinity of the end 437 of the shoe folder extension they assume the condition shown in Fig. 2 with the flaps *f* bearing against the seam fold and resting upon the plough folders 492 which serve to maintain the folds secure until delivery to the chute member 494.

The discharge conveyor

Referring now to Figs. 1, 17, 21 and 22, the pockets 24 associated with the discharge conveyor 22 exist by virtue of the previously mentioned supporting elements or trays 134 each of which is secured by means of a pair of downwardly extending ears 135 to the various conveyor pins 137 in the usual manner of supporting elements of this type. Each element includes a substantially flat rectangular bed plate 139 on which the ears 135 are formed and having upstanding therefrom a rear wall structure 141. The wall structure 141 extends from one corner of the bed plate 139 partially across the rear edge thereof and is provided with a rearwardly extending flange portion 143 which, as shown in Fig. 17, when the pockets 24 are passing through the upper straightaway portion of the conveyor 22, is adapted to lie substantially flush with the front edge of the next succeeding bed plate or which, if desired, may slightly overlap this edge. The wall 141 of each pocket terminates within the confines of the bed plate at a region 144 which lies within the rectilinear confines of the bed plate and the rear side of each end wall is provided with a cutaway portion providing a vertical plane surface 145 which is inclined with respect to the rear edge of the bed plate.

Fig. 21 schematically represents the manner in which a wrapped article S1 is progressively deposited on one of the bed plates 139. Since the conveyor 22 moves at a comparatively high rate of speed and has a continuous unvaried rate of movement it has been found difficult to introduce successive articles to the pockets 24 thereof without spacing the pockets a relatively great distance from each other linearly along the length of the conveyor. Ordinarily in a machine of this character, each pocket would have to be spaced from its adjacent pockets a distance substantially equal to a third of the length of the articles undergoing wrapping along their major axes and a corresponding adjustment of the speed of travel of the conveyor 22 would have to be made to result in a solution of the problem of depositing the articles in their respective pockets without interference from the preceding pocket at the third transfer or discharge zone Z3. In fact, any desired spacing in excess of the minimum spacing mentioned above might prove a satisfactory solution to the problem of depositing the articles on the conveyor 22, but in any event an inordinately long discharge conveyor would have to be employed. The present invention overcomes the necessity of such wide spacing between the conveyor pockets and permits the pockets to be arranged in very close proximity to one another. In the illustration designated 21*a* a wrapped article S is in the process of being discharged from the inclined plate 494 (Fig. 11) into one of the pockets 24. The article is discharged onto the bed plate 139 while one end thereof partially overlaps a portion of the bed plate of the next preceding conveyor pocket 24. During the next increment of motion, as shown in Fig. 21*b*, the article is extended further from the chute 494 and further onto the bed plate 139 and such movement of the article is made permissible solely by the cutaway portion 145 of the end wall portion of the preceding pocket 24. In the third progressive view of Fig. 21*c*, the article has been fully deposited on its respective bed plate 139 and one edge thereof is in contact with the rear wall 141, while the rear edge of the end wall of the preceding pocket is in close proximity to the front edge of the pocket 24 on which the article has been deposited.

By the arrangement of parts described above, high speed delivery of the articles from the wrapping wheel may be accommodated by a conveyor of moderate length and without damage to the articles undergoing transfer from the wrapping wheel to the discharge conveyor.

Operation of the machine

It is believed that from the above description that the nature and operation of the improved wrapping machine can be ascertained. However, for a fuller understanding of the operation of the device it is deemed pertinent to render a brief description of the manner in which an article received at the first transfer zone Z1 is conducted by the transfer wheel 12 to the wrapping wheel at the second transfer zone Z2 wherein it acquires a wrapper *w* and becomes partially wrapped during the transfer operation, and the manner in which the article becomes completely wrapped during its travel around the periphery of the transfer wheel and also the manner in which it is delivered to the discharge conveyor 22.

Referring now to Figures 1 and 6, the articles S which, as previously stated, may be in the form of oval cakes of soap, are conducted along the straightaway or inner portion of the receiving conveyor 10 continuously to the first transfer zone Z1 where they are brought into register with one of the open pockets 18 provided on the transfer wheel 12. Although the movement of the articles along the straightaway portion of the conveyor 10 is continuous, it is sporadic in that the articles are considered to appreciably slow down upon the arrival at the transfer zone Z1. As soon as each article arrives at the transfer zone Z1 and pauses, so to speak, to permit its transfer to the transfer wheel, the forward end of the reach bar 200 passes over the open edge of the article which rests in the pocket 18 provided in one of the supports 72 with its major axis extending longitudinally of the straightaway portion of the conveyor. The reach bar 200 is then tilted downwardly by mechanism previously described so that the hooked end 201 thereof assumes a position behind the article. The reach bar is thereafter moved axially to the left, as viewed in Fig. 1, so that the hooked end thereof gently slides the article S away from the support 72. At the same time the retaining members or pads 202 which are supported on the upper ends of the yoke arms

203 have moved forwardly so as to lightly engage the article and thereafter by virtue of the cam driving mechanism associated with both the pads and the reach bar **200**, the article is slid inwardly of the transfer wheel, it being supported on opposite sides thereof by both the hooked end or extension **201** of the reach bar and both pads **202** until such time as the article is deposited in the pocket **18** which passes through the zone Z1 at the particular moment the transfer operation is being effected.

Continued movement of the transfer wheel **12** in a counterclockwise direction as viewed in Fig. 1, causes the article to be elevated to pass upwardly around the periphery of the transfer wheel bodily as the transfer wheel rotates. During movement of the article upwardly around the periphery of the transfer wheel, the open pockets **18** become closed by virtue of the previously described stationary cam plate **174** and its action on the cam rollers **172** which cause the clamping arms **166** to close upon an end of the article and force the same against the exposed end wall **158**. The articles, however, when initially received in the pockets **18** are only approximately aligned transversely of the transfer wheel and thus as the articles pass between the rollers **190**, they are forced into accurate alignment for subsequent transfer to the pockets **19** of the wrapping wheel at the second transfer zone Z2. Upon arrival of the article at the zone Z2, the pocket **18** containing the article becomes opened and the article is released by the clamping arm **166** and thereafter the transfer pads **314** carried on the transfer arms **310** and **312** are moved into position behind the article and the article is lifted into contact with the wrapper *w* which is positioned in the path of movement of the article across the transfer zone Z2. The retaining pads **384** are at this time moved outwardly and into engagement with the article and are caused to clamp the article against the extensions **315** of the transfer pads **314** and to clamp the wrapper *w* on opposite sides of the article and render the same taut preparatory to movement of the article S "through" the wrapper *w*. Continued movement of the transfer arms **310** in a counterclockwise direction as viewed in Fig. 11 serves to force the wrapper *w* and article S bodily, as a unit, inwardly toward the center of the wrapping wheel **20**. During such bodily movement of the wrapper and article, the side regions of the wrapper come into contact with the end surfaces **253** and **270** of the pocket **19** on the transfer wheel passing through the second transfer zone Z2. Movement of the article into the pocket carries the medial regions of the wrapper with it so that the end regions of the wrapper may slide between the retaining pads **384** and the extensions **315** of the transfer pads **314**. The wrapper is thus deposited in the pocket **18** so that the medial region thereof underlies the article S, while the end regions project outwardly in substantially radial fashion, as shown in Figs. 1 and 11, with the outer surface of the article exposed. The sliding of the wrapper from its position between the clamping pads **384** and extensions **315** may be enhanced by a slight release of pressure of the parts concerned due to the cam action of the cam rollers **394** and **340** in their respective cam grooves **395** and **343**.

As previously described, the pockets **19** arriving at the transfer zone Z2 are open for reception therein of the article S together with the central regions of the wrapper *w*. Upon continued movement of the transfer wheel in a counterclockwise direction, as viewed in Fig. 11, the pockets leaving the transfer zone are caused to close on the articles by virtue of the cam rollers **272** riding inwardly onto the land portion of the region **283** of the stationary cam **274** so that the clamping arms **266** clamp the sides of the article against the end wall surface **258** of the pocket **19**, the wrapper, of course, extending between the sides of the article and the end walls of the pocket. Further movement of the thus clamped articles bring the same successively to the seam folding zone wherein the oscillating seam folding arm **422** causes the toe portion **428** to engage one projecting end of the wrapper and fold it inwardly upon the outer surface of the article. Immediately afterward the article passes under the arcuate shoe **430** which causes the other projecting side portion of the wrapper *w* to be folded over the previously flattened side portion of the article to provide a seam fold. As the article S passes beneath the arcuate folder **430** the seam fold is completed coextensively along the face of the article and this seam fold is maintained until the article arrives at the point **437** where the shoe folder is discontinued. After the seam fold has been made and the article passes under the shoe folder **430**, the article is in effect centrally disposed within a tubular wrapper having a longitudinal seam with open tubular end portions projecting outwardly from the ends of each article and these tubular end portions constitute the paper end portions which are subsequently to become the folded flaps *f* on the article, as shown in Fig. 2.

As the articles proceed beneath the shoe folder **430** and arrive at the flap tucking and folding zone Z*f*, the tubular projecting end portions of the wrapper are engaged at each end of the article by the ends of the rotating and oscillating tucking fingers **470** which rotate bodily with the flap folding elements **459** and which have a longitudinal component of movement relative to the axis of rotation of the folder. The tucking fingers thus effect an inward fold of crease-like configuration, but which is not as sharp as an actual crease, after which the leading edges of the flap folding elements **459** engage the paper material and complete the folding of the flaps *f* while at the same time bending them over the outer face of the article and over the seam fold previously effected in the wrapper. Because of the fact that the edge of the seam folder **459** has a spiral contour and because of the fact that the tucking finger **470**, due to its relationship with the barrel faced cam **478** moves in the same direction as an article travelling through the zone a relatively narrow and neat tucking operation is performed. The inclination of the tucking finger **470** is such as to follow the movement of the article and cause the tucking operation without danger of tearing the paper material comprising the wrapper *w*. After the flap folding operations at the zone Z*f* have been completed, the articles proceed away from the zones Z*f* with the flaps *f* overlying the shoe folder **430** which becomes narrower and narrower as it approaches its end point **437**. The wrapped article then passes beneath the plow folders **492** with the flaps *f* bearing thereagainst and when the article is relinquished by the shoe folder **430**, the flaps rest upon the plow folder **492** until the articles are deposited on the chute member or plate **494**. From the plate **494** the articles slide under the influence of gravity and whatever other momentum they may possess by virtue of the impelling action of the wrapping wheel into the pockets which successively pass through the third transfer zone. As previously described, by virtue of the cutaway portions **145** provided in the end walls **141** no interference to reception of the articles in the closely spaced pockets **24** of the receiving conveyor **22** is experienced and therefore the length of the discharge conveyor need not be of undue length.

Changes may be made in the form, construction and arrangement of the parts without departing from the spirit of the invention or sacrificing any of its advantages, and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

The invention is hereby claimed as follows:

1. In a machine for applying wrappers or the like to a series of articles and for folding the wrappers about the article, a conveyor for delivering the articles successively to a first transfer zone, a continuously rotating transfer wheel adapted to receive the articles delivered to the first transfer zone and to conduct them to a second transfer

zone, a continuously rotating wrapping wheel adapted to receive the articles delivered to the second transfer zone and to deliver them in wrapped condition to a discharge zone, reciprocating lever means at said first transfer zone for removing the articles from said conveyor and for delivering them to said transfer wheel, and means at said second transfer zone for removing the articles from said transfer wheel and for delivering them to said wrapping wheel, said last named means comprising a pair of transfer arms, means to move the arms toward and away from each other to gripping and release positions, and means to tilt the arms toward and away from the transfer wheel and wrapping wheel.

2. In a machine for applying wrappers or the like to a series of articles and for folding the wrappers about the article, a conveyor for delivering the articles successively to a first transfer zone, a continuously rotating transfer wheel adapted to receive the articles delivered to the first transfer zone and to conduct them to a second transfer zone, a continuously rotating wrapping wheel adapted to receive the articles delivered to the second transfer zone and to deliver them in wrapped condition to a discharge zone, reciprocating lever means at said first transfer zone for removing the articles from said conveyor and for delivering them to said transfer wheel, means at said second transfer zone for removing the articles from said transfer wheel and for delivering them to said wrapping wheel, said last named means including a pair of tiltable inwardly and outwardly movable arms straddling the wrapper wheel, means to spread the arms to receive the article, means to move the arms inwardly to grip the article on the transfer wheel, and means to spread the arms at the end of the tiltable movement and means at said second transfer zone for initially applying a wrapper to the articles undergoing transfer from the transfer wheel to the wrapping wheel.

3. In a machine for applying wrappers or the like to a series of articles and for folding the wrappers about the article, a conveyor for delivering the articles successively to a first transfer zone, a continuously rotating transfer wheel mounted for rotation about a horizontal axis and adapted to receive the articles delivered to the first transfer zone and to conduct them to a second transfer zone, a continuously rotating wrapping wheel mounted for rotation about an axis parallel to and spaced from said first axis and adapted to receive the articles delivered to the second transfer zone and to deliver them in wrapped condition to a discharge zone, reciprocating lever means at said first transfer zone for removing the articles from said conveyor and for delivering them to said transfer wheel, means at said second transfer zone for removing the articles from said transfer wheel and for delivering them to said wrapping wheel, said last named means comprising a transfer arm on each side of the wrapping wheel, means to move tiltingly said arms toward and away from the transfer wheel, and means to move said arms toward and away from each other during the tilting movement; means at said second transfer zone for initially applying a wrapper to the articles undergoing transfer from the transfer zone to the wrapping wheel, and means for continuously rotating said transfer wheel and wrapping wheel in timed relationship to each other.

4. In a machine for applying wrappers or the like to a series of articles and for folding the wrappers about the article, a continuously movable conveyor for delivering the articles successively to a first transfer zone, a continuously rotating transfer wheel mounted for rotation about a horizontal axis and adapted to receive the articles delivered to the first transfer zone and to conduct them to a second transfer zone, a continuously rotating wrapping wheel mounted for rotation about an axis parallel to and spaced from said first axis and adapted to receive the articles delivered to the second transfer zone and to deliver them in wrapped condition to a discharge zone, reciprocating lever means at said first transfer zone for removing the articles from said conveyor and for delivering them to said transfer wheel, means at said second transfer zone for removing the articles from said transfer wheel and for delivering them to said wrapping wheel, said last named means comprising a transfer arm on each side of the wrapping wheel, means to move tiltingly said arms toward and away from the transfer wheel, and means to move said arms toward and away from each other during the tilting movement; means at said second transfer zone for initially applying a wrapper to the articles undergoing transfer from the transfer zone to the wrapping wheel, and means for continuously rotating said transfer wheel and wrapping wheel in timed relationship to each other and in timed relation to the movements of said conveyor.

5. In a machine for applying wrappers or the like to a series of articles and for folding the wrappers about the article, a continuously movable conveyor for delivering the articles successively to a first transfer zone, variable speed drive means for moving said conveyor, a continuously rotating transfer wheel mounted for rotation about a horizontal axis and adapted to receive the articles delivered to the first transfer zone and to conduct them to a second transfer zone, a continuously rotating wrapping wheel mounted for rotation about an axis parallel to and spaced from said first axis and adapted to receive the articles delivered to the second transfer zone and to deliver them in wrapped condition to a discharge zone, means at said first transfer zone for removing the articles from said conveyor and for delivering them to said transfer wheel, means at said second transfer zone for removing the articles from said transfer wheel and for delivering them to said wrapping wheel, said last named means comprising a transfer arm on each side of the wrapping wheel, means to move tiltingly said arms toward and away from the transfer wheel, and means to move said arms toward and away from each other during the tilting movement; means at said second transfer zone for initially applying a wrapper to the articles undergoing transfer from the transfer zone to the wrapping wheel, and means for continuously rotating said transfer wheel and wrapping wheel in timed relationship to each other and in timed relation to the movements of said conveyor in the same direction, said conveyor moving at an angle to the path of rotation of said transfer wheel.

6. In a machine for applying a wrapper to an article and for folding the wrapper about the article, a continuously rotating transfer wheel mounted for rotation about an axis and having a pocket therein movable upon rotation of the wheel through a first and a second transfer zone, a continuously rotating wrapping wheel mounted for rotation about an axis parallel to said other axis and having a pocket therein movable upon rotation of the wrapping wheel through said second transfer zone and a discharge zone, reciprocating lever means at said first transfer zone for depositing an article in the pocket of the transfer wheel, means at said second transfer zone for transferring the article from the pocket of the transfer wheel to the pocket of the wrapping wheel, means operable during movement of the pocket of said wrapping wheel from said second transfer zone to said discharge zone for folding a wrapper about the article, said last named means comprising a pair of oppositely disposed rotary folder elements, and a reciprocating finger movable with the rotary folder elements and means for rotating said wheels in timed relationship.

7. In a machine for applying a wrapper to an article and for folding the wrapper about the article, a continuously rotating transfer wheel mounted for rotation about an axis and having a pocket therein movable upon rotation of the wheel through a first and a second transfer zone, a continuously rotating wrapping wheel mounted for rotation about an axis parallel to said other axis and having a pocket therein movable upon rotation of

the wrapping wheel through said second transfer zone and a discharge zone, reciprocating lever means at said first transfer zone for depositing an article in the pocket of the transfer wheel, means at said second transfer zone for transferring the article from the pocket of the transfer wheel to the pocket of the wrapping wheel, means operable during movement of the pocket of said wrapping wheel from said second transfer zone to said discharge zone for folding a wrapper about the article, and means for rotating said wheels in timed relationship continuously and at a constant rate of speed in the same direction.

8. In a machine for applying a wrapper to an article and for folding the wrapper about the article, a continuously rotating transfer wheel mounted for rotation about an axis and having a pocket therein movable upon rotation of the wheel through first and second transfer zones, a continuously rotating wrapping wheel mounted for rotation about an axis parallel to said first axis and having a pocket therein movable through said second transfer zone and a discharge zone, reciprocating lever means at said first transfer zone for depositing an article in the pocket of the transfer wheel, means at said second transfer zone for transferring the article from the pocket of the transfer wheel to the pocket of the wrapping wheel and for initially applying a wrapper to the article, means operable during movement of the pocket of the wrapping wheel from said second transfer zone to said discharge zone for folding the applied wrapper about the article, and means for rotating said transfer wheel and wrapping wheel in the same direction continuously and at a constant rate of speed in the same direction.

9. In a machine for applying a wrapper to an article and for folding the wrapper about the article, a continuously rotating rotary transfer wheel and a continuously rotating rotary wrapping wheel mounted for rotation about spaced parallel axes, means for rotating said wheels in the same direction continuously and at a constant rate of speed and in the same direction, reciprocating lever means for depositing an article on said transfer wheel, means for transferring said article from said transfer wheel to said wrapping wheel, said last named means comprising a transfer arm on each side of the wrapping wheel, means to move tiltingly said arms toward and away from the transfer wheel, means to move said arms toward and away from each other during the tilting movement; means for applying a wrapper to the article during the transfer operation, and means cooperating with said wrapping wheel for folding the wrapper about the article during rotation of the wrapping wheel, said last named means comprising a pair of oppositely disposed rotary folder elements, and a reciprocating finger movable with the rotary folder elements.

10. In a wrapping machine of the character described, a continuously rotating transfer wheel and a continuously rotating wrapping wheel mounted for rotation about spaced parallel axes, means establishing a transfer zone in the vicinity of the adjacent peripheral regions of said wheels, means providing an article receiving pocket in the peripheral regions of said transfer wheel, means providing an article receiving pocket in the peripheral regions of said wrapping wheel, means for rotating said wheels continuously in the same direction in timed relationship to cause the respective pocket thereof to pass through the transfer zone in opposite directions simultaneously, reciprocating lever means for depositing an article in the pocket of said transfer wheel, transfer means operable during movement of said pockets through said transfer zone for bodily shifting the article from the pocket of the transfer wheel and depositing the same in the pocket of the wrapping wheel, and means for loosely supporting a wrapper in the path of movement of the article during the transfer operation whereby said wrapper is engaged by the article and carried bodily therewith into the pocket of the wrapping wheel.

11. In a machine for applying a wrapper to an article and for folding the wrapper about the article, a continuously rotating transfer wheel mounted for rotation about an axis, article supporting and clamping means disposed on said transfer wheel and movable bodily with the wheel past first and second transfer zones, a continuously rotating wrapping wheel mounted for rotation about an axis parallel to the axis of rotation of the transfer wheel, article supporting and clamping means disposed on said wrapping wheel and movable bodily therewith past said second transfer zone and past a discharge zone, said article supporting and clamping means each being movable from a closed article-engaging position to an open article-releasing position, and vice versa, means normally maintaining said clamping means in their closed positions, means operable during passage of the transfer wheel clamping means through said first and second transfer zones for opening said latter clamping means, means operable during passage of the wrapping wheel clamping means through said second transfer and said discharge zones for opening said latter clamping means, reciprocating lever means at said first transfer zone for depositing an article in the article receiving and clamping means of the transfer wheel, means operable at said second transfer zone for transferring the article from said transfer wheel clamping means to said wrapping wheel clamping means, and means for rotating said transfer wheel and wrapping wheel in the same direction in timed relationship.

12. In a machine for applying wrappers to articles and for folding the wrappers about the articles, means establishing first, second and third transfer zones, a receiving conveyor adapted to deliver a series of articles in succession to said first transfer zone, a continuously moving discharge conveyor adapted to receive the fully wrapped articles in succession at said third transfer zone, a continuously moving wrapping wheel mounted for rotation about an axis and having a series of peripheral article receiving pockets movable bodily with the wrapping wheel past said second and third transfer zones, a continuously rotating transfer wheel mounted for rotation about an axis and having a series of peripheral article receiving pockets movable bodily with the transfer wheel through said first and second transfer zones, transfer means for transferring the articles delivered to the first transfer zone to successive pockets of the transfer wheel passing through said latter zone, reciprocating transfer means for yieldably gripping each article and transferring the articles from the pockets of the transfer wheel to the pockets of the wrapping wheel at the second transfer zone, means cooperating with said transfer means at the second transfer zone for initially applying a wrapper to each article undergoing transfer, and means at said third transfer zone for delivering the wrapped articles to said discharge conveyor.

13. Article handling mechanism of the character described comprising first and second continuously rotating article-receiving and conveying members mounted for rotation about substantially parallel axes and establishing therebetween a transfer zone for transfer of articles from the first member to the second member, a series of peripherally arranged article receiving and conducting pockets on each member and movable with the same through said zone, reciprocating lever transfer means for engaging and bodily shifting an article radially inwardly of the first article conveying member and into a pocket thereof, and other transfer means at said transfer zone for bodily shifting the article radially outwardly of the first conveying member from a pocket thereof and radially inwardly of the second conveying member and into a pocket thereof, means for continuously rotating said conveying members in the same direction whereby the pockets of one article conveying member pass through said transfer zone in a direction opposite to the direction of movement of the pockets of the other article conveying

member, said conveying members being rotated at different peripheral speeds, and means for bringing the pockets of one article conveying member into alignment with the pockets of the other article conveying member.

14. Article handling mechanism of the character described comprising first and second continuously rotating article-receiving and conveying members mounted for rotation about substantially parallel axes and establishing therebetween a transfer zone for transfer of articles from the first member to the second member, a series of peripherally arranged article receiving and conducting pockets on each member and movable with the same through said zone, reciprocating transfer means at said transfer zone for yieldably gripping the edges of an article in a pocket of the first article conveying member and for bodily shifting the same radially outwardly of the first conveying member from a pocket thereof and radially inwardly of the second conveying member and into a pocket thereof, and means for continuously rotating said conveying members in the same direction whereby the pockets of one article conveying member pass through said transfer zone in a direction opposite to the direction of movement of the pockets of the other article conveying member.

15. Article handling mechanism of the character described comprising first and second continuously rotating article-receiving and conveying members mounted for rotation about substantially parallel axes and establishing therebetween a transfer zone for transfer of articles from the first member to the second member, a series of peripherally arranged article-receiving and conducting pockets on each member and movable with the same through said zone, transfer means at said transfer zone for engaging an article in a pocket of the first article conveying member and for bodily shifting the same radially outwardly of the first conveying member from a pocket thereof and radially inwardly of the second conveying member and into a pocket thereof, means for varying the effective extent of the article conveying pockets of both of said article conveying members during their respective passage through said transfer zone to facilitate removal of the articles from the pockets of the first conveying member and to facilitate reception of the articles by the pockets of the second conveying member, and means for continuously rotating said conveying members in the same direction whereby the pockets of one article conveying member pass through said transfer zone in a direction opposite to the direction of movement of the pockets of the other article conveying member.

16. In a wrapping machine of the character described, a continuously rotating article receiving conveyor having a series of article conveying pockets thereon, each adapted to receive an article and movable with the article through a transfer zone, a continuously rotating transfer wheel mounted for rotation about an axis and having a plurality of article receiving pockets thereon likewise movable through said transfer zone, said transfer wheel being adapted to receive the articles at said transfer zone and conduct them to a wrapping mechanism, means for continuously moving said conveyor at variable speeds and rotating said transfer wheel in timed relationship to cause successive pairs of cooperating pockets of the conveyor and of the transfer wheel to move into register at the transfer zone, means operable during passage of each pair of cooperating pockets through said transfer zone for shifting the article in the pocket of the conveyor and depositing the same in the pocket of the transfer wheel, said wrapping mechanism comprising a wrapping wheel having article receiving pockets, means including a pair of reciprocating arms to receive an article from a pocket in the transfer wheel and deposit said article in a pocket of the wrapping wheel, and means to spread and close said arms to permit engagement and release of an article during reciprocation of said arms.

17. In a wrapping machine of the character described, a continuously rotating article receiving conveyor having a series of article conveying pockets thereon, each adapted to receive an article and movable with the article through a transfer zone, a continuously rotating transfer wheel mounted for rotation about an axis and having a plurality of article receiving pockets thereon likewise movable through said transfer zone, said transfer wheel being adapted to receive the articles at said transfer zone and conduct them to a wrapping mechanism, means for continuously moving said conveyor at variable speeds and rotating said transfer wheel in timed relationship to cause successive pairs of cooperating pockets of the conveyor and of the transfer wheel to move into register at the transfer zone, means operable during passage of each pair of cooperating pockets through said transfer zone for shifting the article in the pocket of the conveyor and depositing the same in the pocket of the transfer wheel, means operable under the control of said conveyor moving means for periodically retarding the movements of the conveyor during passage of a conveyor pocket through the transfer zone, said wrapping mechanism comprising a wrapping wheel having article receiving pockets, means including a pair of reciprocating arms to receive an article from a pocket in the transfer wheel and deposit said article in a pocket of the wrapping wheel, and means to spread and close said arms to permit engagement and release of an article during reciprocation of said arms.

18. In a wrapping machine of the character described, a continuously rotating article receiving conveyor having a series of open-sided article supports thereon, each adapted to receive thereon an article and movable with the article through a transfer zone, a transfer wheel mounted for rotation about an axis and having a plurality of receiving pockets thereon likewise movable through said transfer zone, said transfer wheel being adapted to receive the articles at said transfer zone and conduct them to a wrapping device, means for continuously moving said conveyor and for continuously rotating said transfer wheel in timed relationship to cause successive pairs of cooperating pockets of the conveyor and of the transfer wheel to move into register at the transfer zone, means operable during passage of each pair of cooperating pockets through said transfer zone for engaging the article in the pocket of the conveyor and sliding the same laterally toward and into the pocket of the transfer wheel, and means operable during such sliding movement of the article for preventing tilting of the latter.

19. In a wrapping machine of the character described, a continuously rotating article receiving conveyor having a series of open-sided article conveying pockets thereon, each adapted to receive an article and movable with the article through a transfer zone, a continuously rotating transfer wheel mounted for rotation about an axis and having a plurality of article receiving pockets thereon likewise movable through said transfer zone, said transfer wheel being adapted to receive the articles at said transfer zone and conduct them to a wrapping mechanism, means for continuously moving said conveyor and for continuously rotating said transfer wheel in timed relationship to cause successive pairs of cooperating pockets of conveyor and of the transfer wheel to move into register during the passage through the transfer zone, a reach arm operable during passage of each pair of cooperating pockets through the transfer zone for shifting the article from the pocket of the conveyor to the pocket of the transfer wheel, and means operable in timed relationship to the movements of said conveyor and transfer wheel for moving said reach arm upwardly and forwardly in a direction substantially radially of said transfer wheel to a position wherein a portion thereof is in register with the article on the conveyor and for thereafter moving said reach arm in a direction substantially radially inwardly of the transfer wheel to engage the article on the conveyor and slide the same laterally from the latter into the pocket of the transfer wheel at the transfer zone, and

means operable during such sliding movement of the article for preventing tilting of the latter.

20. In a wrapping machine of the character described, a continuously rotating article receiving conveyor having a series of open-sided article conveying pockets thereon, each adapted to receive an article and movable with the article through a transfer zone, a continuously rotating transfer wheel mounted for rotation about an axis and having a plurality of article receiving pockets thereon likewise movable through said transfer zone, said transfer wheel being adapted to receive the articles at said transfer zone and conduct them to a wrapping mechanism, means for continuously moving said conveyor and rotating said transfer wheel in timed relationship to cause successive pairs of cooperating pockets of conveyor and of the transfer wheel to move into register during the passage through the transfer zone, a reach arm operable during passage of each pair of cooperating pockets through the transfer zone for shifting the article from the pocket of the conveyor to the pocket of the transfer wheel, means operable in timed relationship to the movements of said conveyor and transfer wheel for moving said reach arm upwardly and forwardly in a direction substantially radially of said transfer wheel to a position wherein a portion thereof is in register with the article on the conveyor and for thereafter moving said reach arm in a direction substantially radially inwardly of the transfer wheel to engage the article on the conveyor and slide the same from the latter into the pocket of the transfer wheel at the transfer zone, and means movable substantially radially of the transfer wheel in timed relationship to the movements of the latter and of the conveyor for engaging the article during transfer thereof from the pocket of the conveyor to the pocket of the transfer wheel to prevent tilting of the article.

21. In a machine for applying a wrapper to and folding the same about an article, a continuously rotating transfer wheel mounted for rotation about an axis, an article support on said transfer wheel adjacent the periphery thereof, said article support being bodily movable upon rotation of the transfer wheel past first and second transfer zones, reciprocating lever means at said first transfer zone for depositing an article on said article support, transfer means at said second transfer zone for removing the article from said support and transferring the same to wrapper applying and folding mechanisms, a clamping arm pivoted to said transfer wheel and movable from a clamping position wherein it engages an article and clamps the same to said support to a retracted position wherein it releases the article, a cam follower on said clamping arm, a stationary cam plate cooperating with said follower, means normally urging said clamping arm to its clamping position, a pair of cam protuberances on said cam plate positioned in the path of movement of said follower for urging said clamping arm to its retracted position during movement of said article support through said first and second transfer zones respectively, said wrapper applying and folding mechanism including a pair of oppositely disposed rotary mounted wrapper devices, a pre-wrapping finger rotating with each wrapper device, and means to intermittently reciprocate said finger.

22. In a machine for applying a wrapper to and folding the same about an article, a continuously rotating transfer wheel mounted for rotation about an axis, an article support on said transfer wheel adjacent the periphery thereof, said article support being bodily movable upon rotation of the transfer wheel past first and second transfer zones, means at said first transfer zone for depositing an article on said article support, transfer means at said second transfer zone for removing the article from said support and transferring the same to wrapper applying and folding mechanisms, stationary alignment means positioned in the path of movement of said article on said support between said first and second transfer zones for engaging and adjusting the position of the article on the support to cause subsequent alignment of the article at the second transfer zone with said wrapper applying and folding mechanisms, a clamping arm pivoted to said transfer wheel and movable from a clamping position wherein it engages an article and clamps the same to said support to a retracted position wherein it releases the article, a cam follower on said clamping arm, a stationary cam plate cooperating with said follower, means normally urging said clamping arm to its clamping position, and a pair of cam protuberances on said cam plate positioned in the path of movement of said follower for urging said clamping arm to its retracted position during movement of said article support through said first and second transfer zones respectively, and a third protuberance on said cam plate for urging said clamping arm to its retracted position during engagement of the article with said stationary alignment means.

23. In a machine for applying a wrapper to and folding the same about an article, a continuously rotating transfer wheel mounted for rotation about an axis, means providing an outwardly facing article conducting pocket in the peripheral regions of said transfer wheel, a continuously rotating wrapping wheel mounted for rotation about an axis parallel to said first-mentioned axis, means providing an outwardly facing article conducting pocket in the peripheral regions of said wrapping wheel, said transfer wheel and wrapping wheel establishing therebetween a transfer zone for removal of an article from the pocket of the transfer wheel and depositing the same in the pocket of said wrapping wheel, means for rotating said wheels in the same direction in timed relationship to cause said pockets to pass through said transfer zone in opposite directions simultaneously, and means at said transfer zone for yieldably gripping the edges of an article carried by the pocket of said transfer wheel and moving the same bodily toward said wrapping wheel and depositing the same in the pocket of said wrapping wheel, said last named means including a pair of spaced arms, one located on each side of the wrapper wheel and the transfer wheel, means for reciprocating said arms, and means for moving said arms toward and away from each other during said reciprocation to clamp an article on the transfer wheel and deliver it to the wrapping wheel.

24. In a machine for applying a wrapper to and folding the same about an article, a continuously rotating transfer wheel mounted for rotation about an axis, means providing an outwardly facing article conducting pocket in the peripheral regions of said transfer wheel, a continuously rotating wrapping wheel mounted for rotation about an axis parallel to said first-mentioned axis, means providing an outwardly facing article conducting pocket in the peripheral regions of said wrapping wheel, said transfer wheel and wrapping wheel establishing therebetween a transfer zone for removal of an article from the pocket of the transfer wheel and depositing the same in the pocket of said wrapping wheel, means for rotating said wheels in the same direction in timed relationship to cause said pockets to pass through said transfer zone in opposite directions simultaneously, means for releasably positioning a flexible wrapper at said transfer zone in the path of movement of the article across said zone from the pocket of the transfer wheel to the pocket of the wrapping wheel, and transfer means at said transfer zone for yieldably gripping the article carried by the pocket of said transfer wheel and moving the same bodily toward said wrapping wheel and depositing the same in the pocket of said wrapping wheel, whereby the article engages said wrapper and carries the same bodily therewith into said latter pocket, said transfer means including spaced arms, and means to spread apart said arms to receive an article on the transfer wheel, means to close said arms when engaged by said article, and means to spread said arms to release the article for deposit in said pocket of the wrapping wheel.

25. In a machine for applying a wrapper to and folding the same about an article, a continuously rotating transfer wheel mounted for rotation about an axis, means providing an outwardly facing article conducting pocket in the peripheral regions of said transfer wheel, a continuously rotating wrapping wheel mounted for rotation about an axis parallel to said first-mentioned axis, means providing an outwardly facing article conducting pocket in the peripheral regions of said wrapping wheel, said transfer wheel and wrapping wheel establishing therebetween a transfer zone for removal of an article from the pocket of the transfer wheel and depositing the same in the pocket of said wrapping wheel, means for rotating said wheels in the same direction in timed relationship to cause said pockets to pass through said transfer zone in opposite directions simultaneously, a transfer pad at said transfer zone movable from a retracted position behind the article in the pocket of said transfer wheel to an advanced position wherein it carries the article bodily across the transfer zone and deposits the same in the pocket of said wrapping wheel, means for releasably supporting a wrapper in said transfer zone in the path of movement of the article across said zone whereby the article engages the wrapper and conducts the same bodily into the pocket of the wrapping wheel, and clamping means movable bodily with the transfer pad for clamping the wrapper against the pad during movement of the pad and article across the transfer zone.

26. In a machine for applying a wrapper to and folding the same about an article, a continuously rotating transfer wheel mounted for rotation about an axis, means providing an outwardly facing article conducting pocket in the peripheral regions of said transfer wheel, a continuously rotating wrapping wheel mounted for rotation about an axis parallel to said first-mentioned axis, means providing an outwardly facing article conducting pocket in the peripheral regions of said wrapping wheel, said transfer wheel and wrapping wheel establishing therebetween a transfer zone for removal of an article from the pocket of the transfer wheel and depositing the same in the pocket of said wrapping wheel, means for rotating said wheels in the same direction in timed relationship to cause said pockets to pass through said transfer zone in opposite directions simultaneously, a pair of clamping arms designed for engagement with the article in the pocket of the transfer wheel and movable about an axis from a retracted position behind the article in the transfer wheel to an advanced position wherein it conducts the article across the transfer zone and deposits the same in the pocket of the wrapping wheel, means for positioning a wrapper in the path of movement of said article across the transfer zone, a pair of cooperating clamping members movable with said clamping arms for yieldingly clamping the wrapper to the latter during movement of the article across the transfer zone and for thereafter releasing the wrapper as said article is deposited in the pocket of the wrapping wheel, and means for moving said clamping arms and members in timed relationship to the movement of said transfer and wrapping wheels.

27. In a folding mechanism for folding a wrapper or the like about an article, a continuously rotating wrapping wheel mounted for rotation about an axis, a support for supporting and advancing an article and wrapper, the wrapper extending completely around the article in tubular fashion to provide a seam fold from a previous folding operation and projecting a predetermined distance beyond the supporting part of the support, a tucking finger mounted for rotation about an axis extending transversely of the axis of rotation of said wrapping wheel and adapted upon rotation thereof to engage the extending tubular portion of the wrapper to create a partial fold or inward tuck therein, said rotary tucking finger having a lateral component of reciprocating motion along its axis of rotation whereby the same may follow the movement of the wrapper on the wrapping wheel during the folding or tucking operation, a rotary folder mounted for rotation about the axis of rotation of said tucking finger and engageable with the wrapper after the partial fold or tuck has been formed therein to hold the wrapper against the article, a stationary member positioned in the path of movement of the folded wrapper end to hold the same in its folded position, and means for rotating said wrapping wheel, tucking finger and folder in timed relationship with respect to one another.

28. In a folding mechanism for folding a wrapper or the like about an article, a continuously rotating wrapping wheel mounted for rotation about an axis, a support for supporting and advancing an article and wrapper, the wrapper extending completely around the article in tubular fashion to provide a seam fold from a previous folding operation and projecting a predetermined distance beyond the supporting part of the support, a tucking finger mounted for rotation about an axis extending transversely of the axis of rotation of said wrapping wheel and adapted upon rotation thereof to engage the extending tubular portion of the wrapper to create a partial fold or inward tuck therein, said rotary tucking finger having a lateral component of reciprocating motion along its axis of rotation whereby the same may follow the movement of the wrapper on the wrapping wheel during the folding or tucking operation, said tucking finger being inclined relative to its axis of rotation in the direction of motion of said support, a rotary folder mounted for rotation about the axis of rotation of said tucking finger and engageable with the wrapper after the partial fold or tuck has been formed therein to fold the wrapper against the article, a stationary member positioned in the path of movement of the folded wrapper end to hold the same in the folded position, and means for rotating said wrapping wheel, tucking finger and folder in timed relationship with respect to one another.

29. In a folding mechanism for folding a wrapper or the like about an article, a rotary driving shaft, a continuously rotating wrapping wheel mounted on said shaft for rotation therewith, an article support for supporting and advancing an article and wrapper, the wrapper extending completely around the article in tubular fashion to provide a seam fold from a previous folding operation and projecting a predetermined distance beyond the supporting part of the support, a second shaft mounted for rotation about an axis spaced from and transverse to the axis of said driving shaft, a sleeve slidable upon said latter shaft for axial reciprocating movement therealong, means connecting said sleeve to said latter shaft for rotation in unison therewith, a tucking finger mounted on and projecting outwardly from said sleeve and adapted to rotate bodily with the latter and adapted upon rotation thereof to engage the extending tubular portion of the wrapper to create a partial fold or inward tuck therein, a stationary cam adjacent said sleeve, yieldable means normally urging said sleeve into engagement with said cam, said cam having formed thereon a protuberance engageable with said sleeve for causing the latter together with the tucking finger thereon to follow the movements of the article and wrapper during the tucking operation, a rotary folder mounted for rotation about the axis of rotation of said tucking finger and engageable with the wrapper after the partial fold or tuck has been formed therein to fold the wrapper against the article, a stationary member positioned in the path of movement of the folded wrapper end to hold the same in the folded position, and means for rotating said wrapping wheel, tucking finger and folder in timed relationship with respect to one another.

30. In a folding mechanism for folding a wrapper or the like about an article, a rotary driving shaft, a continuously rotating wrapping wheel mounted on said shaft for rotation therewith, an article support for supporting and advancing an article and wrapper, the wrapper ex-

tending completely around the article in tubular fashion to provide a seam fold from a previous folding operation and projecting a predetermined distance beyond the supporting part of the support, a second shaft mounted for rotation about an axis spaced from and transverse to the axis of said driving shaft, a sleeve slidable upon said latter shaft for axial reciprocating movement therealong, means connecting said sleeve to said latter shaft for rotation in unison therewith, a tucking finger mounted on and projecting outwardly from said sleeve and adapted to rotate bodily with the latter and adapted upon rotation thereof to engage the extending tubular portion of the wrapper to create a partial fold or inward tuck therein, a stationary cam adjacent said sleeve, yieldable means normally urging said sleeve into engagement with said cam, said cam having formed thereon a protuberance engageable with said sleeve for causing the latter together with the tucking finger thereon to follow the movements of the article and wrapper during the tucking operation, said tucking finger being inclined with respect to the axis of rotation of said second shaft in the direction of movement of the article and wrapper, a rotary folder mounted for rotation about the axis of rotation of said tucking finger and engageable with the wrapper after the partial fold or tuck has been formed therein to hold the wrapper against the article, a stationary member positioned in the path of movement of the folded wrapper end to hold the same in its folded position, and means for rotating said wrapping wheel, tucking finger and folder in timed relationship with respect to one another.

31. In a folding mechanism, a continuously rotating wrapping wheel having instrumentalities associated therewith adapted to perform a series of wrapping and folding operations whereby an article becomes completely enclosed in an outer wrapper and adapted to discharge the fully wrapped articles at uniform time intervals at a discharge zone, a continuously moving discharge conveyor for receiving the articles discharged at said zone, said conveyor being disposed at a substantial angle with respect to said wrapping wheel and including a series of closely spaced article supports movable in succession through the discharge zone and adapted during movement through the zone to receive the articles thereon, means for confining the articles on said article supports comprising an upstanding wall on each support and extending transversely of the direction of movement of the support, the wall on each support cooperating with the wall on the next adjacent support for confining the articles therebetween, the wall of each support being provided with a cutaway portion to provide a clearance for the wrapped article as the same moves progressively onto the next adjacent support during discharge of the article from the wrapping wheel at the wrapping zone, and means for moving said wrapping wheel and conveyor in timed relationship.

32. In a folding mechanism, a continuously rotating wrapping wheel adapted to perform a series of wrapping and folding operations whereby an article becomes completely enclosed in an outer wrapper and adapted to discharge the fully wrapped articles in a substantially tangential direction outwardly and downwardly on an incline from the periphery of the wrapping wheel, a continuously rotating discharge conveyor beneath said wrapping wheel for receiving the articles discharged therefrom, said conveyor being disposed at a substantial angle with respect to said wrapping wheel and comprising a series of closely spaced article supports movable in succession beneath the wrapping wheel and through the discharge zone and adapted during movement through the zone to receive the individual wrapped articles thereon, means for confining each article on a conveyor support, said means comprising an upstanding wall at the trailing edge of each support, the distance between the opposed faces of adjacent upstanding walls on the conveyor being substantially equal to the overall length of the wrapped article, the wall of each support being provided with an inclined cutaway portion providing a clearance for an article as the same moves by gravity toward a centered position on the next succeeding support, and means for moving said wrapping wheel and conveyor in timed relationship.

33. In a folding machine a continuously rotating wrapping device having instrumentalities associated therewith for performing a series of wrapping and folding operations upon an article and adapted to discharge the wrapped article at uniform timed intervals at a discharge zone, a continuously moving discharge conveyor for receiving the articles discharged at said zone, said conveyor being disposed at a substantial angle with respect to said wrapping wheel and including a series of closely spaced article supports movable in a straight line in succession through the discharge zone and adapted during such movement to receive the articles thereon, means for confining the article on said supports comprising an upstanding wall on each support etxending transversely in the direction of movement of the support, the wall of each support cooperating with the wall of the next adjacent support for confining the articles therebetween, each wall being provided with a cutaway portion on the trailing side thereof to provide a clearance for the article discharged onto the next succeeding article support.

34. In a wrapping machine, a continuously rotating wrapping wheel mounted for rotation about an axis, a support for supporting and advancing an article and a wrapper, the length of the article being greater than the thickness of the article and the wrapper extending completely around the article transversely in tubular fashion to provide a seam fold from a previous folding operation and the ends of the wrapper extending beyond the ends of the article a greater distance than the thickness of the article, a tucking finger mounted for rotation about an axis extending transversely of the axis of rotation of said wrapping wheel and adapted upon rotation of said tucking finger to engage the extending tubular portion of the wrapper to create an inward tuck therein, said rotary tucking finger being adapted to reciprocate along its axis of rotation to follow the movement of the wrapper on the wrapping wheel during the tucking operation, a rotary folder mounted for rotation about the axis of rotation of said tucking finger and engageable with the wrapper after the partial tuck has been formed therein to hold the wrapper against the article, stationary means positioned in the path of movement of the folded wrapper end to hold the folds of the wrapper and to turn the ends of the wrapper onto the broad face of the article, and means for rotating said wrapping wheel, tucking finger and folder in timed relation with respect to one another.

35. An article transporting and wrapping device comprising a transfer wheel carrying articles to be wrapped, means to rotate said wheel, a wrapping wheel receiving articles from the transfer wheel, means to rotate the wrapping wheel and means arranged between said wheels to transfer articles from the rotating transfer wheel to the rotating wrapping wheel, said last named means including an arm on each side of the wrapping wheel, means to reciprocate said arms in timed relation with the rotation of said wheels, means to intermittently move said arms toward and away from each other in timed relation with the rotation of said wheels, whereby an article on the transfer wheel will be gripped by said arms and then released for deposit on the wrapping wheel when the arms have reached the end of reciprocation of the arms.

36. An article transporting and wrapping device comprising a transfer wheel carrying articles to be wrapped, means to rotate said wheel, a wrapping wheel receiving articles from the transfer wheel, means to rotate the wrapping wheel, means to support a wrapper between said wheels, and means arranged between said wheels to transfer articles partly wrapped from the rotating transfer

wheel to the rotating wrapping wheel, said last named means including an arm on each side of the wrapping wheel, means to reciprocate said arms in timed relation with the rotation of said wheels, means to intermittently move said arms toward and away from each other in timed relation with the rotation of said wheels, said arms first engaging the article and then the wrapper as the arms move toward the wrapping wheel to grip an article and wrapper, said arms releasing the article and the wrapper at the end of said reciprocation, whereby an article on the transfer wheel will be gripped by said arms and then the article and wrapper will be released for deposit on the wrapping wheel when the arms have reached the end of a reciprocation of the arms.

37. An article transporting and wrapping device comprising a transfer wheel carrying articles to be wrapped, means to rotate said wheel, a wrapping wheel receiving articles from the transfer wheel, means to rotate the wrapping wheel, means to support a wrapper between said wheels, and means arranged between said wheels to transfer articles partly wrapped from the rotating transfer wheel to the rotating wrapping wheel, said last named means including an arm on each side of the wrapping wheel, means to reciprocate said arms in timed relation with the rotation of said wheels, means to intermittently move said arms toward and away from each other in timed relation with the rotation of said wheels, said arms first engaging the article and then the wrapper as the

arms move toward the wrapping wheel to grip an article and wrapper, said arms releasing the article and the wrapper at the end of said reciprocation, whereby an article on the transfer wheel will be gripped by said arms and then the article and wrapper will be released for deposit on the wrapping wheel when the arms have reached the end of a reciprocation of the arms, and means to effect wrapper folding operations on a wrapper about an article, said last named means comprising a pre-tucking finger, means to rotate each said finger, means to reciprocate each said finger, a folder on each side of the wrapper wheel, and means to rotate each folder simultaneously with the rotation of the finger.

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