

Sept. 15, 1942.

S. J. CAMPBELL

2,296,142

PACKAGING MACHINERY

Filed Aug. 2, 1940

5 Sheets-Sheet 1

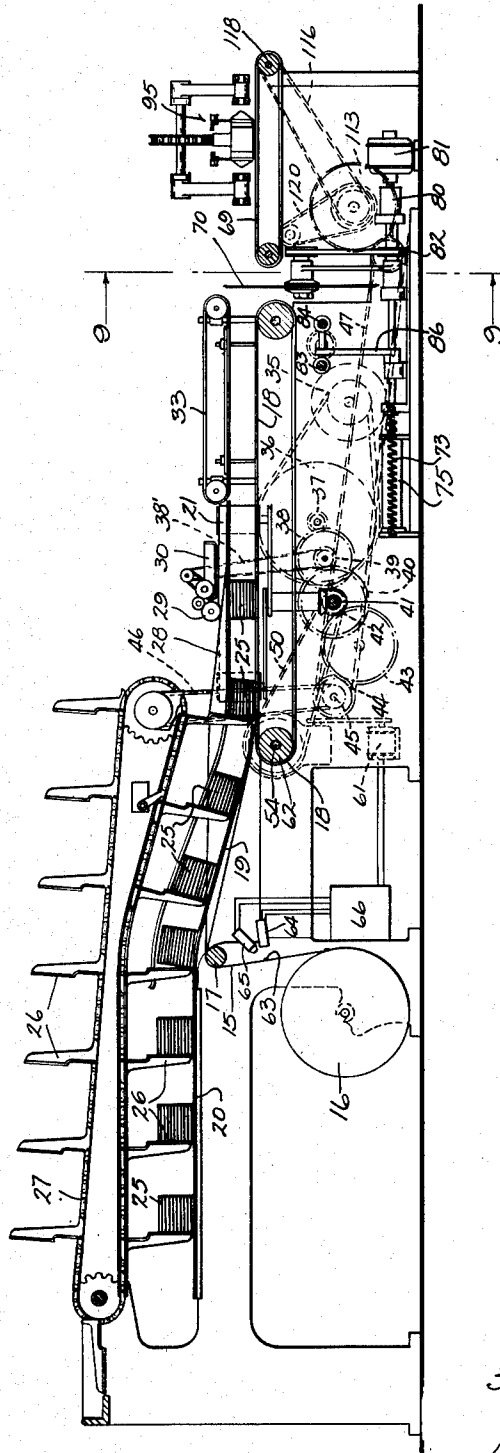


Fig. 1.

INVENTOR
SAMUEL J. CAMPBELL

BY

Wheeler, Wheeler & Wheeler
ATTORNEYS

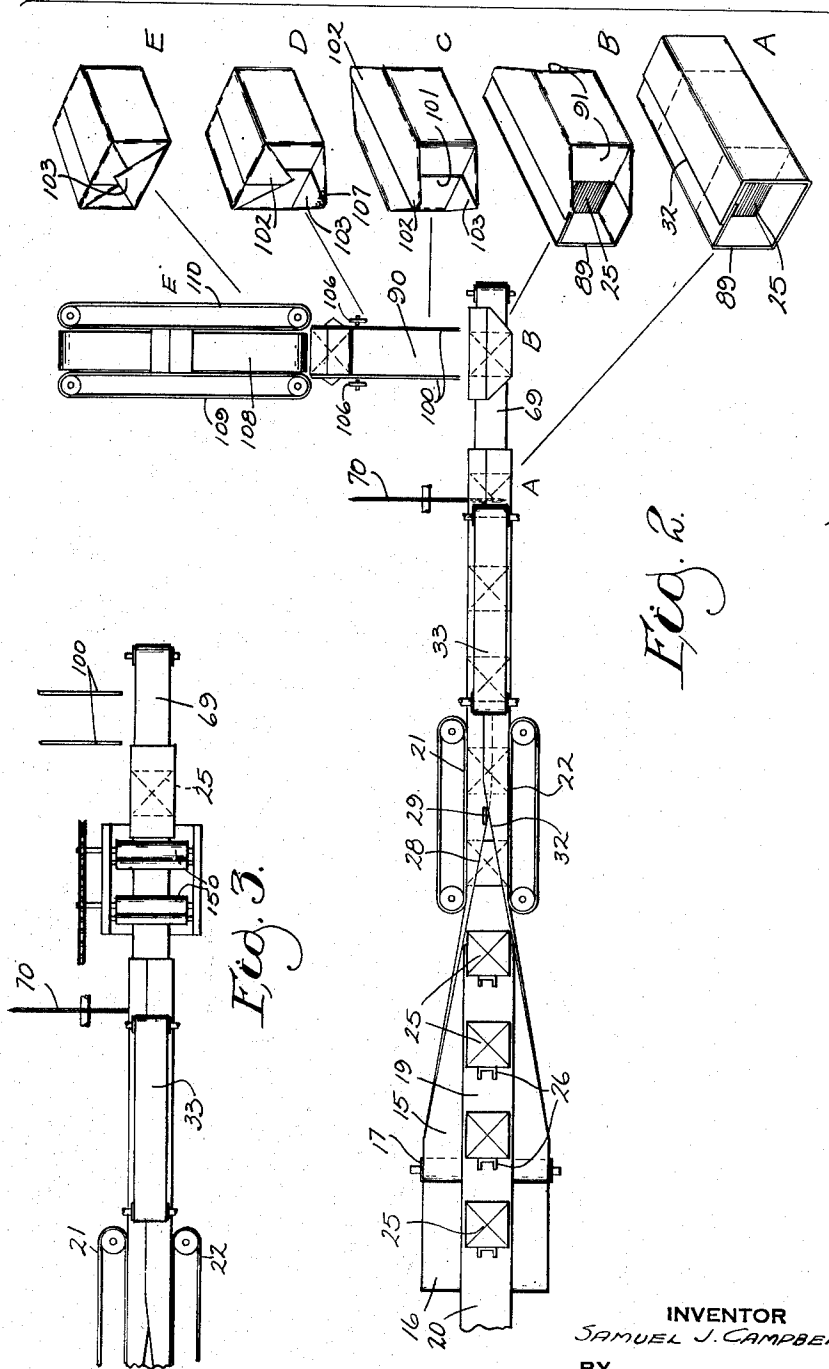
Sept. 15, 1942.

S. J. CAMPBELL
PACKAGING MACHINERY

2,296,142

Filed Aug. 2, 1940

5 Sheets-Sheet 2



INVENTOR
SAMUEL J. CAMPBELL
BY
Wheeler, Wheeler & Wheeler
ATTORNEYS.

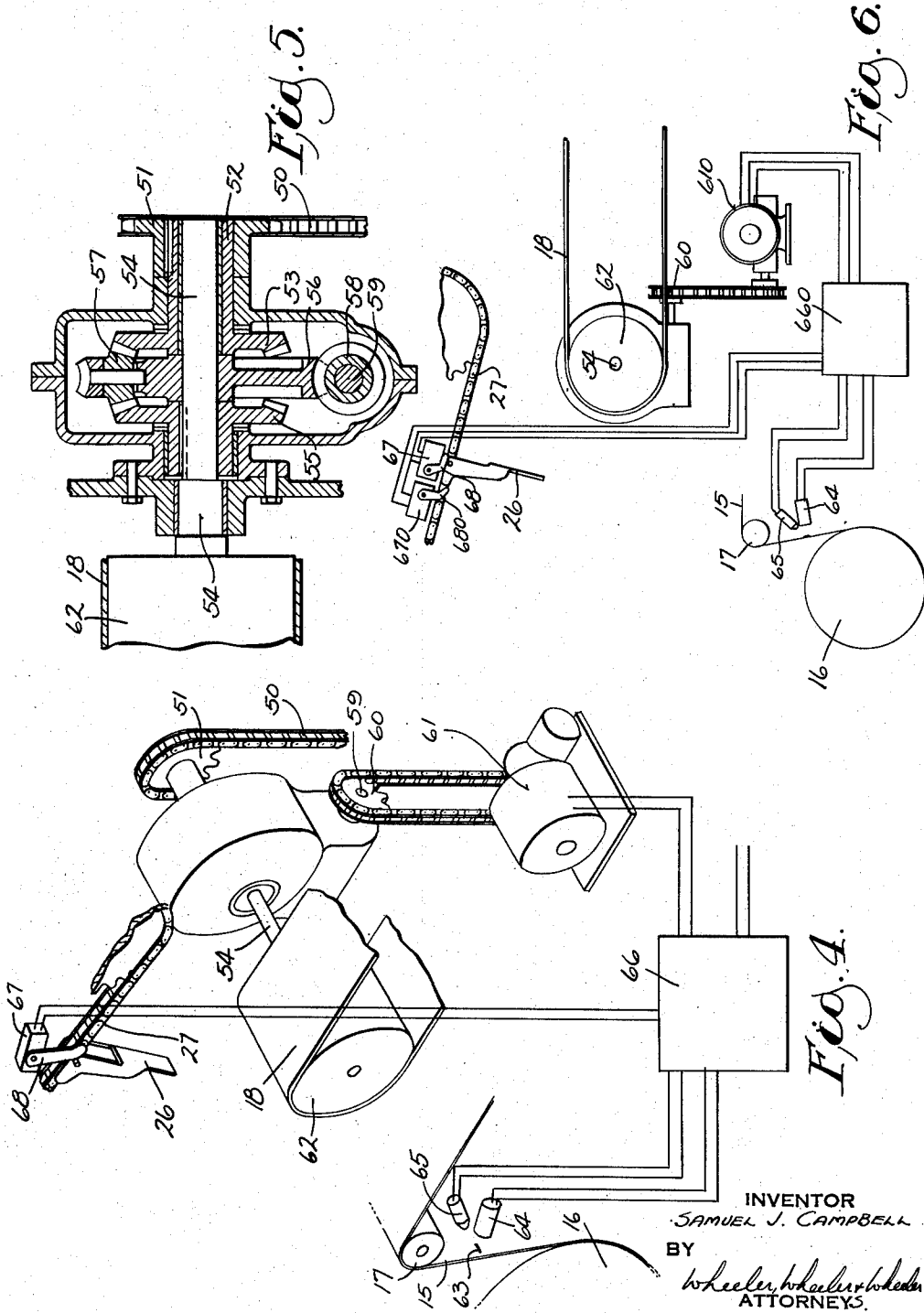
Sept. 15, 1942.

S. J. CAMPBELL
PACKAGING MACHINERY

2,296,142

Filed Aug. 2, 1940

5 Sheets-Sheet 3



INVENTOR
SAMUEL J. CAMPBELL
BY
Wheeler, Wheeler & Wheeler
ATTORNEYS.

Sept. 15, 1942.

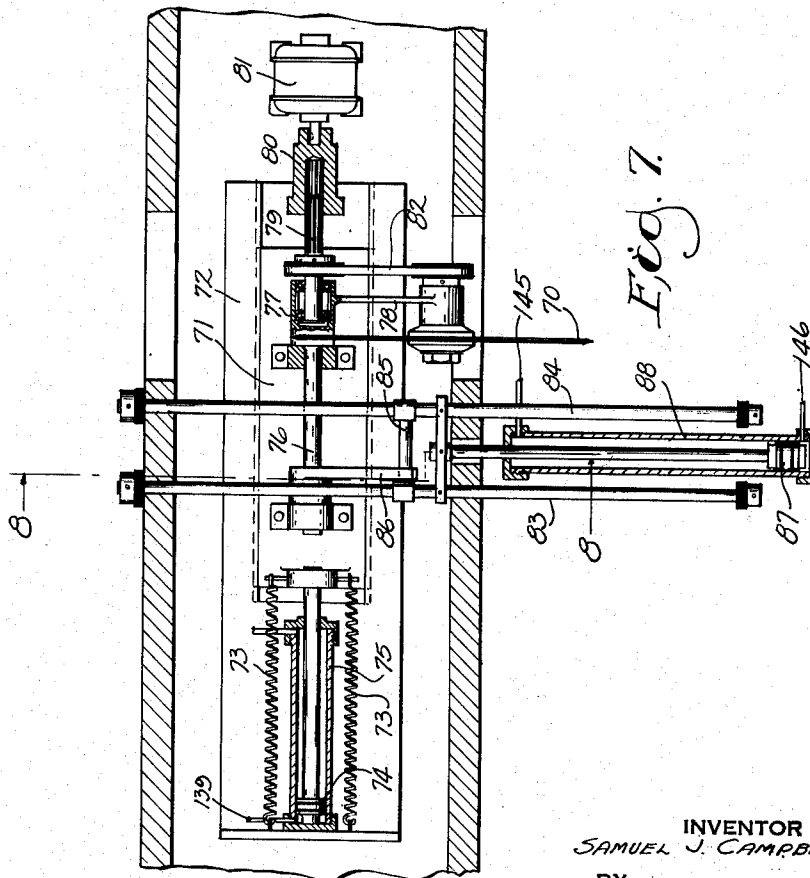
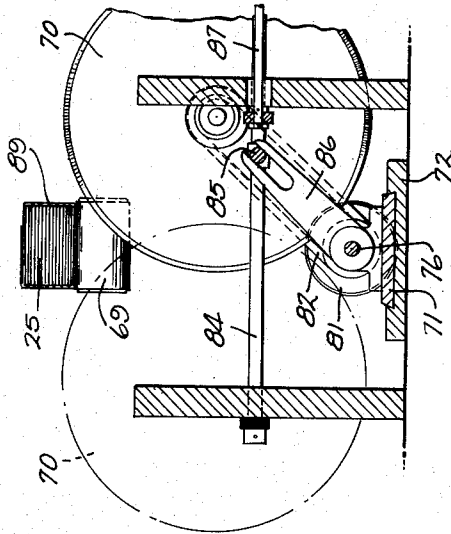
S. J. CAMPBELL

2,296,142

PACKAGING MACHINERY

Filed Aug. 2, 1940

5 Sheets-Sheet 4



INVENTOR
SAMUEL J. CAMPBELL

BY
Wheeler, Wheeler & Wheeler
ATTORNEYS.

Sept. 15, 1942.

S. J. CAMPBELL

2,296,142

PACKAGING MACHINERY

Filed Aug. 2, 1940

5 Sheets-Sheet 5

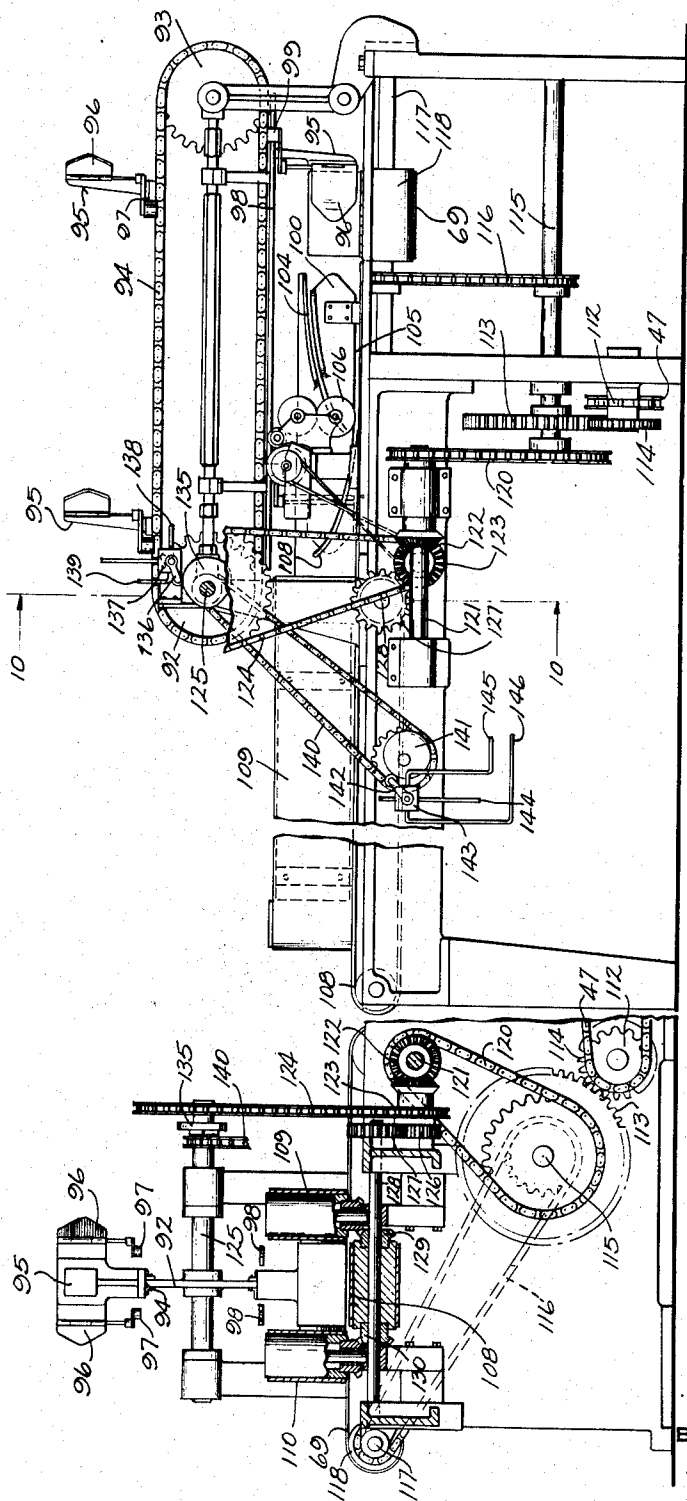


Fig. 9.

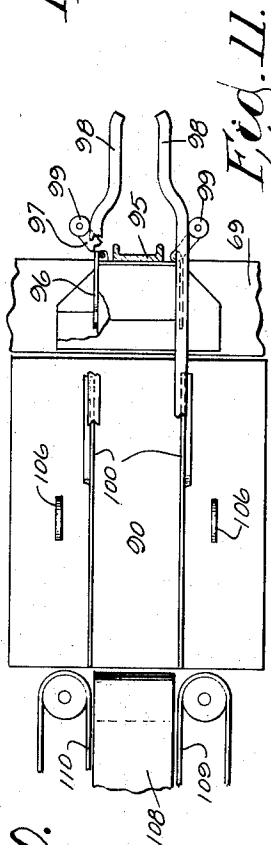


Fig. 10.

INVENTOR
SAMUEL J. CAMPBELL

BY
Wheeler, Wheeler & Wheeler
ATTORNEYS.

Fig. 11.

UNITED STATES PATENT OFFICE

2,296,142

PACKAGING MACHINERY

Samuel J. Campbell, Green Bay, Wis.

Application August 2, 1940, Serial No. 349,877

17 Claims. (Cl. 93—3)

This invention relates to an improvement in packaging machinery and methods.

It is the primary object of the invention to provide a packaging machine in which the material to be packaged is fed at a constant rate and the printing on the wrapper is adjusted to the rate of package feed, the cut-off of the tubed wrapper between the material packaged therein being accomplished at the fixed rate at which such material is fed, without regard to the printing on the wrapper.

More specifically, it is proposed in the preferred embodiment of the machine to provide apparatus which will package loose and bulky articles such as stacks of napkins, the machine being organized to feed the napkin stacks at a constant rate and a previously printed wrapper being arranged with a normal feed at a rate slightly lower than the rate of feed of the articles to be wrapped, together with a supplemental feed for accelerating the feed of the wrapper in conformity with the feed of the articles from time to time as discrepancies in the timing appear.

Small articles have been wrapped by tubing a wrapper about them and subsequently cutting the wrapper between the articles. The cutting of a tubed wrapper between such bulky articles as a stack of paper napkins has presented difficulties which it is a further object of the present invention to solve. It is proposed herein to use a cut-off knife which, while moving transversely of the tube wrapper for the severance thereof, also moves with the wrapper to make a clean transverse cut.

Other objects of the invention have to do with novel and improved means for making and securing the folds in the ends of the successive packages after the tubular wrapper has been cut between the articles wrapped.

In the drawings:

Fig. 1 is a view largely in side elevation of a wrapping machine embodying the invention.

Fig. 2 is a diagrammatic plan view of the machine with which I have associated successive views in perspective of the article in successive stages of wrapping, these views in perspective being shown on an enlarged scale and connected by lead lines with the portions of Fig. 2 in which the wrapping has progressed to the point indicated by the perspective.

Fig. 3 is a fragmentary diagrammatic view in plan illustrating a modified embodiment of the organization shown in Fig. 2.

Fig. 4 is an enlarged diagrammatic view in perspective showing the organization of the syn-

chronizing controls which regulate the feed of the wrapper in accordance with feed of the product to be wrapped.

Fig. 5 is a detail view in transverse section of a differential mechanism used in the regulating device of Fig. 4.

Fig. 6 is a diagrammatic view in side elevation showing a modified type of regulating equipment.

Fig. 7 is a fragmentary horizontal section on an enlarged scale showing a detail of the cut-off knife and its associated mechanism in plan.

Fig. 8 is a detail view taken in section on line 8—8 of Fig. 7.

Fig. 9 is an end elevation of the end folding portion of the packaging equipment as viewed in the plan designated at 9—9 in Fig. 1.

Fig. 10 is a detail view in section taken on line 10—10 of Fig. 9.

Fig. 11 is a fragmentary detail view partially in plan and partially in section showing the operation of certain of the end folding devices illustrated in Fig. 9 and Fig. 10.

Like parts are identified by the same reference characters throughout the several views.

While the device herein disclosed is particularly designed to package stacks of paper napkins, it will be understood that the machine is also adapted to package other articles and particularly bulky articles such as have not heretofore been packaged in any machine of this character.

The web 15 of wrapping paper is fed from a supply roll 16 over a guide 17 on to a feed belt 18. The inclined portion 19 of the feed table 20 rests centrally upon the web 15 and the sides of the web are supported by the lateral conveyors 21 and 22 to provide a channel into which successive objects 25 requiring packaging are propelled by the arms 26 of conveyor 27.

The margin of the side of the paper web supported by conveyor 21 is folded inwardly as indicated at 28 in Fig. 2 and is treated with adhesive by a roll 29 supplied from glue pot 30 in a conventional manner as shown in Fig. 1. The opposite margin of that side of the web supported by conveyor 22 is now folded inwardly as indicated at 32 and contacts with the glued margin 28. Any conventional folding means may be employed such, for example, as the folders shown in Marcus Patent 1,038,493 of September 10, 1912, Bauer Patent 1,794,358 of March 3, 1931, or Armstrong Patent 1,341,408 of May 25, 1920. Assuming that the packages of napkins or other articles to be wrapped are substantially

oblong or cubical as indicated in 25, it will be apparent that the tube in which the wrapper is formed about the articles is substantially square in cross section. As the tubed wrapper is propelled by feed belt 18 and confined at its sides by conveyors 21 and 22, the overlapping margins 28 and 32 are maintained under compression by a top conveyor belt 33 until the adhesive applied by roller 29 has time to set.

The conveyor 27 which introduces the successive articles to be wrapped is driven at a constant rate by motor 35 which is belted to a pulley 36 carrying a pinion 37 meshing with gear 38. From gear 38, a belt 38' drives the glue pot mechanism. A small pinion 39 connected with gear 38 drives gear 40 on a cross shaft 41 which carries pinion 42 meshing with gear 43. Gear 43 meshes with another gear 44 on a shaft 45 carrying sprockets which drive chains 46 and 47 respectively connected to the conveyor mechanism 27 and to the cut-off knife hereinafter to be described.

Bevel gearing connected with shaft 41 drives the chain 50 which operates the wrapping paper web conveyor 18 subject to the regulating means now to be described.

The sprocket 51 driven by chain 50 is mounted on sleeve shaft 52 which carries differential gear 53. Piloted in the sleeve shaft 52 is shaft 54 carrying a complementary differential gear 55. Free of shaft 54 and rotatably supported thereby is a worm gear 56 carrying three or more pinions, one of which is shown at 57 in mesh with differential gears 53 and 55. Worm gear 56 is driven by a worm 58 on shaft 59 which carries sprockets 60 driven by motor 61. This motor may drive in one direction only, as shown in Fig. 4, or it may be reversible, as shown at 610 in Fig. 6.

The output shaft 54 of the differential mechanism supports a pulley 62 over which the feed conveyor 18 for the wrapping paper web is operated.

As viewed in Fig. 1 and Fig. 4, shaft 54 must operate in a clockwise direction. Accordingly, the motion is applied counter-clockwise to sprocket 51 and such motion transmitted through pinions 57, drives shaft 54 in the proper direction.

The design of the sprockets and gears is such that the labels or other patterns repetitively printed on the web 15 of wrapping material will not be fed quite fast enough to register accurately with the successively fed articles to be wrapped. Or, in the alternative, the design may be such that the web of wrapping material will be fed slightly too fast for proper registration of its label or other design with successive articles to be wrapped. In either case, it is possible through the use of a uni-directional motor at 61 to operate the differential mechanism shown in Figs. 4 and 5 to make suitable correction.

This is done by printing at intervals on the web of wrapping material 15 a suitable indicating mark 63, one of which is preferably associated with each label design or pattern. This indicating mark passes beneath a scanning device comprising a photo-electric cell 64 and a source of illumination 65 which may be used if desired. The impulse produced in the photo-electric cell upon the passage of indicia 63 is amplified in the conventional amplifier 66 which contains a relay and electrical correlating mechanism for integrating another impulse which is received at intervals from switch 67 whenever one of the work

propelling arms 26 passes a depending switch lever 68. The arrangement is such that whenever the proper correlation between the impulses received from the scanning cell 64 and the switch 67 are out of the desired relation, a relay in the control mechanism 66 operates the motor 61 in a direction to rotate the gear 56 whereby the motion derived from motor 61 may be added to or subtracted from the motion transmitted through the differential gearing from chain 50. If the wrapping web is being underfed in relation to the delivery of the articles to be wrapped, the pitch of the threads of the worm 58 and worm gear 56 will be such as to slightly step up the rate of wrapper feed whenever the discrepancy becomes apparent. Since the retrogression of the wrapper will only be one- or two-thousandths of an inch for each article wrapped, the corrective mechanism will only function after the passage of several successive articles. It is not sensitive enough to detect the discrepancy until the discrepancy becomes sufficiently substantial to warrant correction.

If the rate of feed of the wrapping web exceeds the rate at which the articles are supplied, then the direction of rotation of the motor 61 or the pitch of the threads of worm 58 and worm gear 56 will be such as to subtract the motion derived from motor 61 from the motion derived from chain 50 in the differential, whereby to retard the wrapper until registration of the printed design thereon with the articles wrapped therein is reestablished.

If desired, the motor 610 may be a two-speed motor and the switch 67 may be supplemented by a switch 670 and an arm 680. In this arrangement, the control mechanism 660 is so organized by known electrical circuits that if the impulse received from the scanning cell 64 registers with the impulse received from switch 67, the reversible motor 610 will be operated in a direction to accelerate the web feeding conveyor 18, whereas if the impulse received from scanning cell 64 synchronizes with the impulse received from switch 670, the motor 610 will be operated in reverse to retard the rate of operation of the feeding conveyor 18.

Aligned with the feed conveyor 18 is a conveyor 69 and between such conveyors moves a cut-off knife 70 which is preferably in the nature of a disk saw and is shown in detail in Figs. 7 and 8.

A slide 71 is reciprocable in a guideway 72. As viewed in Fig. 7, it is drawn to the left by tension spring 73 and advanced to the right by a piston 74 operating in an air cylinder 75.

Mounted on the slide 71 is a rock shaft 76 to which is fixed a sleeve 77 carrying an arm 78 on which the saw 70 is rotatably mounted. Journalled in the sleeve 77 is a drive shaft 79 having splined engagement with a driving head 80 actuated by the separate motor 81. The drive shaft 79 is connected by belt 82 to the saw. It is axially aligned with rock shaft 76 so as not to affect the centers over which belt 82 operates while the rock shaft 76 is oscillated. The motor 81 could be mounted on the slide 71 but the splined connection provided between parts 79 and 80 permits the motor to remain stationary while maintaining the driving connection to the saw.

The transverse bars 83 and 84 support a cross head 85 to which the arm 86 on rock shaft 76 is slidably connected. To operate the cross head transversely with respect to the slide 71, a piston 87 is connected to the cross head and operates under pneumatic pressure in the cylinder 88.

The saw 70, continuously driven by motor 81, is normally held by gravity at one or the other of the extremes of movement permitted to rock shaft 76 by the length of travel of piston 87 in cylinder 88. In this position it is at one side of the path of travel of the tubed wrapper in which the articles to be packaged have been enveloped. By means hereinafter to be described, air is admitted simultaneously into cylinders 88 and 75 whereby the respective pistons 87 and 74 are advanced. Piston 87 transmits its motion through arm 86 to the rock shaft to swing the saw transversely across the path of the tubed wrapper 89 (Fig. 8). Since the wrapper is in constant motion, propelled by the feed belt 18, the cut would be at an angle and the wrapper would be bent by contact with the blade of the knife 70, but for the fact that the knife is caused by piston 74 to move with the wrapper in the same direction and at substantially the same rate during the interval of cut.

In one cutting operation the knife 70 will be moved from its full line position to its dotted line position in Fig. 8. It will remain in the dotted line position until the time arrives for the next subsequent cutting operation whereupon air will be admitted again to cylinder 75 and this time to the opposite end of cylinder 88 whereby to move piston 87 in the opposite direction and swing the saw back to its full line position, again moving with the tubed wrapper to make a cut therethrough at 89. Thus, in each to and fro oscillation of rock shaft 76, the knife 70 makes a cut of the tubed wrapper between the articles enfolded therein and, regardless of which direction the rock shaft oscillates to swing the knife through the work, the knife is always moved in the direction of the work and substantially at the same speed by movement of the slide 71 produced by piston 74 and cylinder 75.

As delivered on to conveyor 69, the work pieces comprise an article such as a stack of napkins 25 wrapped in a square tubed jacket having the overlapped margins adhesively joined as shown at A in Fig. 2.

The work is now moved from conveyor 69 at right angles on to table 90 and simultaneously portions of the wrapper are folded in as indicated at 91 in the perspective drawing B of Fig. 2.

Pulleys 92 and 93 above the table 90 support a conveyor belt 94 upon which at suitable intervals are disposed sets of propelling paddles 95 having folding wings 96 hinged to the sides of the paddles and provided with cam follower control levers 97 as shown in Figs. 9, 10 and 11.

As each successive propelling paddle 95 passes about the pulley 93 into engagement with a work piece A on the conveyor belt 69, stationary cams 98 engage the rollers 99 on the cam follower levers 97 to oscillate the folding wings 96 about their respective hinge connections with said lever to fold inwardly the portions 91 of the work pieces as shown at B. The work piece with its rear end portions folded inwardly is then propelled between the stationary folding blades 100 which engage the opposite side portions 101 of the wrapper and fold them inwardly as indicated at C. This leaves at each end of the work piece upper projecting wrapper portions 102 and lower projecting wrapper portions 103. The upper projecting wrapper portions engage in the slots 104 of the stationary folding blades 100 and the downward arcuate curvature of such slots as indicated in Fig. 9 forces the upper apices 102 of

the wrapper to fold downwardly to the position indicated at D in Fig. 2.

In the meantime, the lowermost apices 103 at the ends of the wrapper have been engaged in the horizontal slots 105 of the stationary folding blades 100 and as they project through slots 105 they pass beneath a glue applying roller 106 at each side of the path of movement of the work piece, whereby each of the lower projecting apices 103 is treated with an application of glue at 107.

Thereupon the slot 105 curves upwardly at 108 (Fig. 9) with the result that the glued apices 103 of the wrapper are forced to fold upwardly into positions overlying the downwardly turned apices 102 thereof as shown at E in Fig. 2. This completes the folding operation and before the paddle 95, which has been propelling the work across table 90, turns upwardly over pulley 92, the work is delivered on to conveyor belt 108 along which it moves between belts 109 and 110 at opposite sides of its path which hold the overlapped ends of the wrapper under pressure until the adhesive has time to set.

Reference has already been made to the driving chain 47 leading toward the rear of the machine from shaft 45. This chain drives a sprocket 112 which, in turn, drives the gear 113 through pinion 114 (Fig. 9). Gear 113 is mounted on a shaft 115 connected by chain 116 with the shaft 117 on which is located the pulley 118 over which conveyor belt 69 operates.

Also driven by shaft 115 through chain 120 is shaft 121. Through bevel gearing at 122 and sprocket 123 and chain 124, motion is transmitted to the shaft 125 on which is located pulley 92 for the top conveyor 94 which propels the work through the folder. Associated with sprocket 123 to receive motion from the bevel gearing 122 is a gear 126 meshing with gear 127 on a cross shaft 128 which, through bevel gearing 129, drives pressure conveyor 109 and through bevel gearing 130 drives pressure conveyor 110.

On shaft 125 for the overhead conveyor 94 is a cam 135 with which coacts a cam follower 136 and connected with valve 137 which has a supply pipe 138 for air under pressure and pipe 139 leading to the end of air cylinder 75 (Fig. 7) which advances the knife with the work whenever the knife is in operation to cut the wrapper.

Driven at half speed from the same shaft 125 through a chain 140 is another cam 141 with which cooperates the cam follower lever 142 of a valve 143 having an air supply pipe 144 for delivering air under pressure thereto and two air outlet pipes 145 and 146, respectively connected to opposite ends of the air cylinder 88 which oscillates the knife to and fro for successive cutting operation (Fig. 7). Since cam 141 operates at half the speed of cam 135, it will be obvious that valve 137 will be operated twice in each complete cycle of operation of valve 143, thereby affording the required reciprocation of the slide 71 with each to and fro movement of the cutting knife.

The organization of the wrapping machine disclosed is such that comparatively few changes are necessary to enable the fundamental structure to operate on particles of differing sizes for the purposes of packaging the same. The spacing between side and top conveyors may readily be varied to suit the requirements of the work and only very few parts such as the folding and propelling paddles 95 need be bodily interchanged

when it is desired that the machine handle a different product.

While synchronizing apparatus has been used in other fields, it is believed new to use a scanning device 64 in conjunction with a timing switch 67, an integrating control 66 and a differential mechanism as a means of adjusting the rate of delivery of a tubed wrapper with respect to constantly supplied work pieces and a cut-off knife operating in synchronism with the rate at which the work pieces are supplied.

In the device of Fig. 3, it is not essential to use any means for synchronizing web movement to the rate at which articles are supplied to the web to be enfolded therein, inasmuch as the device of Fig. 3 does not employ a previously printed web, but, instead, accomplishes the registration of printed portions of the wrapper with the articles enfolded in the wrapper by imprinting the pattern on the wrapper only after the articles have been registered therewith.

It is immaterial whether the pattern be imprinted on the folded web before or after the web is cut into sections by the cut-off knife 70. Either the wrapping section of the machine or the folding section thereof may be lengthened to provide space for the printing, embossing or other patterning dies 150. It is convenient in this connection to use the press dies 150 to print with aniline ink which is a quick-drying ink and well suited for the purposes of the present invention, since it dries before the subsequent operations are performed upon the partially completed package. Obviously, any desired number or form of dies at 150 may be used to repeat any desired pattern upon the tubular section containing an article in registration with the article entubed therein.

I claim:

1. The combination with means for feeding articles to be wrapped, a cut-off knife, and means for operating the cut-off knife periodically across a predetermined path in synchronism with the rate at which articles are supplied, of means for supplying a patterned wrapper, means for tubing the wrapper about the articles to be wrapped and advancing the wrapper and the enfolded articles on said path past the cut-off knife, and mechanism for synchronizing the feed of the wrapper to the rate at which articles to be wrapped are supplied by said first mentioned means.

2. In a device of the character described, the combination with means for supplying articles at a constant rate, of means for advancing a web of wrapping material, means for enfolded the articles successively in the web, means for cutting the folded web between the articles enfolded therein, and means including an auxiliary booster mechanism co-operative with the web feed means for synchronizing a pattern on the web with said cut-off means whereby said pattern is repeated in portions of the web intervening between each cut made therein.

3. In a wrapping machine, the combination with means for advancing articles to be wrapped, of means for supplying a web provided with a pattern repeated at predetermined intervals, said web advancing means being slightly out of synchronism in a predetermined manner with said article supplying means, means for tubing the web about the articles to be wrapped therein, a supplementary feeding device for said web adapted to vary the rate of feeding of the web toward synchronization with said article supplying means, and mechanism including a scanning

device past which said web is operative and a switch operatively connected to be actuated by said article supplying means for regulating said supplemental feeding means to maintain said web in substantial synchronism with said articles, and a cutter operated in synchronism with said article supplying means for cutting the web midway between articles enfolded therein.

4. In a packaging machine, the combination with an article supplying conveyor, of means including a conveyor for advancing an article wrapping web bearing a repetitive pattern and indicia in predetermined relation to the pattern, of means for actuating said web conveyor at a rate slightly out of synchronism with said article conveyor, a supplemental means effecting actuation of said web conveyor, scanning means in behalf of said web affected by said indicia and including mechanism controlling said supplemental web actuating means in a direction to compensate for lack of synchronism between the web and the articles to be wrapped, mechanism for enfolded the wrapping web in a tube about the articles, mechanism for severing the tubed web midway between articles previously wrapped therein, and mechanism for folding upon such articles the cut ends of the wrapping tube.

5. In a wrapping machine, the combination with an article conveyor and a wrapping web conveyor, of means for operating said conveyors slightly out of synchronism, a supplemental means for actuating said web conveyor, and mechanism controlling the operation of said supplemental means at a rate such as to maintain substantial synchronism between the web conveyor and the article conveyor.

6. The combination with an article conveyor and a web conveyor, of means for tubing the web about the articles propelled by the article conveyor, means for cutting the tubed web midway between articles enfolded therein and said cutting means including actuating connections synchronized with the article conveyor, and means for driving the article conveyor and the web conveyor slightly out of synchronism with the web conveyor slightly retarded as compared with the article conveyor, a supplemental driving means for the web conveyor and web control mechanism comprising a scanning device, and means actuated thereby in operative controlling connection with said supplemental driving means to regulate the operation thereof at a rate to maintain said conveyors in substantial synchronism.

7. In a wrapping machine, the combination with an article conveyor and a web conveyor, means for tubing a web carried by the web conveyor about the articles delivered by the article conveyor, means for cutting the web midway between the articles entubed therein, means for actuating said cutting means in synchronism with the article conveyor, a first means for actuating the web conveyor at a rate slightly greater than the rate of operation of the article conveyor, and a second driving means opposed to the first driving means in operative driving relation to the web conveyor, and mechanism including a scanning device positioned to scan the web delivered by the web conveyor and provided with speed regulating connections for controlling said second driving means for the operation thereof just sufficiently to reduce the rate of operation of the web conveyor into synchronism with that of the article conveyor.

8. In a wrapping machine, the combination with an article conveyor and a web conveyor and means for operating said conveyors slightly out of synchronism, of successive switches operable in accordance with the passage of successive articles, a scanning device operable in accordance with the passage of successive sections, of web means for tubing the web on the web conveyor about the articles delivered by the article conveyor, and means for advancing and retarding the rate of operation of the web conveyor as compared with the rate of operation of the article conveyor, said means including control mechanism actuated in part by said successive switches and in part by said scanning devices.

9. In a wrapping machine, the combination with means for delivering articles to be wrapped, means for delivering a web for the wrapping of said articles, and means for entubing said web about said articles, of means controlled in accordance with the operation of both of said first mentioned means for maintaining synchronization of web feed with article feed, means synchronized with the rate of article feed for cutting the tubed web midway between articles enfolded therein, and means for folding the cut ends of the tubed web upon the articles.

10. In a wrapping machine, the combination with means for delivering articles to be wrapped, means for delivering a web for the wrapping of said articles, and means for entubing said web about said articles, of means controlled in accordance with the operation of both of said first mentioned means for maintaining synchronization of web feed with article feed, means synchronized with the rate of article feed for cutting the tubed web midway between articles enfolded therein, and means for folding the cut ends of the tubed web upon the articles, said web cutting means comprising a knife, means for moving the knife transversely of the moving web, and means for advancing the knife with the web in the course of its transverse movement.

11. A wrapping machine comprising the combination with means for delivering an article to be wrapped, of means for delivering a tubular wrapper about each such article, and means for completing the folding of the wrapper upon the article, said means comprising a cross conveyor, a paddle engaged with a side of the tubular wrapping wings hinged to the paddle and movable across the ends of the tubular wrapping to make a preliminary fold therein, and cam means operable in the advance of said paddle for hingedly moving said wings.

12. In a wrapping machine, the combination with means for feeding successive articles to be wrapped, and means for enfolding successive articles in tubular sections, of wrapper feeding means variable as to its rate of operation, wrapping means including mechanism for varying the rate of said feeding means to register patterned portions of the wrapper with said articles, and means for folding the ends of the tubular wrapper sections upon the articles.

13. In a wrapping machine, the combination with means for feeding successive articles to be wrapped, of means for enfolding successive articles in tubular sections, of wrapping means for registering patterned portions of the wrapper with said articles, and means for folding the ends of the tubular wrapper sections upon the articles, said means comprising a cross conveyor including successive article propelling paddles

engageable with sides of the tubular wrapper sections, folding wings hinged to the respective paddles and engageable with projecting end portions of the tubular wrapper sections, and cam means in the path of movement of said paddles, said wings having cam followers engageable with said means for the actuation of said wings in directions to fold forwardly the end portions of tubular wrapper sections engaged by said wings in the propulsion of the articles and tubular wrapper sections.

14. In a wrapping machine, the combination with means for feeding successive articles to be wrapped, of means for enfolding successive articles in tubular sections, of wrapping means for registering patterned portions of the wrapper with said articles, and means for folding the ends of the tubular wrapper sections upon the articles, said means comprising a cross conveyor including successive article propelling paddles engageable with sides of the tubular wrapper sections, folding wings hinged to the respective paddles and engageable with projecting end portions of the tubular wrapper sections, and cam means in the path of movement of said paddles, said wings having cam followers engageable with said means for the actuation of said wings in directions to fold forwardly the end portions of tubular wrapper sections engaged by said wings in the propulsion of the articles and tubular wrapper sections, and stationary folding blades having portions engageable with forward portions of the projecting ends of the tubular wrapper sections to fold said forward portions inwardly and oppositely curving slots successively engageable with upper and lower apices remaining projecting from said articles whereby to fold said apices over each other.

15. A machine for wrapping successive articles in webbed sections having a predetermined pattern and indicia thereon, said machine comprising a web support, a web advancing conveyor, a scanning device in the path of movement of the web between the support and the conveyor, a table having a delivery portion extending on to said conveyor, an article propelling means operating across the table and adapted to deliver spaced articles on to the web on the conveyor, means associated with the conveyor for entubing the web about the articles spaced thereon, means for joining the overlapping side marginal portions of the entubed wrapper, means controlled by said scanning device for regulating the feed of the web conveyor to synchronize the patterned portions of the web with the articles delivered thereto, a cut-off knife, means for actuating said cut-off knife across the path of the tubed web in synchronism with the rate of article delivery to the web, said knife being timed to cut the entubed web midway between articles enfolded therein, and means for advancing the knife with the web in the course of each cutting operation, and means for folding upon each article the cut ends of the web in which the article is entubed.

16. The combination with means for feeding articles to be wrapped, said feed being at a constant rate, a cut-off knife, and means for operating the cut-off knife periodically across a predetermined path in synchronism with the rate at which articles are supplied, of means for supplying a wrapper, means for tubing the wrapper about the articles to be wrapped and advancing the wrapper and the enfolded articles on said paths past the cut-off knife, a mechanism for synchronizing the feed of the wrapper to the

rate at which articles to be wrapped are supplied by said first mentioned means, said mechanism comprising photo-responsive auxiliary drive means for boosting the speed of the article supply means.

17. A combination with means for feeding articles to be wrapped, said feed being at a constant rate, a cut-off knife, and means for operating the cut-off knife periodically across a predetermined path in synchronism with the rate at which articles are supplied, of means for supplying a wrapper, means for tubing the wrapper

about the articles to be wrapped and advancing the wrapper and the enfolded articles on said paths past the cut-off knife, and mechanism for synchronizing the feed of the wrapper to the rate at which articles to be wrapped are supplied by said first mentioned means, said mechanism comprising an auxiliary source of power and photo-responsive apparatus for controlling said source of power to alter the normal speed of the auxiliary supply means.

SAMUEL J. CAMPBELL.