June 29, 1926. 1,590,366

P. H. GRIMM ET AL

PACKAGE WRAPPING MACHINE

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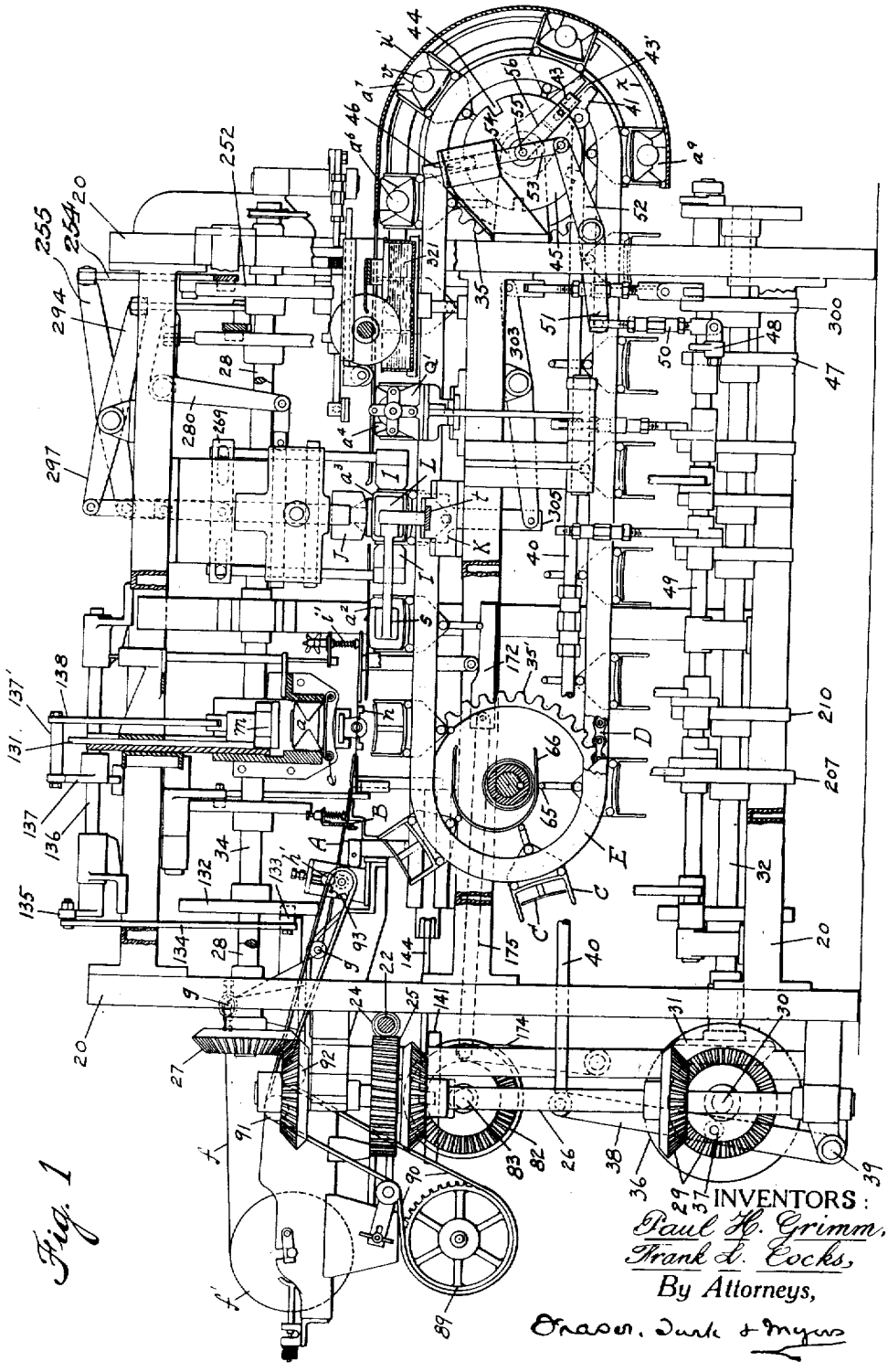


Fig. 1

INVENTORS:
Paul H. Grimm,
Frank L. Cocks,
By Attorneys,
Dyer, Clark & Myers

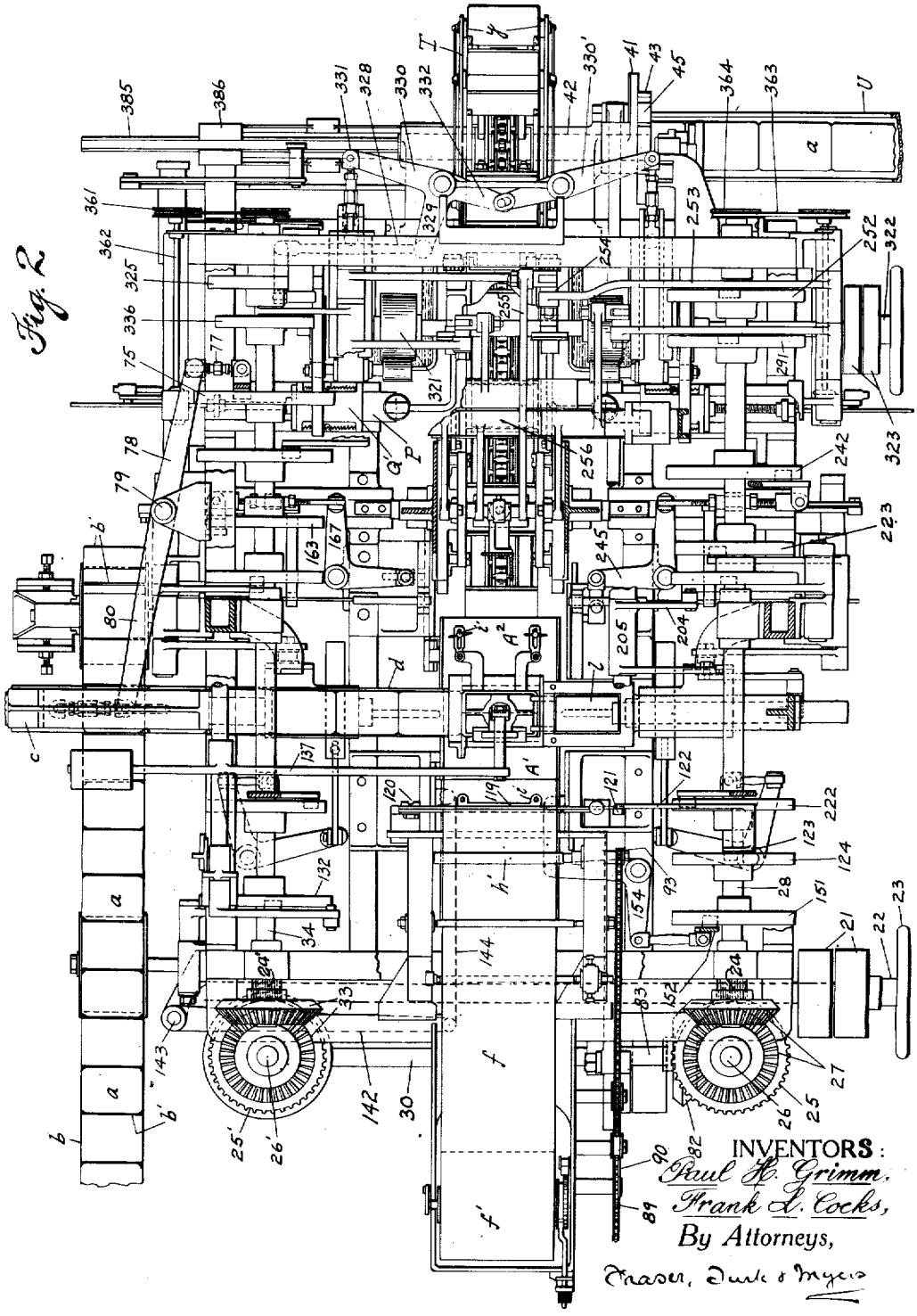
June 29 , 1926. 1,590,366

P. H. GRIMM ET AL

PACKAGE WRAPPING MACHINE

Filed Jan. 27, 1921 15 Sheets-Sheet 2

Fig. 2



INVENTORS:
Paul H. Grimm,
Frank L. Cocks,
By Attorneys,
Fraser, Dunlop & Myers

June 29 , 1926. 1,590,366

P. H. GRIMM ET AL

PACKAGE WRAPPING MACHINE

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Fig. 4

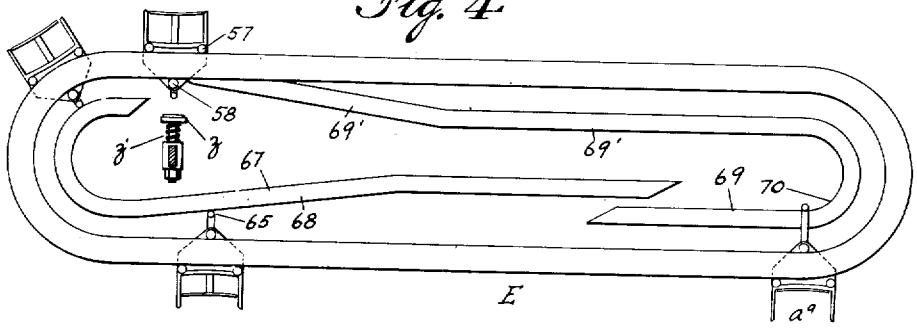
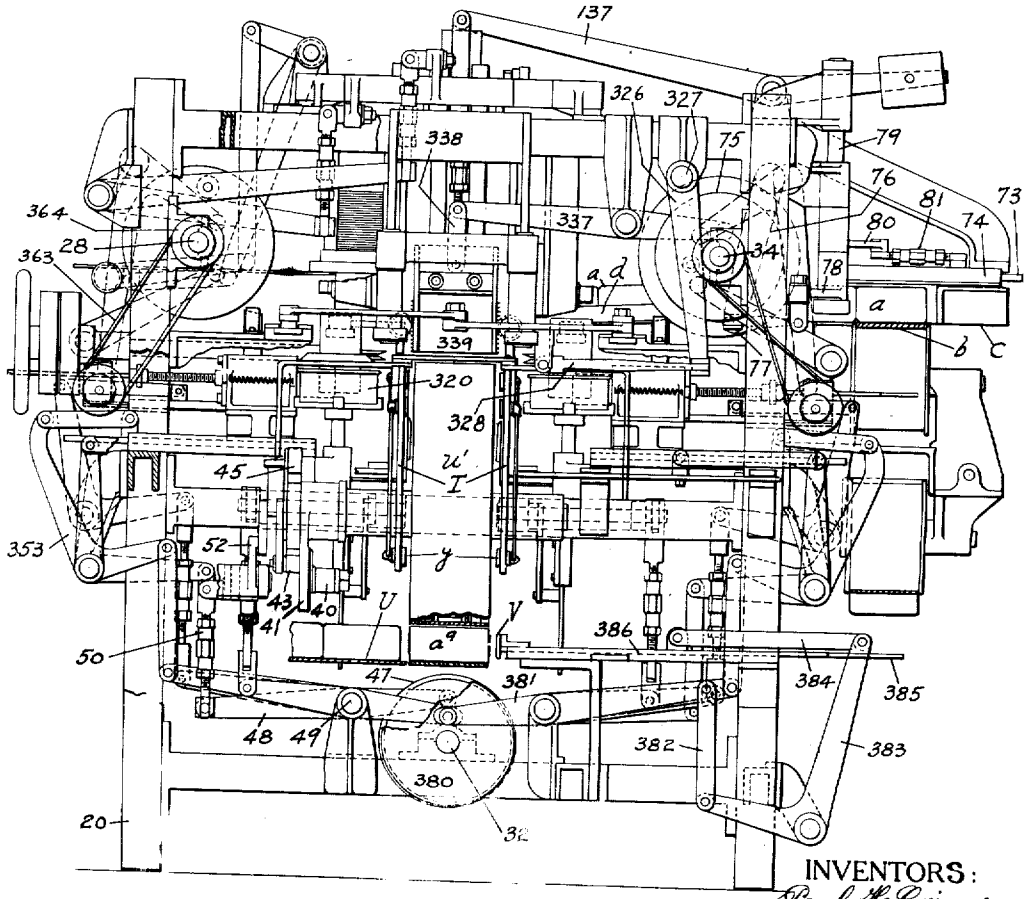



Fig. 3




INVENTORS:
Paul H. Grimm,
Frank L. Cocks,
By Attorneys,
Mason, Mark & Myers

June 29, 1926. 1,590,366

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PACKAGE WRAPPING MACHINE

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Fig. 5

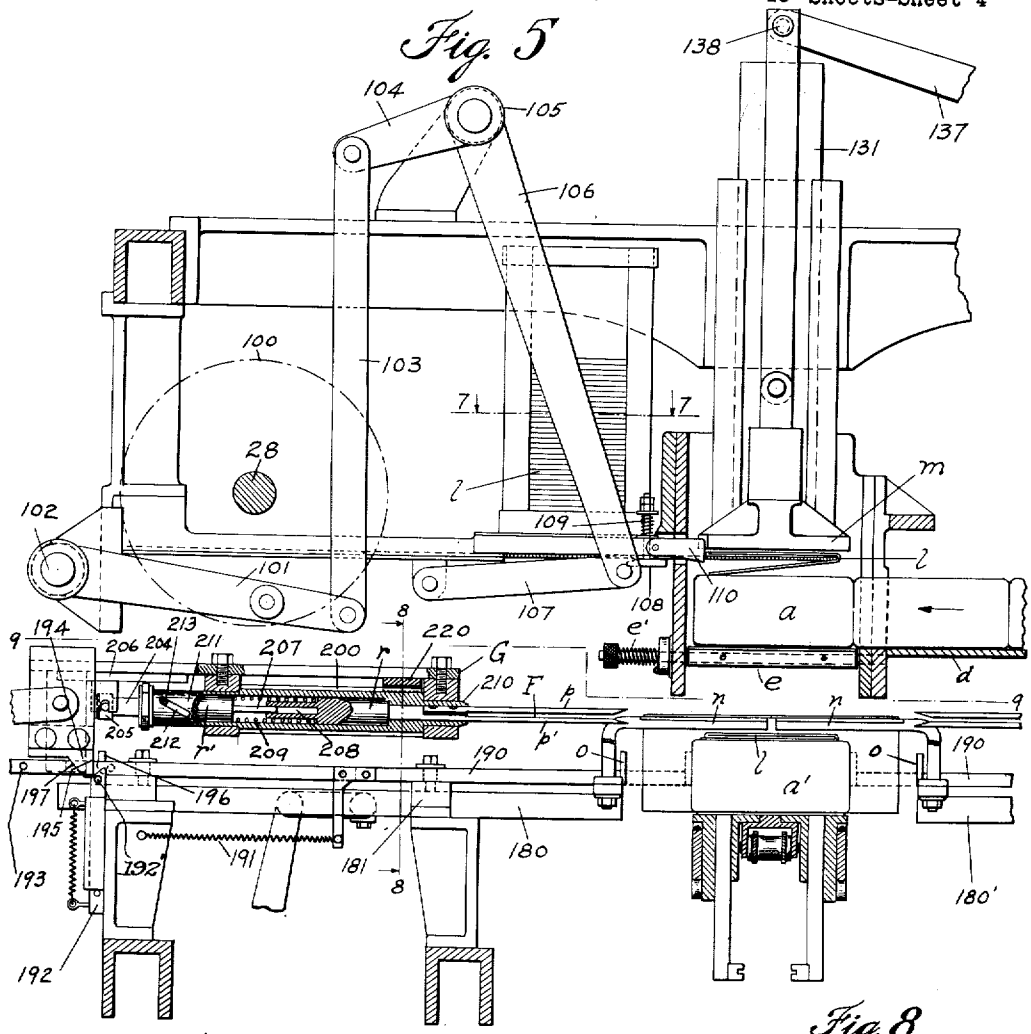



Fig. 7

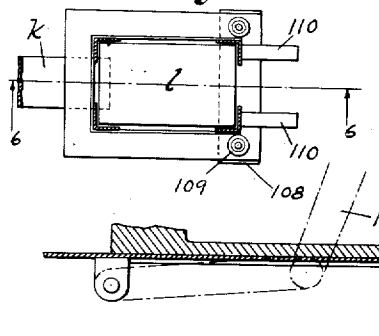
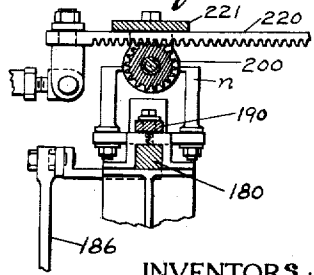



Fig. 6




Fig. 8




INVENTORS:
Paul H. Grimm,
Frank L. Cocks,
By Attorneys,
Fraser, Dunk & Myers

June 29 , 1926. 1,590,366

P. H. GRIMM ET AL

PACKAGE WRAPPING MACHINE

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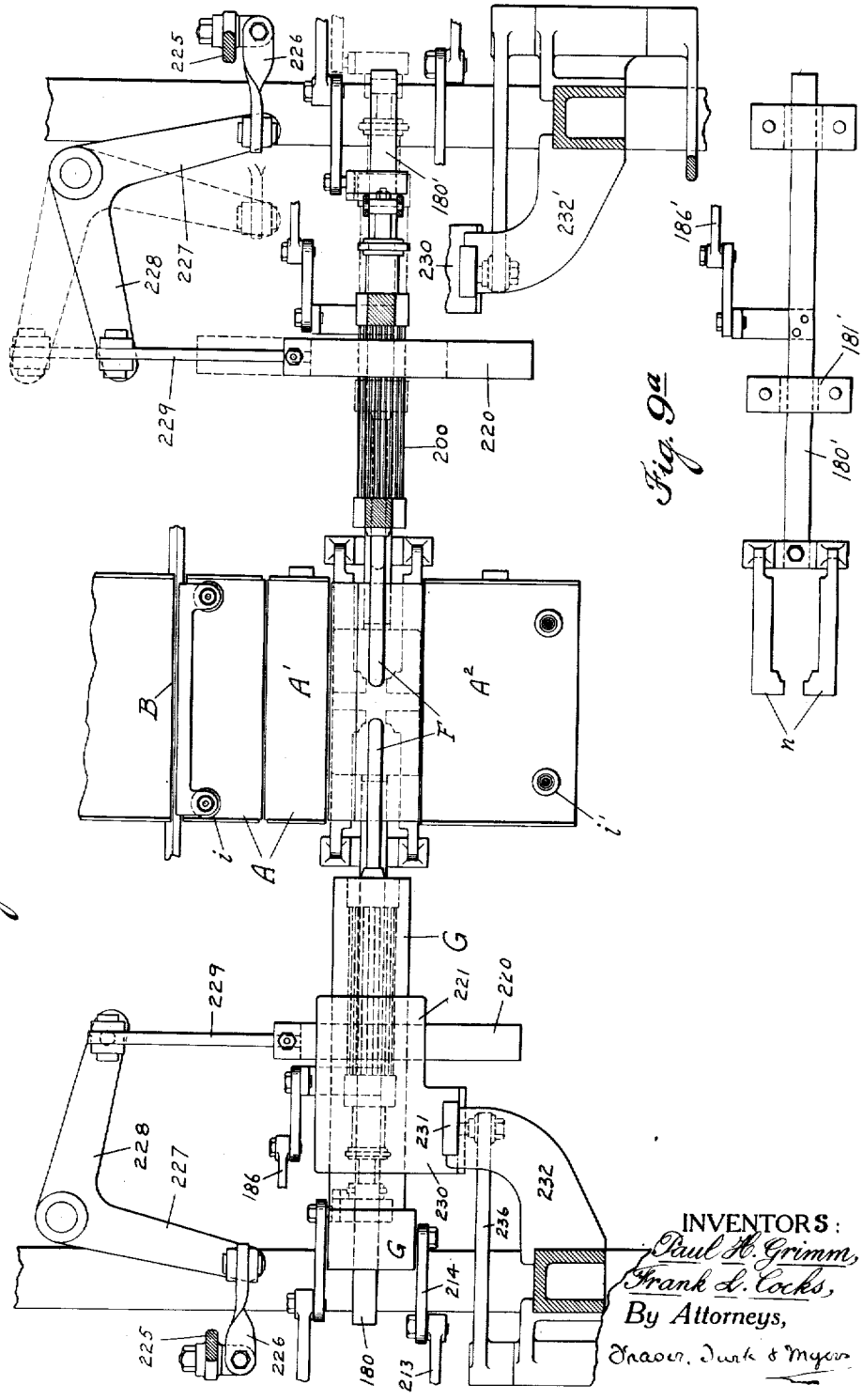



Fig. 9




Fig. 9a

INVENTORS:
Paul H. Grimm,
Frank L. Cocks,
By Attorneys,
Fraser, Dunk & Myers

June 29, 1926.

1,590,366

P. H. GRIMM ET AL

PACKAGE WRAPPING MACHINE

Filed Jan. 27, 1921

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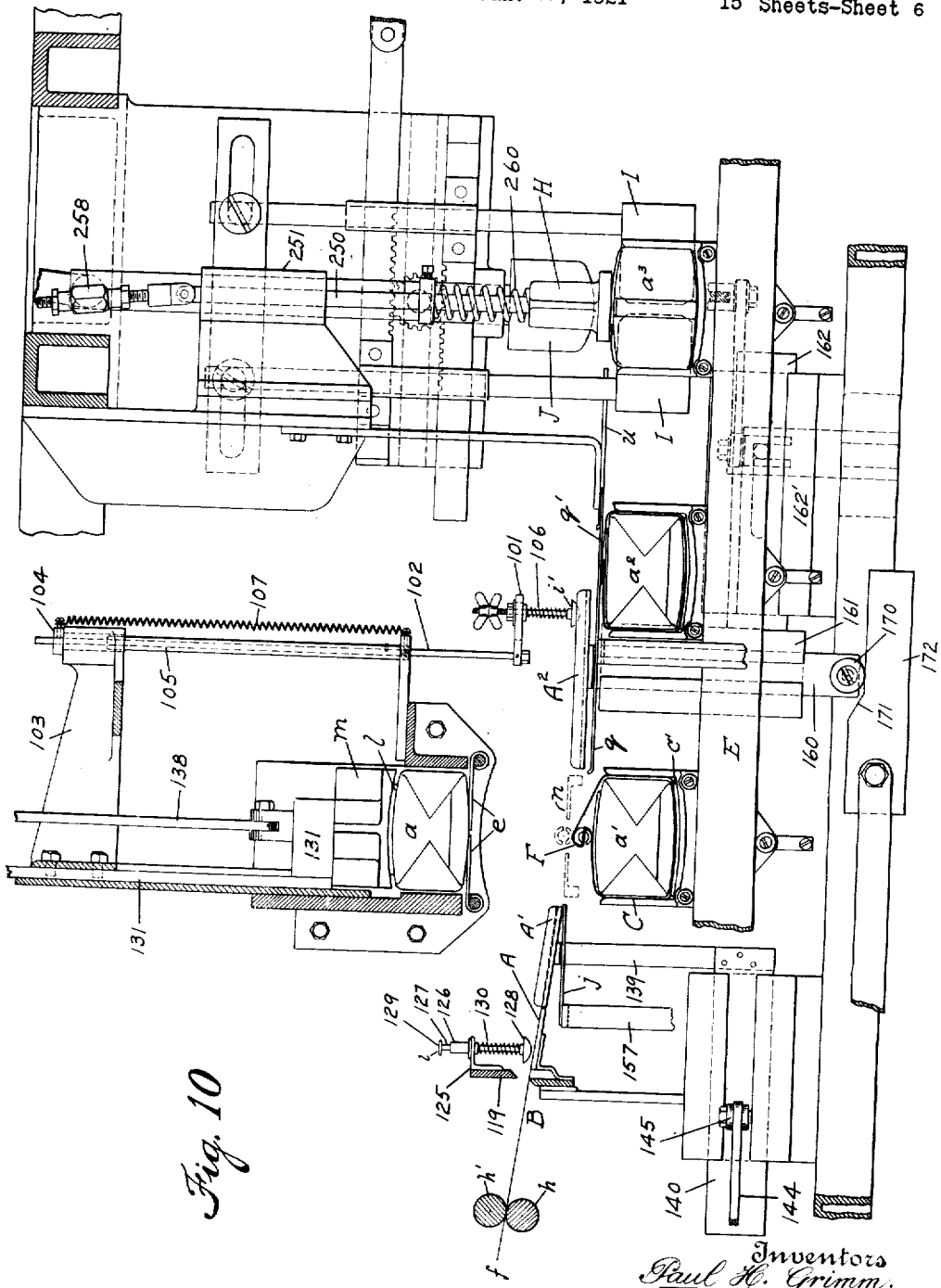



Fig. 10

Inventors
Paul H. Grimm,
Frank L. Cocks,
By their Attorneys,
Dyer, Tuck & Ingle

June 29, 1926.

P. H. GRIMM ET AL

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PACKAGE WRAPPING MACHINE

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Fig. 11

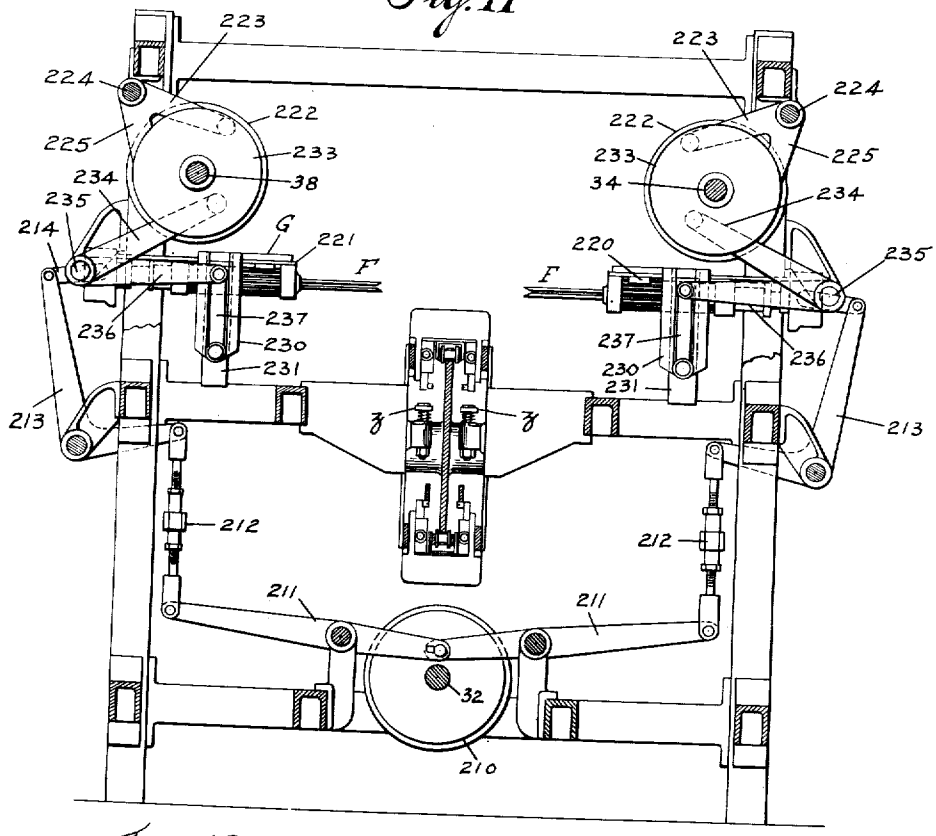



Fig. 12

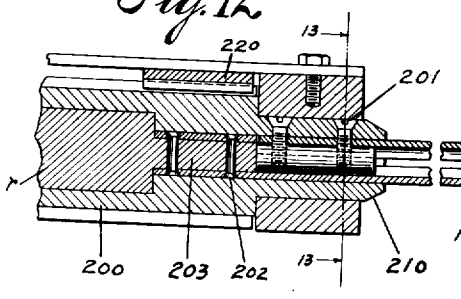



Fig. 13

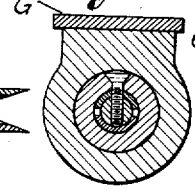
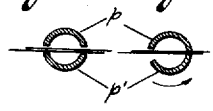



Fig. 14

Fig. 15



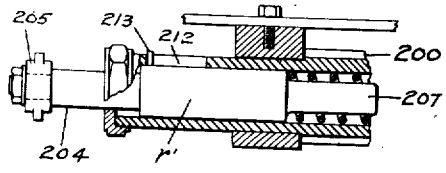




Fig. 12a

Inventors
Paul H. Grimm,
Frank L. Cocks,

By their Attorneys,
Fraser, Durle & Myers

June 29, 1926.

P. H. GRIMM ET AL

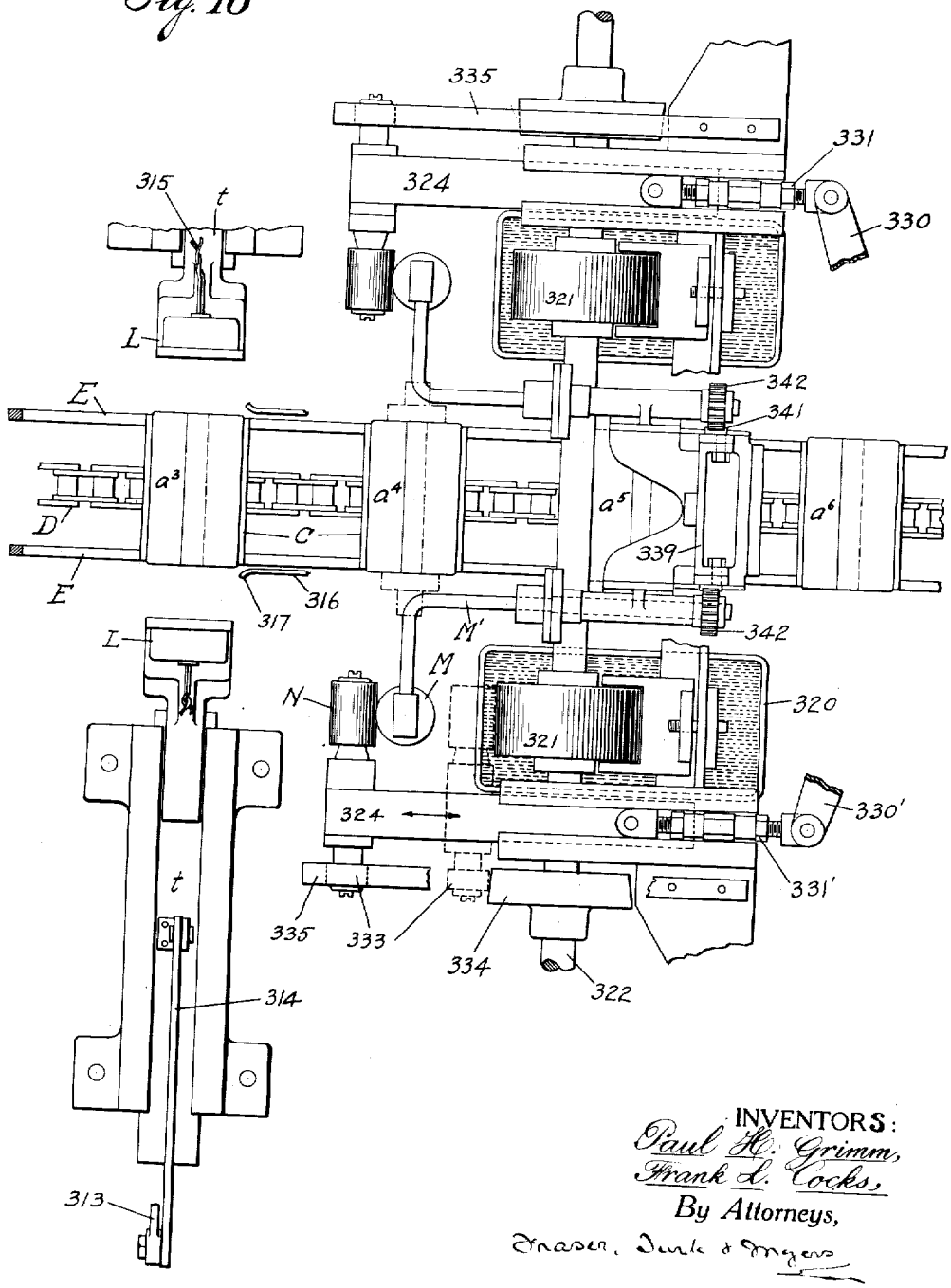
1,590,366

PACKAGE WRAPPING MACHINE

Filed Jan. 27, 1921

15 Sheets-Sheet 8

Fig. 16




INVENTORS:
Paul H. Grimm,
Frank L. Cocks,
By Attorneys,
Fraser, Dunlop & Myers

June 29, 1926. 1,590,366

P. H. GRIMM ET AL

PACKAGE WRAPPING MACHINE

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Fig. 19

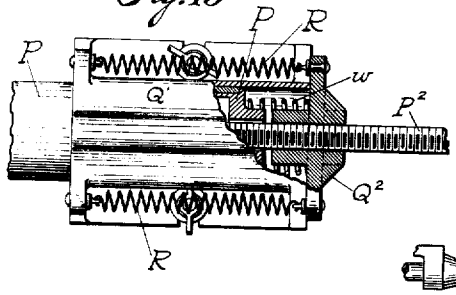



Fig. 18

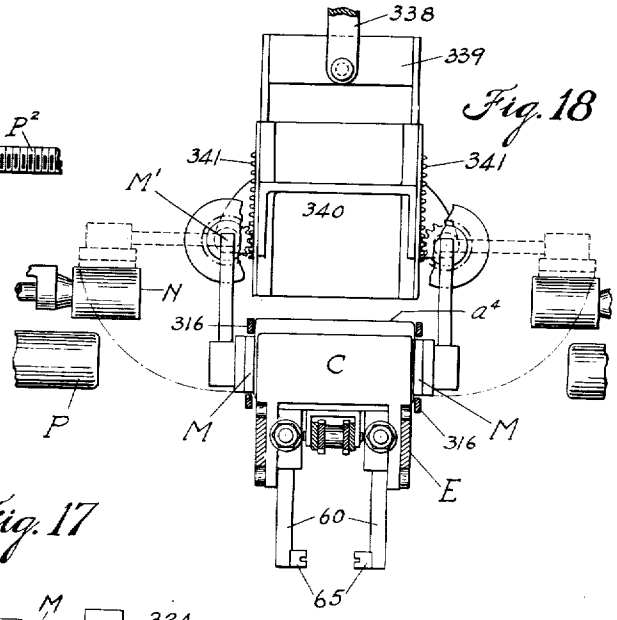



Fig. 17

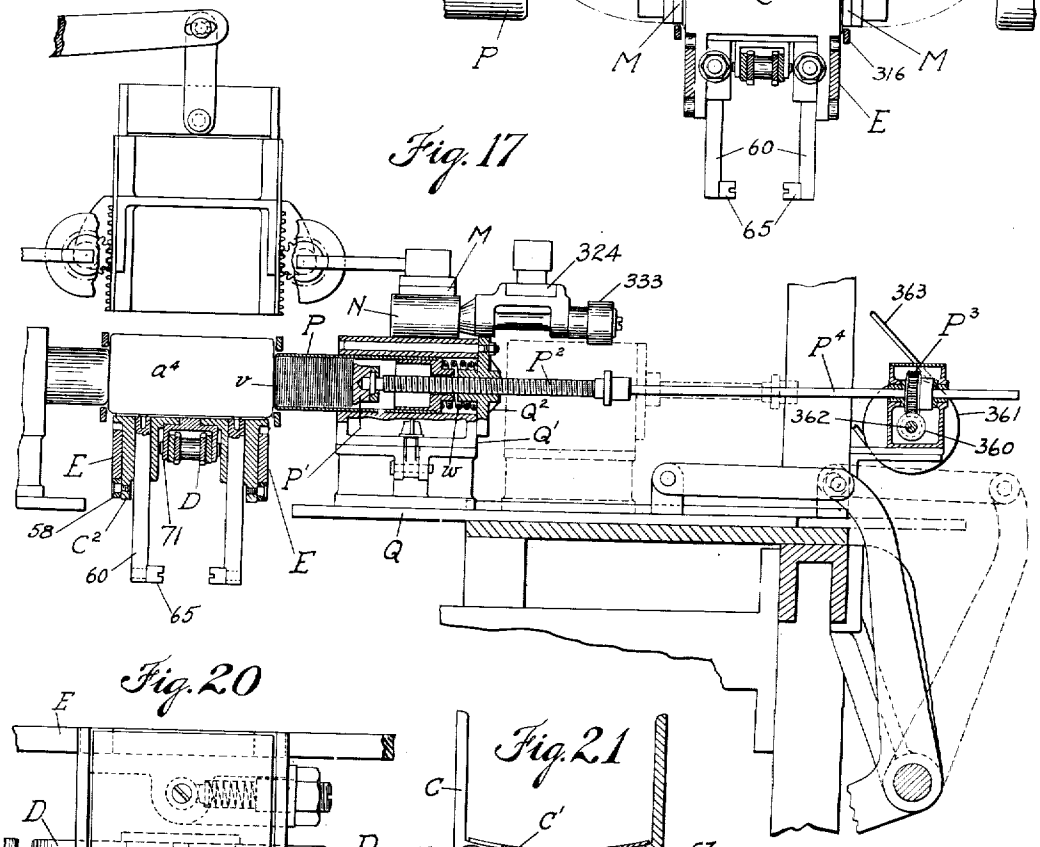



Fig. 20

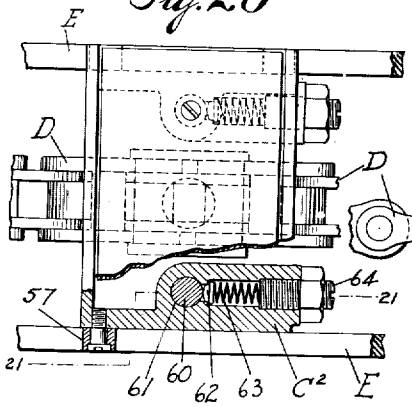
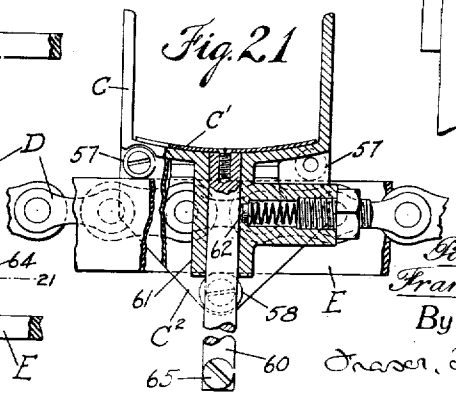



Fig. 21




INVENTORS:
Paul H. Grimm,
Frank L. Cocks,
By Attorneys,
Fraser, Dunk & Myers

June 29 , 1926.

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Filed Jan. 27, 1921

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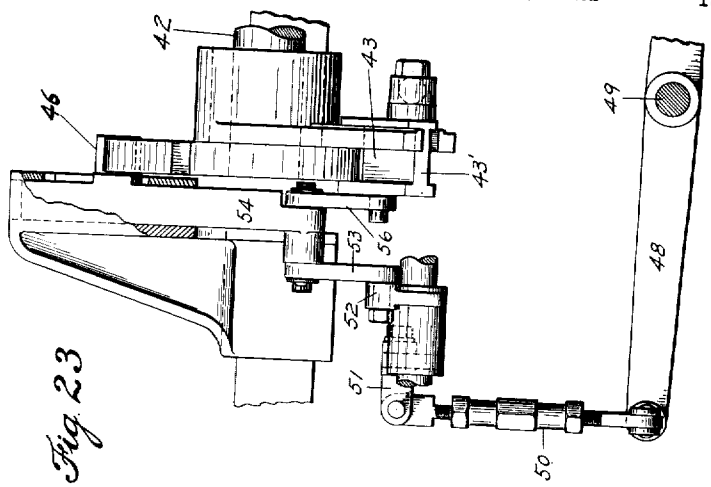



Fig. 23

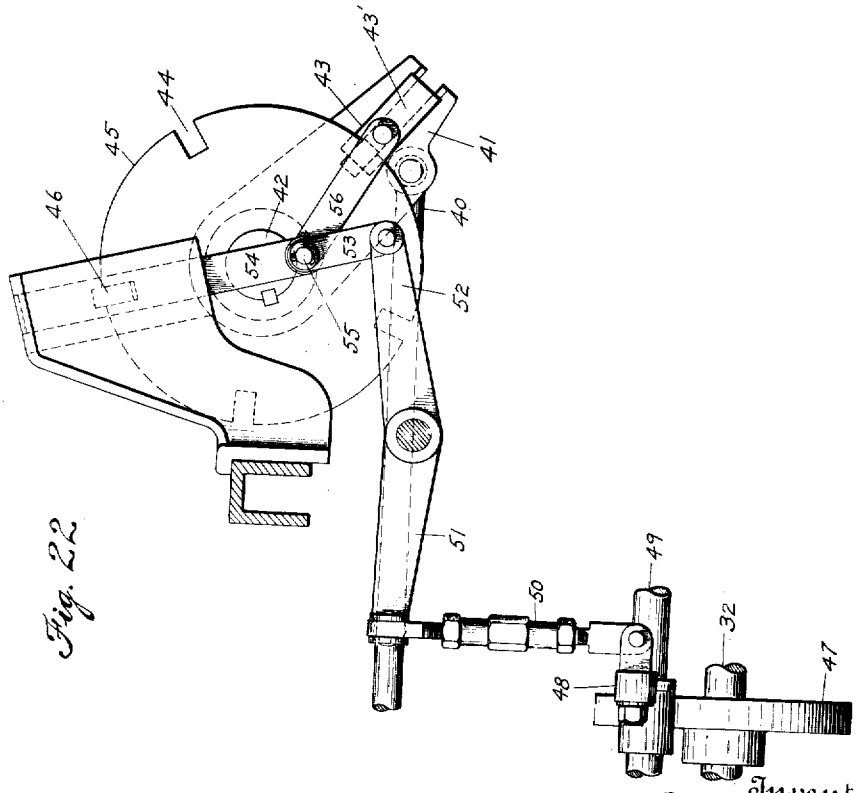



Fig. 22

Inventors
Paul H. Grimm,
Frank L. Cocks,
By their Attorneys,
Fraser, Clark & Myers

June 29, 1926. 1,590,366

P. H. GRIMM ET AL

PACKAGE WRAPPING MACHINE

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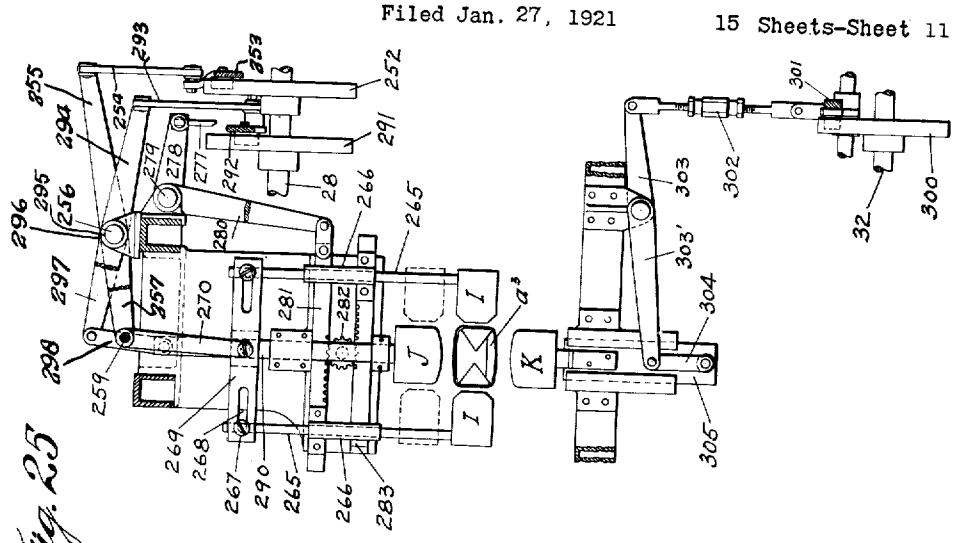



Fig. 25

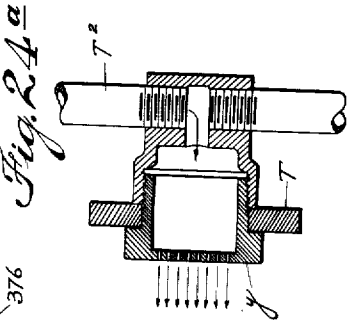



Fig. 24a

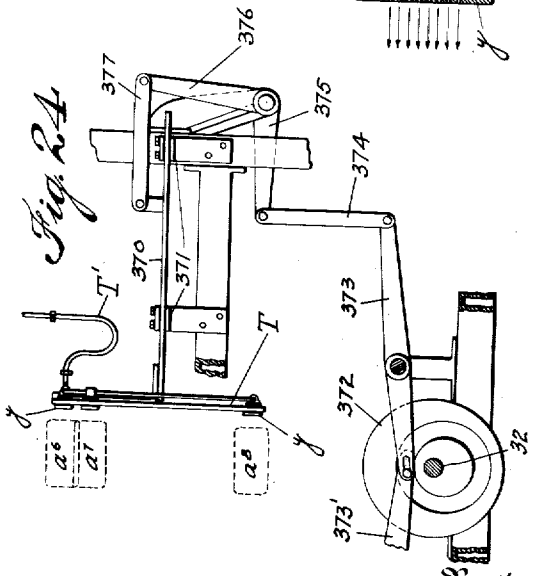



Fig. 24

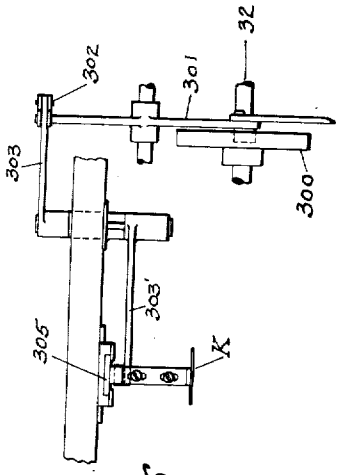



Fig. 26

Inventors
Paul H. Grimm,
Frank L. Cocks,
By their Attorneys,
Fraser, Dunk & Myers.

June 29, 1926.

P. H. GRIMM ET AL

1,590,366

PACKAGE WRAPPING MACHINE

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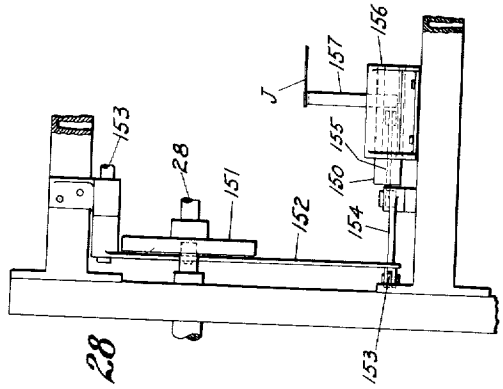


Fig. 28

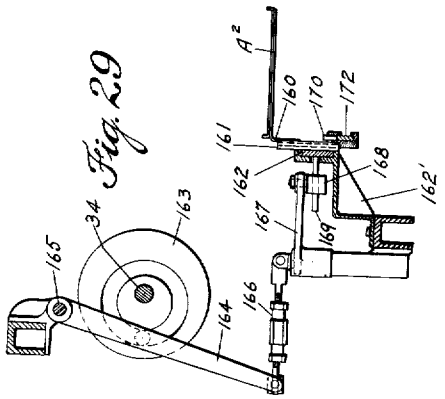


Fig. 29

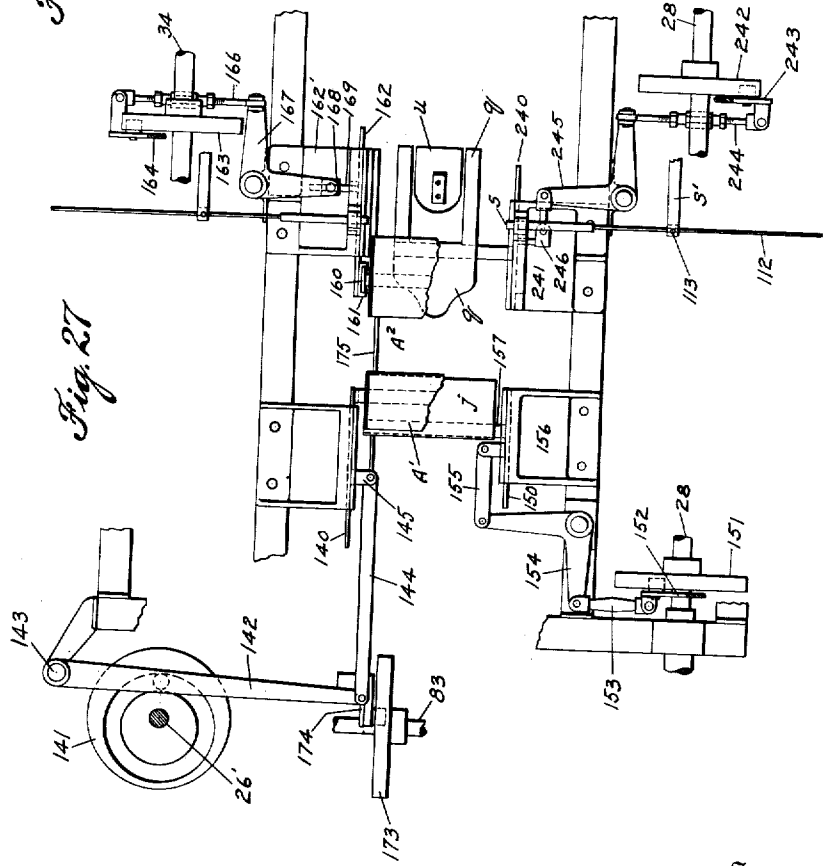


Fig. 27

Inventors
Paul H. Grimm,
Frank L. Cocks,

By their Attorneys,
Fraser, Dunk & Myers

June 29 , 1926. 1,590,366

P. H. GRIMM ET AL

PACKAGE WRAPPING MACHINE

Filed Jan. 27, 1921 15 Sheets-Sheet 13

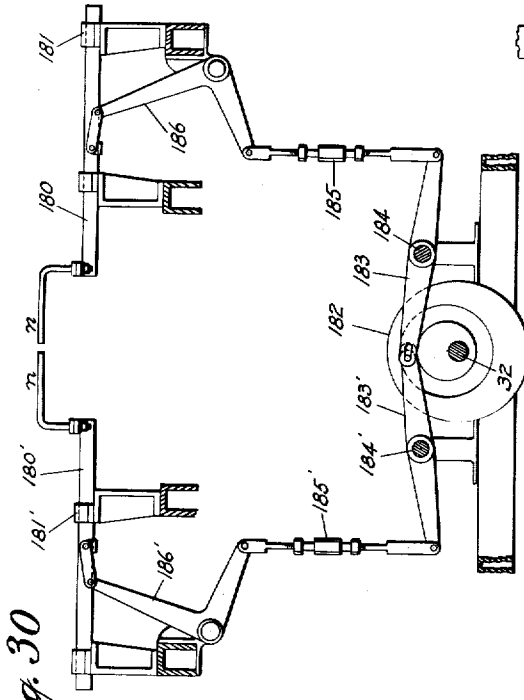



Fig. 30

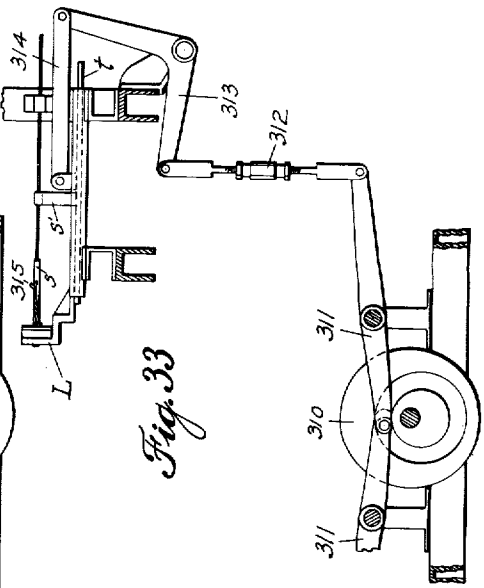



Fig. 33

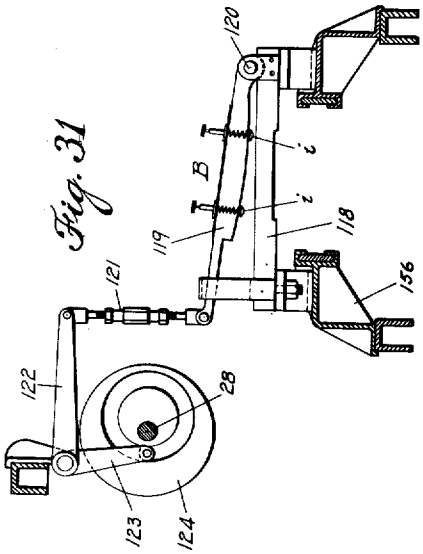



Fig. 31

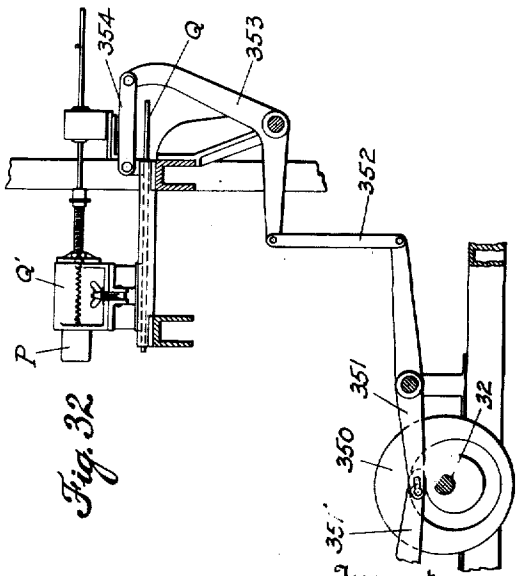



Fig. 32

Inventors
Paul H. Grimm,
Frank L. Cocas,
By their Attorneys,
Fraser, Dunlop & Myers

June 29 , 1926. 1,590,366

P. H. GRIMM ET AL

PACKAGE WRAPPING MACHINE

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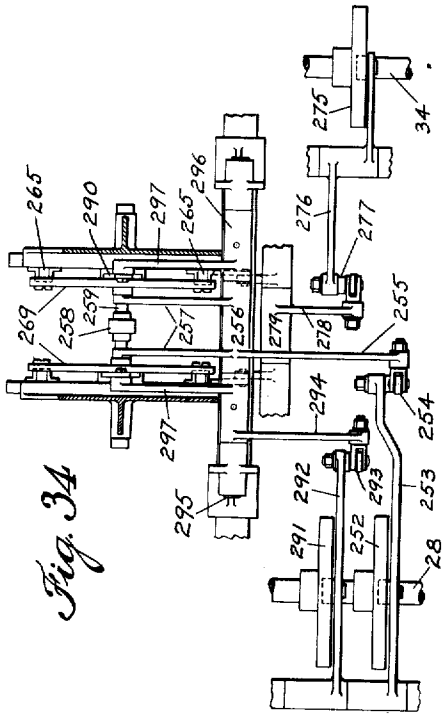



Fig. 34

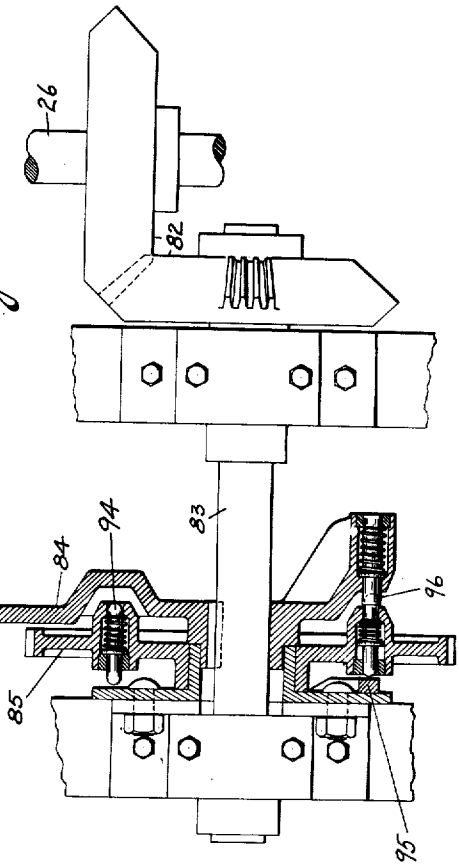



Fig. 36

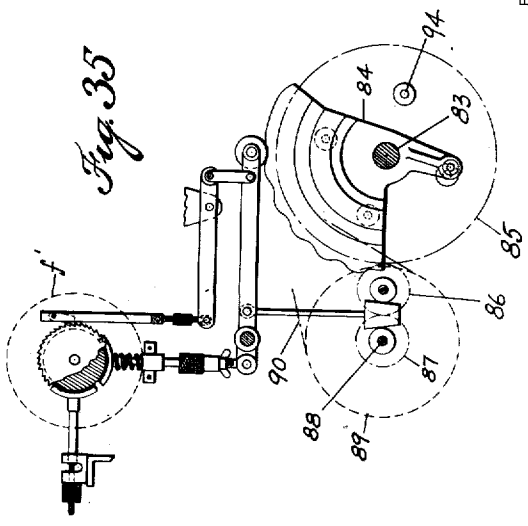



Fig. 35

Inventors
Paul H. Grimm,
Frank L. Cocks,
By their Attorneys,
Fraser, Denk & Myers

June 29 , 1926. 1,590,366

P. H. GRIMM ET AL.

PACKAGE WRAPPING MACHINE

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Fig. 37

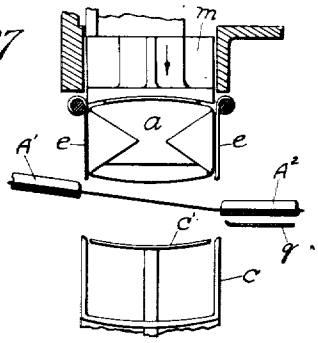



Fig. 38

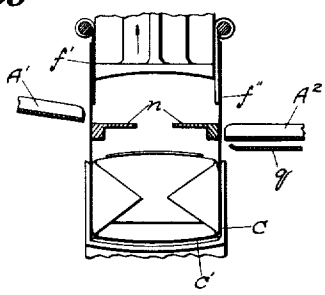



Fig. 39

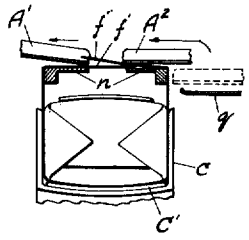



Fig. 40

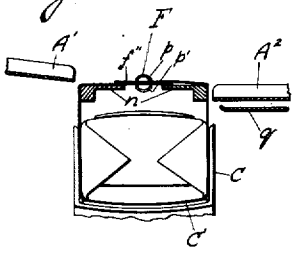



Fig. 41

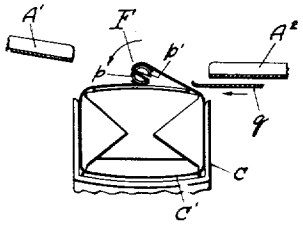



Fig. 42

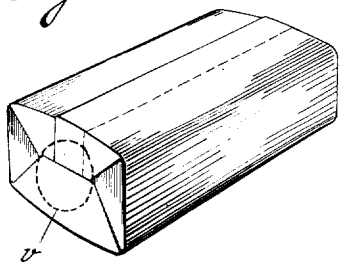
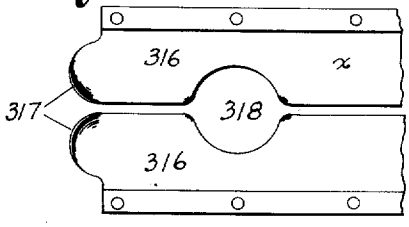



Fig. 43




Inventors
Paul H. Grimm,
Frank L. Cocks,
By their Attorneys.
Dyer, Duke & Myers

Patented June 29, 1926.

1,590,366

# UNITED STATES PATENT OFFICE.

PAUL H. GRIMM, OF GLEN COVE, AND FRANK L. COCKS, OF BROOKLYN, NEW YORK, ASSIGNORS TO ARBUCKLE BROTHERS, OF NEW YORK, N. Y., A FIRM COMPRISING WILLIAM A. JAMISON, CATHERINE A. JAMISON, AND CHRISTINA ARBUCKLE.

## PACKAGE-WRAPPING MACHINE.

Application filed January 27, 1921. Serial No. 440,378.

This invention relates to machines for applying an outer wrapper around a package. The invention is in part applicable to machines for applying wrappers around suitably shaped objects or articles of manufacture, or around cartons containing goods. The improved machine is, however, designed especially for applying an outer wrapping of impervious material, such as waxed paper, around paper packages of slightly varying sizes containing goods in bulk, such, for example, as coffee or sugar which has been weighed and packaged. The specific exterior wrapper for which the machine is designed is of so-called "glassine" paper, which is treated with a starchy compound to render it impervious and semi-transparent, the purpose of which is to preserve the contents of the package against the escape of moisture from within, as well as against the effect of dampness entering from without.

It is desirable to apply such an exterior wrapping snugly and firmly around the enclosed package, so as to leave no loose portion of the treated paper such as might by its projection become caught and torn. Such paper is made thin, so as to be as light and as nearly transparent as possible, whereby to permit the printed matter on the enclosed package to be easily read through it, so that it is necessarily somewhat fragile and easily punctured or torn. The more closely it is stretched around the package without, however, straining it, the better the enclosed package protects the fragile wrapper from injury. As the packages vary somewhat in dimensions, there is some difficulty in applying the wrapper in every case with equal snugness around the package; certain features of the present invention are directed to the overcoming of this difficulty. Other features will be developed as the description proceeds.

The accompanying drawings illustrate a machine embodying the invention designed primarily for wrapping packages of ground coffee of uniform weight in a wrapping of glassine paper or similar semi-transparent impervious thin material.

Figure 1 is a side elevation of the machine, partly broken away in vertical section;

Fig. 2 is a plan of the machine, partly broken away in horizontal section;

Fig. 3 is a rear elevation of the machine, portions being broken away in vertical section;

Fig. 4 is a fragmentary vertical section illustrating certain parts of the machine;

Fig. 5 is a partial transverse section on a larger scale, looking in the same direction as Fig. 3;

Fig. 6 is a vertical transverse section on the line 6—6 in Fig. 7, through the mechanism for inserting a folded circular within the wrapper;

Fig. 7 is a horizontal section on the line 7—7 in Fig. 5, through the magazine holding such circulars;

Fig. 8 is a section in a plane longitudinally of the machine and transverse to the plane of Fig. 5, on the line 8—8 therein;

Fig. 9 is a plan, being an enlargement of a portion of Fig. 2, but in section on a lower plane, the plane of the section being approximately indicated by the line 9—9 in Fig. 5;

Fig. 9ª is a plan of one of the parts of Fig. 9, detached;

Fig. 10 is a vertical section of a portion of the machine, being in effect a fragment of Fig. 1 in section on nearly the same plane;

Fig. 11 is a vertical transverse section of the machine showing the means for operating the lock-seam folders;

Fig. 12 is an enlarged fragmentary detail of one of the lock-seam folders;

Fig. 12ª is a similar fragmentary detail of the opposite end portion thereof;

Fig. 13 is a transverse section on the line 13—13 in Fig. 12;

Figs. 14 and 15 are transverse sections of the fingers $p$ $p'$, Fig. 12;

Fig. 16 is a plan of a portion of the machine showing the means for heating the end folds and for applying adhesive;

Fig. 17 is a vertical transverse section of the mechanism for applying adhesive and for affixing end labels;

Fig. 18 is a similar section showing the parts in a different position;

Fig. 19 is a plan of the label-affixing means partly in horizontal section;

Fig. 20 is a plan of one pocket, partly in horizontal section, with a fragment of the chain and guide rails;

Fig. 21 is a side elevation of the parts shown in Fig. 20, partly in vertical section, on the line 21 in Fig. 20;

Fig. 22 is a side elevation of the chain feed mechanism shown at the right in Fig. 1, the parts being on a larger scale and shown in a different position;

Fig. 23 is a rear end elevation (corresponding to Fig. 3) of the parts shown in Fig. 22;

Fig. 24 is a rear elevation, partly in vertical section, of the parts for driving the perforated compressed air pads;

Fig. 24ª is a fragmentary view showing in section one of these pads and its adjacent parts;

Fig. 25 is an elevation corresponding to Fig. 1, showing the end folders and their driving mechanisms;

Fig. 26 is a plan of the bottom end folder and its driving means, shown at the lower part of Fig. 25;

Fig. 27 is a plan showing the means for driving the top folder plates and gap bridge plate, and lock-fold flattening iron;

Fig. 28 shows in elevation, looking from the rear, the mechanism for operating the gap bridge plate *j*;

Fig. 29 is a vertical transverse section, looking from the front, of the means for operating the rear folding plate $A^3$;

Fig. 30 is a vertical transverse section showing the means for operating the fingers *n n*;

Fig. 31 is a vertical transverse section showing the means for operatng the shears;

Fig. 32 is a vertical transverse section showing the means for operating the label magazine carrier;

Fig. 33 is a vertical transverse section showing the means for reciprocating the end fold heaters;

Fig. 34 is a plan, partly in horizontal section, showing certain of the mechanism for operating the end folders;

Fig. 35 is a side elevation answering to Fig. 1, partly in section, showing part of the mechanism for feeding the strip of wrapping material;

Fig. 36 is a fragmentary front end elevation of the machine, partly in vertical section, showing a portion of the feed mechanism shown in Fig. 35, on a larger scale;

Figs. 37, 38, 39, 40 and 41 are fragmentary views, being sectional vertical mid-sections corresponding to Fig. 10 and showing the successive operations performed on the package in the first wrapping position;

Fig. 42 is a perspective view showing the wrapped package, its end label being shown in dotted lines;

Fig. 43 is a detail of the plates for holding the end flaps folded.

While the machine thus illustrated may be useful for wrapping articles or packages of various shapes and characters, yet it is particularly designed and adapted for performing the difficult work of the uniform wrapping of more or less yielding packages of granular material which vary slightly in their dimensions. The variations in size of such packages, which, coming from a weighing and packing machine, have uniform weight, are due to differences in specific gravity or other causes, whereby packages of like weight vary from time to time in their cubical contents. Such variations are quite noticeable when the packed material is coffee, and in packages of one pound weight, which are made of closely uniform width and length, so that the variations which occur in the thickness of the package (i. e., its height when laid in its normal position) amount to as much as three-eighths of an inch. The problem presented, therefore, is to handle these packages of varying thickness in such manner as to apply the wrapper with equal snugness and in equally neat manner, notwithstanding such variations in size of the package.

The general nature of the machine here illustrated may be best understood by a description of the operations which it performs, without regard to the specific mechanisms which will be described in detail hereinafter.

The packages of coffee to be wrapped are fed into the machine, as by a suitable conveyor belt. The wrapper (waxed or glassine paper) is drawn from a roll and advanced intermittently onto a table or support, a sufficient length for one wrapper being cut off, and this wrapper being held momentarily on such table. While so held, a package of coffee is fed to a position over this table, onto a yielding support, such as spring wings, where it rests temporarily. While in this position a folder or circular (or a card or other thing to be inserted between the package and wrapper) is fed from a magazine or stack and delivered onto the top of the package, to be subsequently wrapped in between the package and wrapper. The package is then forced downward by a plunger descending from above, which pushes it down between the wings or trap doors and into a pocket located just beneath the table; during this movement the wrapper is folded around three sides of the package, leaving it with two flaps upstanding. The upstanding flaps are then folded down over the top of the package by folders or slides which advance from opposite sides (front

and rear), folding down first one and then the other of the flaps, so that they lie down over the top of the package, thus forming the paper wrapper into an open-ended tube the lapped sides of which are unconnected. The overlapping flaps of the wrapper are then folded together to form a lock fold or so-called "druggist's fold," which is done by two pairs of fingers (called "twisters") which move from beyond the ends of the package toward the center, embracing the two flaps of paper between them, and which then turn together for a half revolution or more to make the lock fold. In making this fold the paper is drawn snugly around the package, the fingers descending as they take up the slack in the wrapper. The lock fold is completed by a folder on the front side advancing to flatten the lock fold and hold it from unfolding; as this folder advances, engaging first the middle of the lock fold, the respective pairs of fingers recede, the top folder simultaneously moving forward and flattening the fold as the fingers release it. The pocket then moves forward to a succeeding station, where the next operations are performed; during this movement the top folder and a continuing stationary plate hold the lock fold against unfolding. At the next station plungers enter the projecting ends of the wrapper from opposite sides and push the package into an exactly central position if it has become displaced therefrom. On these plungers receding, the pocket again moves forward to the next station. At this station the ends of the wrapper are folded by a succession of folders, comprising first lateral folders which move in from opposite sides; second, a folder which moves down from above; and, finally, a folder which moves upward from beneath; these folders are duplicated at opposite ends, so that both ends are folded in simultaneously. As the last fold is completed, hot irons advance against the opposite ends and hold the folds from unfolding while the folders recede, and then advance and press against the ends of the package, with the result of softening the wax or other preparation in the paper, and rendering the folded end flaps limp, or setting them in their folded condition, so that they will not spring open. The pocket is then advanced to the next station, fixed guides engaging the end flaps and holding them from unfolding during this movement. Labels or seals are then applied to the opposite ends of the package to seal down the end flaps. This is best accomplished by first causing pads to which a thin coating of paste or glue has been applied, to press against the ends of the package; as these recede, plungers advance and press gummed labels or seals against the end flaps, so that each label adheres to the end flaps and holds them closed together, Each label-affixing device comprises a label-holding cartridge or magazine which is carried by a plunger and contains a stack of labels pressed forward by an internal spring, the end label being pulled out at each movement by its adhesion to the end of the package. The next advance movement of the pocket carries the ends of the package between plates which extend along the path of travel and guide the ends of the packages, and at each stopping point or station the ends come against air jet roses or pads which subject the end flaps to pressure for a sufficient time to insure the adhesion of the labels. This end pressure may be given by compressed air jets, or by movable pads which press against the ends, and press the labels against the end flaps. This end pressure is repeated during several successive advance movements of the pocket, to afford sufficient time to securely seal the wrappers to the ends of the package. Finally, the pocket carrying the wrapped package comes opposite an ejecting plunger which slides the package endwise out of the pocket onto a conveyor belt which carries it away.

The machine the operations of which are thus briefly described, includes a succession of intermittently-moving pockets for holding the successive packages and advancing them to the successive stages at which the operations are performed. These pockets are connected together and advanced by an endless carrier of suitable character, such, for example, as an endless chain. The machine comprises mechanisms for giving the described movements to the operating devices in properly timed relation.

The machine will now be described with reference first to its operative elements or those which directly act upon the package and wrapper; and later the mechanisms for imparting the requisite movements to these operative elements will be described.

The packages *a a* to be wrapped are brought to the machine in any suitable manner, as by a conveyor belt *b* (Fig. 2), and are successively pushed by a reciprocating pusher *c* along a supporting trough *d* until the end package arrives at the middle of the machine directly over a pair of wings or trap doors *e e* which serve as a temporary support for the package in the position shown in Fig. 1.

The waxed or other wrapping paper *f* is drawn from a roll *f'* (Fig. 1) and carried over guiding pulleys *g g'* between feed rollers *h h'* which revolve intermittently to advance the paper, and the advancing paper is slid over a table A on which, after each feeding operation, the paper rests, the proper length being cut off by shears B. To prevent displacement of the severed sheet constituting the wrapper, it is held at suitable points, preferably near its four cor-

ners, by yielding pressers *i i'*. These pressers are dropped on the paper at the end of each feeding movement and rest lightly upon it, holding it until it is pulled away from them by the first wrapping movement to be described, and are then lifted before the next feed.

A series of pockets or receptacles C C are connected by an endless chain D or other suitable intermittently-moving carrier, and are guided by guides E. Each pocket has a movable false bottom C'. In the initial position a pocket stands directly beneath the package *a* in Fig. 1, with its false bottom elevated.

The table A has at its middle a gap or opening (Fig. 10) directly beneath the package, through which the package may be moved down into the pocket. In the preferred construction shown, the primary and secondary platforms constituting the table on opposite sides of said gap are formed of plates $A^1$ and $A^2$ respectively, which have also the function of flap folders, as will be described later. During the feeding of the paper these plates $A^1$ $A^2$ are stationary, the plate $A^2$ being dropped to a slightly lower level than the plate $A^1$. During the feeding of the paper the gap between them is bridged by a slide *j* which forms a temporary support or bridge for the paper while it is being fed forward, and the advancing edge of which carries the paper to a level slightly above the top of the plate $A^1$, so that the feed of the advancing edge of the paper over this after-section of the table is insured. The bridge slide *j* begins to draw back just after the edge of the paper has crossed the gap, and completes its return movement while the paper is still advancing, having moved back out of the way just before the package is pushed down through the gap in the table.

If it is desired to introduce a sheet, folder, circular, card or other object between the package and its wrapper, this is best done while the package is resting on the trap doors *e* in the position shown in Fig. 1. The manner of inserting this sheet will be described later, it being sufficient now to state that the bottom folded sheet *l* is pushed out by a reciprocating slide *k* and carried over the package *a*, as shown in Figs. 5 and 6, the receding movement of the slide *k* leaving the circular *l* lying on top of the package and beneath the plunger *m*.

The parts being in the positions shown in Fig. 1, the plunger *m* descends against the top of the package and forces it down, causing the trap doors *e e* to swing downwardly and admit the package to pass between them. These trap doors are normally upheld by springs *e'* with sufficient strength to carry the weight of the package until the latter is forced downward by the plunger. The movement of the plunger pushes the package down through the gap in the table, carrying the wrapper with it (the ends of the wrapper pulling out from under the pressers *i i'* during this movement) onto the false bottom C' of the pocket, and by a continued movement downward fully into the pocket, whereby the wrapper is carried around the bottom and the front and rear sides of the package and left with its flaps projecting upward. These operations are shown in Figs. 37 and 38, the former showing the package being pushed down between the trap doors, and the latter showing the package fully seated in the pocket, with the flaps *f' f''* of the wrapper projecting upward, and the plunger *m* ascending to get out of the way of the next operations. The false bottom C' is sustained frictionally and moves down a distance depending upon the precise thickness of the package, so that, the stroke of the plunger *m* being uniform, the upper side of each package is always left at a uniform height, so that it is properly presented for the action of the folders which will form the lock seam fold, to be described. Any construction whereby the false bottoms C' are subjected to a suitable frictional resistance to their descent, will accomplish this important purpose.

Instantly upon the package having been thus deposited in the pocket, two pairs of fingers *n n* begin to enter the gap in the table from opposite sides of the machine, completing their advancing movements while the plunger *m* is ascending. The function of these fingers is to afford a support above the package on which to fold down the flaps *f' f''*, as will be described.

The package should have been deposited in exactly central position in the pocket; but as the packages may vary in length, it may happen that it is slightly displaced with respect to the pocket. To correct this the package, while thus lying idly in the pocket, is, if need be, centered by means of a pair of plungers *o o* (Fig. 5), which approach from opposite sides to the positions in which the respective ends of the package should be if properly centered. These slides then stop and afford supports for the ends of the package, and remain in this position, holding the package between them until the completion of the flap folding and lock seam folding operations to be described, whereby to prevent any displacement of the package during these operations and during the retracting movements of the lock seam folders. Finally these plungers are caused to quickly recede in time to move clear of the protruding ends of the wrapper before the next advancing movement of the pocket.

The next operation is the folding down of the upstanding flaps. The fingers *n n* having already moved into the gap over the

package, as already described, the first flap $f'$ is folded down onto the fingers $n$ by a forward movement of the platform or table section A' which constitutes a folding plate or folder and which advances horizontally and lays down the flap $f'$ flat upon the fingers $n$. Meanwhile the second table section $A^2$ has been rising to a level just above the top of the supporting fingers $n$. As the folder plate A' comes to rest, the folder plate $A^2$ begins to advance, and continues to advance, thus folding down the flap $f''$ and stopping with the two folders in the positions shown in Fig. 39, the respective flaps $f'$ $f''$ lying one on top of the other. These flaps being thus laid down against the fingers $n$ $n$, the wrapper encloses a space somewhat larger than the package. At this stage the wrapper forms an open-ended tube, the superposed flaps on top being merely held in place temporarily between the fingers $n$ beneath, and the folder plates A' $A^2$ above: these elements dwell in this position during the advance of the lock folders next to be described.

Thereupon the lock seam folders F F advance from opposite sides of the machine. These folders consist each of a pair of fingers $p$ $p'$ carried by an oscillatory spindle $r$, which is mounted on a slide G which moves it longitudinally of the package. The special construction of these parts will be described later. As the folders F F advance from beyond the ends of the wrapper, they are slightly separated and receive the superposed flaps $f'$ $f''$ between them. When fully advanced, so that they approach each other to about the extent shown in Fig. 9, the fingers close together so as to grasp or lightly grip the two flaps. This is best accomplished by giving the fingers a relative rotary movement of a few degrees, so that their edges come together on one side, as shown in Fig. 15, but may be otherwise done. When the folders have thus gripped the flaps the finger supports $n$ recede, and at the same time the folder plates A' and $A^2$ are retracted, leaving the superposed flaps held only by the grip of the lock seam folders. These folders F F then execute simultaneously a rotary movement (of at least a half turn and preferably as much as a three-fourths turn) in the direction of the arrow in Fig. 41, by which they roll together the two flaps $f'$ $f''$ to form the lock fold on the top of the wrapper. In this rolling operation, since the flaps are gripped between the two fingers, the first effect is to pull up any slack in the wrapper and contract it snugly around the package. At the beginning of this movement the folders stand somewhat above the package, as best shown in Fig. 40; and simultaneously with the rotation of the folders (or it might occur previously), they are caused to move down bodily, so that at the end of the rotary movement they lie close against the top of the package, as shown in Fig. 10, so that the slack taken up by the rolling of the fold is largely compensated by the approach of the folders to the package. According to the precise size of the package, it will ordinarily occur during this rolling movement that the flaps, upon the wrapper being tightened around the package, will yield by pulling through to a greater or less extent between the gripping surfaces of the fingers of the folders. The pressure with which the flaps are gripped is just sufficient to serve to draw the wrapper snugly around the package, but not sufficient to prevent the pulling through of the flaps after the wrapper has been drawn taut. By this means the same mechanism is adapted, without any necessity for adjustment, for wrapping packages of varying size, that is to say, which vary in peripheral measurement; with a package of maximum size the wrapper is drawn taut about the package sooner, and the slipping through of the wrapper flaps continues longer, than with a package of smaller dimension. Upon the completion of this rolling movement the folders begin to recede, drawing out endwise while still holding the flaps gripped frictionally between their fingers.

At the beginning of this receding movement a folding blade or slide $q$ (called a "seam ironer") advances over the rolled portion of the wrapper and presses it down flat to complete the lock fold, and remains overlying it to hold this fold against loosening. This slide, which flattens or irons the fold, co-operates with the folders F F by being shaped to engage first the middle of the roll between the ends of the folders, and to continually engage a greater length of the roll as it advances and as the folders recede. To accomplish this it is made of somewhat V-shape, its middle portion projecting in advance of its side portions, as best shown in Fig. 27, the sloping sides being of such angle as to ride over the roll or fold at the same speed as the folders recede, so that it flattens first the middle portion of the roll and extends the flattening effect progressively toward both ends, completing it by the time the folders have moved slightly beyond the ends of the enclosed package. The folders F continue to recede until they have passed entirely beyond the ends of the wrapper, whereupon, before their next advance, they are separated and are rotated backward to their starting point, and simultaneously are lifted to their original elevation, ready for their next operation. As soon as the folders F have released their hold upon the flaps, the plungers $o$ $o$ are quickly retracted to carry them beyond the ends of the wrapper out

of the way of its advance movement upon the ensuing feed of the pocket.

The operations at the initial station of the pocket C having thus been completed, the pocket then advances, by the turning of the chain D, to the next station. During this movement the lock fold is held flat and prevented from unfolding by means of the seam ironer $q$ which moves in the advancing direction together with the package, until it has moved just beyond the gap in the table to a position just beneath the folder plate $A^2$, which by this time has descended to its original lower position. The movement of the pocket carries the package beyond the seam ironer $q$ to the position $a^2$ in Fig. 1; and in order to continue to hold down the lock fold, the seam ironer is provided with extensions or tails $q'$ at opposite sides which extend far enough in the advancing direction to overlie the package in position $a^2$ after the next ironing movement of the ironer $q$. Between these tails $q'$ is a gap which is entered by a stationary flap holder $u$ which extends far enough to hold the lock seam in the next position $a^3$ of the package. In the position $a^2$ two centering plungers $s$ $s$ enter the wrapper from opposite ends and bear against the ends of the package to again center it, and to flatten its ends if these have become convex or bulging. These plungers $s$ $s$ are best shown in Fig. 1; they are formed as slides, suitably guided, and are conveniently moved by arms $s'$ projecting from slides $t$ $t$ to be described. These plungers are retracted before the next advance movement of the package.

The pocket then advances to the next station, where the package occupies the position $a^3$ in Figs. 1 and 10. Here the package lies under the seam holding plate $u$ already described, which holds the lock fold. Immediately upon stopping in this position, a plunger H descends and presses down upon the top of the package, this plunger being recessed at its middle to receive the holder plate $u$. The function of this plunger is to hold the lock fold in place and keep the package in its proper shape during the operations of folding the ends of the wrapper. These ends are then folded by folders in the form of blades or plates which act against the respective ends of the package. First, at each end opposite folding blades I I advance from the sides and fold in the two side portions of the projecting wrapper; next, a top folder J descends and folds in the top flap; and finally, a folder blade K, (Fig. 25) shown in dotted lines in Fig. 1, ascends from beneath and folds up the bottom in the form of a triangular flap against the end of the package. Each of the folder blades recedes as soon as it has performed its work, and the next succeeding blade has advanced sufficiently to prevent the unfolding of the flaps already folded. As the bottom blade K recedes, a hot iron or heating plate L moves up near the end of the wrapped package and there dwells until the bottom blade is out of the way, whereupon it advances and presses against the folded end flaps of the wrapper. This plate is heated electrically or otherwise, so that when waxed paper is used, it partly melts the wax in the paper and causes the flaps to adhere; or, when glassine paper is used it irons down the flaps so that they cease to have any tendency to spring out and thereby undo the work of the end folders. The heaters L are conveniently mounted on slides $t$ $t$ which also carry the arms $s'$ of the centering plungers $s$ $s$. After the end flaps have been thus folded, the plunger H rises to free the package for the next feeding movement of the pocket.

The pocket then moves forward again, stopping with the package in the position $a^4$ in Fig. 1, in which position end labels $v$ are pasted against the folded end flaps of the wrapper. These labels are of such size that they overlie the top and bottom end flaps of the waxed paper wrapper and thereby seal these flaps and prevent the unfolding of the wrapper. They are applied simultaneously to opposite ends by mechanism best shown in Figs. 16–19. As the mechanisms are duplicated at opposite ends, those for one end alone need be described. First the end flaps of the wrapped package are moistened with a suitable adhesive (or it may be with water alone if the labels are already gummed) by means of a swinging pad M carried on an arm projecting from an oscillating shaft M', and which in its upper position, shown in Figs. 16 and 17, receives adhesive from a travelling roller N and then swings down to press against the end flaps and apply the adhesive thereto, as shown in Fig. 18. Immediately after the pad M swings up out of the way, a magazine P carrying the labels (which may be gummed or not) is moved forward, that is, toward and against the end of the wrapped package, being carried by a reciprocating slide Q. The magazine P is pressed yieldingly against the end of the package while the mass or stack of labels within it are pressed forward, so that the end label is caused to attach itself to the end flaps of the wrapper by reason of the adhesive (either that applied by the pad M or that with which the label was previously coated, or both); whereupon the magazine P is carried back away from the package far enough to be out of the way of the next movement of the pad M.

The magazine P is yieldingly mounted in a carrier Q' carried on the slide Q, the magazine backing through a cushion spring $w$ against a head $Q^2$ which is pressed for-

ward by springs R R (Fig. 19). As the magazine P strikes the end of the package it stops, while the parts Q and Q′ continue to advance, the springs R R taking up this extra movement and holding the magazine against the package. The labels are pressed forward by a follower P′ within the magazine, which is swivelled on the end of a screw $P^2$ which turns little by little in the head $Q^3$ to advance the follower enough to compensate for the shortening of the stack of labels as these are fed off.

The label is so firmly pressed against the end of the package that it adheres strongly thereto, and upon the withdrawal of the magazine on the back stroke of the slide, the edge of the label frees itself from the slightly inturned end of the magazine and remains attached to the package. The package is then advanced by the next movement of the pocket to the next stopping position, and at each succeeding movement of the endless chain carrying the series of pockets it is advanced, so that it moves step by step to the ejecting position indicated at $a^9$ in Fig. 1. Between the positions $a^4$ and $a^9$ the package is engaged on its upper or outer face by a plate $u'$, and its opposite ends are held between plates $x$ $x$. In the successive intermediate stopping positions or stations $a^5$—$a^8$, the end labels are successively pressed against the end flaps of the wrapper in order that if the label has separated from these flaps it may be reunited thereto. This repeated exertion of pressure against the labels may be variously accomplished; one suitable means is by jets of compressed air blown against the label in its successive stopping positions; another suitable means is by providing pads in these stopping positions which move toward and from the ends of the wrapped package, being suitably actuated by a reciprocating slide. In any case, it is desirable to avoid the difficulty which might arise by reason of the adhesive used for applying the labels becoming transferred to the means for repressing the labels, which might cause an adherence between such means and subsequent labels such as would tear the latter off, or displace them, or throw them out of register. To accomplish this it is highly desirable to make use of jets of compressed air either for immediately exerting the necessary pressure against the labels, or in conjunction with pressure pads for preventing any adherence of the labels to these pads during the retractile movement of the latter. At each stopping position a pad $y$ is provided, facing the label, which pad is hollow to receive air, and is perforated on its face toward the label in order to discharge jets of compressed air against the label. The pads may be stationary and arranged just sufficiently out of contact with the ends of the wrapped packages to permit of free movement as the pockets advance; in which case the jets of air alone act upon the label; or the pads (being of the same construction) may be mounted on a movable frame T, whereby as the packages come to rest after each feeding movement of the chain, the pads simultaneously advance and press against the yielding ends of the packages, dwelling there a moment during preferably the entire resting period of the pockets, and then receding in time to clear the pockets for the next successive feed. By this construction the air jets are cut off, or substantially so, during the time that the pad remains pressed against the ends of the package, their function being chiefly to insure the separation of the label from the pad at the beginning of the receding movement of the latter, whereby to insure against any adherence of the label to the pad which might drag it out of place. Compressed air from any suitable source is supplied by means of a pipe or hose T′ to the frame T, which is made tubular to conduct the air to the respective pads.

When each package reaches the ejecting position $a^9$, it is pushed out by means of an ejecting plunger V, shown best in Fig. 3, the successive packages being pushed along a trough U in which the packages are in contact end to end, and whereby the pressure against their ends is continued during the time that they are being fed through this trough to a point suitably removed from the machine, whence they may be taken by hand or by any suitable carrier.

The general nature of the operating devices and the operations which they severally perform, being now understood, the specific mechanisms and the driving means therefor will now be described.

*Frame and shafting.*—In its most convenient construction the machine comprises a suitable framework 20 which provides the necessary bearings and supports for the operative parts. In the construction shown, these parts are driven from belt pulleys 21, one of which may be fast, and the other loose, on a transverse shaft 22 at one end of the machine, this shaft being shown as having a hand wheel 23 for turning it slowly by hand when desired. This shaft carries two worms 24 which drive worm gears 25, 25′ on upright shafts 26, 26′ at the entering end of the machine. The shaft 26 drives through miter gears 27 a longitudinal shaft 28 on the right-hand side of the machine near the top. The shaft 26 also drives through miters 29 a transverse shaft 30 which in turn, through miters 31, drives a horizontal longitudinal shaft 32 extending through the middle of the machine near the bottom. The other vertical shaft 26′ drives through miters 33 a horizontal longitudinal

shaft 34 on the left-hand side of the machine near the top. These shafts 28, 30, 32 and 34, are cam shafts which revolve synchronously; in the precise construction shown, they turn at 1/30th the speed of the driving shaft 22.

*Chain feed.*—The means for supporting and driving the chain D which carries the pockets C will now be described. This chain is carried on sprocket wheels 35, 35′ (Fig. 1), the former being the drive wheel and the latter the idler. The particular means for intermittently advancing the chain is immaterial, it being only essential that it be advanced at required intervals a distance from one pocket C to the next, and held at rest between the successive advance movements while the various operations are being performed on the packages in the pockets. In the construction shown, the feeding movements are communicated by a cam 36 on the shaft 30, this cam having a cam groove engaging a roller 37 on a lever 38 pivoted at 39 and connected at its free end to a link 40 which extends through to the delivery end of the machine and engages a swinging arm 41 (Fig. 22) turning freely around a shaft 42 on which the sprocket 35 is keyed, and the arm 41 having a radial slideway in which works a slide 43′ carrying a bolt 43 which is adapted to engage any one of five (more or less) notches 44 in the periphery of a feed disk 45 keyed on the shaft 42. The bolt 43 is caused to enter one of the notches 44 at the end of the dwell of the chain, whereupon the arm 41 is swung by a pull of the rod 40 a distance equal to 1/5th turn of the disk 45, at the end of which movement the bolt 43 is slid out of the notch, and at the same instant a stationary locking bolt 46 is slid into engagement with another notch so as to lock the disk 45 stationary during the period of dwell. The radial movements of the bolts 43 and 46 are imparted by means of a cam 47 fixed on the shaft 32, this cam having a groove engaging a roller carried by a lever 48 hung on a stationary fulcrum shaft 49, its opposite arm connecting through an adjustable link 50 with a lever 51 the opposite arm 52 of which connects at its end through a link 53 with a slide 54 which carries the locking bolt 46; the link 53 being pivoted to this bolt at a point 55 by a pin which also engages a link 56 the opposite end of which is pivoted to the radially-moving slide 43′ carrying the feed bolt 43. The pivotal center 55 is concentric with the axis of the shaft 42 during the feed movement of the chain, that is, while the bolt 43 is engaged in the notch and the lock bolt 46 is disengaged; during the idle return movement after the cam 47 has reversed these bolts, the joint 55 is eccentric. This intermittent feed mechanism is not in itself new, having been used on packaging machines for many years.

*Pockets.*—The pockets C C are of peculiar contruction, best shown in Figs. 20 and 21. Each pocket consists of parallel sides and a bottom, with the movable false bottom C′, the latter preferably curved (or it may be otherwise conformed according to the particular shape of the package or other article to be wrapped). The pocket has a base portion $C^2$ which extends down on opposite sides, that is, beneath opposite ends of the pocket, and travels between stationary guide rails E E which are engaged by rollers 57 above, and 58 beneath, whereby the pocket is caused to travel on the guide rails with minimum friction. The false bottom C′ is carried by two rods 60 which slide through sockets 61 in the base portion $C^2$. These rods move against frictional resistance sufficient to uphold the weight of the package when resting on the elevated false bottom, and require that the package be forced into the pocket by pressure from the plunger *m*, so that in this movement the false bottom will stop at a height depending upon the thickness of the package, in order that packages of varying thicknesses shall all be presented with their upper sides at a uniform level. This frictional resistance is best given by means of pads 62 (Figs. 20 and 21) pressed against the rods by springs 63, the stress of each of which is adjustable by means of a screw 64 which may be locked fast by a lock nut, With a package of maximum thickness the false bottom is forced to the bottom of the pocket, as shown in Fig. 21, but with packages of lesser thickness it will be left slightly above the bottom, until in the position $a^3$ it is finally pressed down by the action of the plunger H, to be described. The false bottom then remains seated on the bottom of the pocket during the remainder of the travel of the wrapped package; at any time after the ejection of such package, and before again reaching the position $a^1$, the false bottom requires to be moved toward the open mouth of the pocket, so that when that position is reached it will stand at the top, as shown in Fig. 1. This displacement of the false bottom is accomplished by a stationary cam which acts against the rods 60 or against screws or rollers 65 carried at their lower ends. This stationary cam may be a bar 66 suitably supported in the position shown in Fig. 1; or it may preferably be a longer cam bar 67, as shown in Fig. 4, in which case the displacement is accomplished by the inclined lower edge 68 of this bar acting upon the rods while the pockets are inverted. Fig. 4 also shows a supplemental bar 69 having a concentric curved portion 70 the function of which is, by engaging the terminal screws or rollers 65, to

prevent the premature displacement of the false bottoms in the inverted ejecting position shown at $a^9$ in Fig. 4, as such premature displacement might cause the false bottom to interfere with the movement of the ejecting plunger. The bar 69 may be prolonged at the top, as shown at 69', but this is not essential. As shown in Fig. 4, the rollers 57, 58, by engaging the outer and inner faces of the guide rails or tracks E, E, keep the pockets in the upright position during their horizontal movements, and in radial position while the chain is moving around the respective sprocket wheels. The connection of the pockets with the chain D may be effected by a bracket piece 71 (Fig. 17), the middle portion of which engages the middle of the pocket base $C^2$, and the lateral portions engage one of the pivots of the drive chain.

Located beneath the pocket in the position $a^1$ (Fig. 10) are two buffers $s$, shown in Figs. 4 and 11, being located directly beneath the sliding rods 60 of the pocket, so as to be struck by these rods toward the end of the downward movement of the false bottom while the package is being forced down into the pocket. These buffers are pads with cushion tops mounted on upright rods and pressed upward by springs $s'$, so that they constitute spring plungers. Their function is to ease the shock incident to the forcing of the false bottom down and prevent its striking hard upon the bottom of the pocket.

*Package feed.*—As before stated, the packages or articles to be wrapped are fed to the machine by means of a conveyor $b$ which may be any sort of intermittently-moving conveyor belt. As such conveyors are common in analogous machinery, this feature requires no description. The belt is desirably provided with pusher plates $b'$ so spaced that at each stop in the movement one package shall be in line with the plunger or pusher $c$ (Figs. 2 and 3). This pusher $c$, which slides the packages endwise from the conveyor along the chute $d$, is mounted on a slide 73 moving in a transverse slideway 74; this slide is reciprocated from a cam 75 on the cam shaft 34 through any suitable intervening mechanism, which in the construction shown comprises a lever 76 (shown in dotted lines in Fig. 3) carrying a roller which works in the cam groove, transmitting movement through a link 77 to a lever arm 78 turning on a vertical stud 79, the opposite arm 80 connected by a link 81 to the slide 73.

*Paper feed.*—The endless web $f$ of wrapping paper is advanced intermittently by feed rollers $h$ $h'$ (Fig. 10), one of which, $h$, is driven by any suitable means properly synchronized with the other mechanisms, as by a cam and ratchet and intervening connections. In the machine constructed as shown, this feeding mechanism is of the same construction shown in our Patent No. 1,133,857, dated March 30, 1915, for intermittently feeding a strip of waxed or similar paper from a roll. Because this mechanism is there fully set forth and forms no part of the present invention, no detailed illustration or description is here necessary. We will only briefly describe how the rollers $h$ $h'$ are revolved intermittently, so that they turn during each feeding movement far enough to carry forward a length of paper sufficient for one wrapper, and then stop and hold the paper stationary during the time necessary for the shearing off and first wrapping operations. The driving movement is taken from a horizontal shaft 83 driven by miter gears 82 (Figs. 35 and 36) from the upright shaft 26. On shaft 83 is keyed a drive cam 84 which intermittently drives, through a cam and pin arrangement, a gear wheel 85 turning loose on a fixed collar concentric with shaft 83, which gear, through idler pinion 86 and pinion 87, drives shaft 88 on which is keyed a sprocket wheel 99 (Fig. 1) which through chain 90 carries over idler rollers 91, 92 (dotted lines in Fig. 1), drives sprocket 93 on the shaft of feed roller $h$. Gear 85 carries drive pins 94 pressed back by springs and pushed out by stationary arc cam 95 for a part of each turn (say 90°), so as to stand in the way of a drive pin 96 carried by the drive cam 84, so that at each revolution of 84 it drives 85 a part of a revolution (say one-quarter turn), so that the feed rollers are advanced during, say, one quarter of each rotation of the timed cam shafts, and remain at rest the remaining time. To assist in starting the roll F' at the beginning of each feed, and to stop it promptly at the end of each feed, the cam, ratchet and brake mechanism shown in Fig. 35 is provided, which requires no description, being a substantial duplication of that shown in Fig. 3 of said Patent No. 1,133,857.

*Paper shearing.*—The shears B (Fig. 31) for cutting off the wrapper after feeding have, as usual, a fixed under blade 118 and a movable upper blade 119, the latter being hung on a pivot 120, and its free end connected by an upright link 121 to a lever arm 122 the opposite arm 123 of which has a roller working in the slot of a cam 124 fixed on the shaft 28.

The two pressers $i$ $i'$ which hold the rear corners of the wrapper are carried by the movable shear blade 119, whereby they are given rising and falling movements coincident with the movements of this blade. As the blade descends to shear the paper, these pressers are dropped into engagement with the paper to hold it for an instant until it is drawn from under them in the plunging of the package through the gap in the table, as already described. Immediately after-

ward, and before the feeding of the paper, the shear blade 119 lifts to give the paper a clear way, and by this movement lifts the pressers above the path of the paper, where they also are out of its way. The pressers are best constructed as shown in Fig. 10, the shear arm carrying a bracket 125 on which is a guiding sleeve 126 in which freely slides a rod 127 having on its bottom a pad 128 to engage the paper, and on its top a head 129 to limit its downward movement when lifted. The rod may operate by gravity, but is preferably provided with a light spring 130.

*Feeding folders.*—When it is desired to introduce a folded circular, card or other matter between the package and its wrapper, this is done by the mechanism shown in Figs. 5, 6 and 7. The reciprocating slide *k* is operated by a cam 100 on the shaft 28 through a lever arm 101 pivoted at 102, communicating movement through its free end by a link 103 to the short arm 104 fixed on a tubular shaft 105 from which an arm 106 extends downwardly and connects by a link 107 with the slide *k*. The slide *k* in its retracted position stands as in Fig. 6, the folders *l* being upheld by resting on its projecting portion at one side, and on a ledge 108 on the other side, this ledge being a bar mounted at its opposite ends on springs 109 beneath the magazine, so that it may yield downwardly as the advancing movement of the slide pushes the folder *l* out. When the folder is fully delivered, as shown in Fig. 5, suitable pawls 110 drop behind it, so that the backward movement of the slide *k* cannot draw back the folder with it. During the feeding movement the pawls are lifted by the folder as it passes under them. If it is not desired to introduce folders into the wrapper packages, it is sufficient to leave the magazine empty, the described parts then performing their movements idly.

*Side folding means.*—As already described, the wrapper is carried around three sides of the package or article by the act of plunging the latter through the gap or opening in the table A. The plunger *m* which forces down the package is mounted on an upright slide 131 (Fig. 5), and driven from a cam 132 (Fig. 1) fixed on the shaft 34, the driving means shown being through a lever 133 fulcrumed on a stud at the left side of the machine having a roller running in the cam groove and connected at its free end by a link 134 with a lever arm 135 on a shaft 136 carrying another lever arm 137 which has a pin 137′ connected by a link 138 with the slide 131.

The paper-holding pressers *i′ i″* for the front end of the wrapper are conveniently carried by some part connected with the plunger *m*, the vertical movements of which are so timed as to make these pressers function correctly; that is, they are dropped on the plate or platform $A^2$ forming the second section of the table, shortly in advance of the entry of the descending package into the gap of the table, and they rest on the wrapper, holding it lightly during the descending movement and while the front portion of the wrapper is being pulled from beneath them as the package descends through the gap. The paper holders *i″ i″* are carried on bracket arms 101, connected by rods 102 to brackets 103 projecting from the slide 131 which carries the plunger *m*, in the manner shown in Fig. 10, where the pressers are shown lifted. As the plunger descends, the bracket 103 lowers the rod 102 until its head 104 strikes the top of a fixed tube 105, thus lowering *i″* onto the table, and compressing its light spring 106. Rod 102 is pulled down by spring 107. The construction of the paper holders *i″* is essentially the same as that of the other holders *i* carried by the shear blade B.

The folder $A^1$ forming the first section of the table A has a movement longitudinally of the machine without any vertical movement. The folder $A^1$ is a plate mounted by means of a bracket 139 above a horizontal slide 140 which is driven (Fig. 27) from a cam 141 fixed on the upright shaft 26′; the groove of this cam is engaged by a roller carried by a lever 142 fulcrumed at 143, and its free end connected by a link 144 to an arm 145 bolted to the slide 140.

The bridge plate or slide *j* which carries the advancing paper over the gap in the table between the folder plates $A^1$ and $A^2$, is given a horizontal longitudinal movement, being mounted on a slide 150 (Figs. 27 and 28) which is actuated by a cam 151 on the shaft 28. The cam groove is engaged by a roller carried by a lever arm 152 turning on a stud 153 and its free end pivoted to a link 155 which communicates motion through an elbow lever 154 and link 155 to the slide 150, which moves in a bracket 156 fixed to the framework of the machine. The plate *j* is carried by a bracket piece 157 which extends down and is fastened against the slide 150.

The second folding plate $A^2$ forming part of the table A has both up and down and horizontal movements. It first moves down to receive the paper over it; and then moves up to bring it above the supporting fingers *n;* then moves rearwardly to fold down the second flap *f″*, and finally moves forwardly to its original position. To give it these movements the plate $A^2$ is mounted as shown in Fig. 10, on a vertical slide 160 which moves in a upright slideway 161 which in turn is carried on a horizontal slide 162 moving in a fixed slideway 162′. The horizontal movements are communicated to the slide 162 from a cam 163 (Figs. 27 and 29) on the shaft 34 through the medium of a lever 164 having a roller engaging the cam groove, this lever being hung at 165 and its free end

engaging a link 166 which through an elbow lever 167 communicates movement to a slotted block 168 engaging a pin 169 projecting from the slide 162 through a slot in the bracket slide-way 162'. To communicate the vertical movements to the plate $A^2$, the slide 160 (Fig. 10) is carried beneath the slide 161 and has a roller 170 which is engaged by the cam portion 171 formed on the upper side of a horizontal slide 172 which is guided in ways in the fixed bracket 162'. This slide is driven from a cam 173 fixed on the shaft 33, the driving being effected through a lever 174 (Figs. 1 and 27) hung on a stud beneath, having a roller engaging the cam slot and connected at its free upper end by means of a link 175 to the slide 172. In operation, the folder plate being down to receive the paper, the slide 172 moves to the rear, so that the cam 117 will lift the roller and thereby elevate the plate; then the slide 162 moves in the direction contrary to the feed to cause the folder to lay down the second flap $f''$, and in so doing the roller 170 runs along the level top of the slide 172; after the return movement of the slide 162 to retract the folder plate, the slide 172 moves back and permits the roller 170 to run down the incline 171, thereby lowering the plate to its lowermost position ready for a new feed of paper.

The fingers $n$ which enter the gap in the table from opposite sides prior to the movements of the folders $A^1$ $A^2$, are carried on transverse slides 180, 180', (Figs. 5, 9 and $9^a$), moving in ways 181, 181', and actuated from a single cam 182 on the lower cam shaft 32. The transmission shown (Fig. 30) is through two levers 183, 183', one of which carries the cam roller and engages the other, these levers being fulcrumed at 184, 184', and their opposite arms communicating movement through links 185, 185', to elbow levers 186, 186', which connect by links with the respective slides 180, 180', as shown in Figs. 30 and $9^a$.

By reason of the described function of the frictionally-held false bottoms C', the successive packages are delivered into the pockets always with their upper sides of uniform height, notwithstanding variations in the thicknesses of the packages, so that their tops are always presented in uniform relation to the fingers $n$, and to the action of the lock seam folders or "twisters" F F to be next described. This is a function of great importance in the practical solution of the difficult problem of uniformly wrapping packages which, although they may have uniform weight, will vary somewhat in capacity.

*Lock folding.*—The peculiar movements which are imparted to the lock seam folders or twisters F F which form the lock fold on the top of the package, will now be described.

As the folders for opposite ends are alike, it will suffice to describe one folder F. Referring to Figs. 5 and 11–15, the gripping fingers $p$ $p'$ are sections of tubing each being somewhat less than half the circumference, as shown in the cross-section, Fig. 14, so as to leave a gap between them for receiving the flaps of the wrapper. The finger $p$ is fastened by screws 201 to a pinion 200, while the finger $p'$ is fastened by pins or rivets 202 to a contracted neck 203 on the inner spindle $r$ which is housed within a recess in the elongated pinion 200. The spindle $r$ is made in two sections, having a sliding but non-rotative engagement, the other section $r'$ emerging, as shown in Fig. 5, beyond the outer end of the pinion in the form of a neck 204 on which is fitted a swivel head 205 which has pins engaged by notches in a slide 206. The connection between the two spindle sections $r$ $r'$ is shown as formed by a flat portion 207 on the one entering a transverse longitudinal recess 208 in the other, the two sections being pressed apart by an enclosed spring 209. The elongated pinion 200 is reduced at opposite ends to form necks or journals 210, 211, which turn in bearings formed on the slide G. The outer neck 211 is prolonged beyond the bearings, as shown in Fig. 5, and is formed with an oblique slot 212 which is engaged by a pin 213 projecting from the spindle section $r'$. It results that when the slide 206 gives an endwise movement to this spindle section, the pin engaging the oblique slot communicates a rotative movement of a few degrees to the pinion to which the finger $p$ is fastened, relatively to the spindle which carries the finger $p'$ (the actual movement being that of the spindle and finger $p'$, since the finger $p$, is held from turning by the engagement of the pinion 200 with its rack, as will be described). This movement is sufficient to turn the fingers from the position shown in Fig. 14 to that shown in Fig. 15, whereby on one side their edges are brought together to grip the paper between them. This gripping movement is accomplished by the lateral motion of the slide 206, the two slides on opposite sides of the machine being actuated by a single cam 207 on the bottom shaft 32. The transmission from this cam to the respective slides is accomplished by precisely the same arrangement of levers and links as that already described from cam 182 to slides 180, 180' (Fig. 30), so that no special description of this particular transmission is necessary.

The sliding movement by which the folding fingers are caused to enter into engagement with the flaps, and to withdraw after the folding operation, is accomplished by moving the slide G. The two slides G on opposite sides of the machine are actuated

by a single cam 210 on the shaft 32, the transmission being the same as from cams 182 and 207, the several elements being shown in Fig. 11, and comprising levers 211, links 212, elbow levers 213 and links 214, connecting to the outer end portions of the slides G.

The rotary movements of the folders F are imparted by horizontally-moving racks 220 which are formed as slides and move in stationary slideways 221, being conveniently constructed as the same fixed slideways in which the slides G are guided. Each rack 220 is driven from its own cam 222, these cams being mounted on the cam shafts 34 and 28. The transmission is through any suitable mechanism, for example, that shown in Figs. 9 and 11, the cam roller for each cam being carried on an arm 223 of an elbow lever turning on a shaft 224, its opposite arm 225 connecting by a link 226 to an arm 227 (Fig. 9) of an elbow which moves in a horizontal plane, the opposite arm 228 of which connects by a link 229 to the sliding rack 220; this mechanism being duplicated on the opposite side.

To give the folders F F their up and down movements, the slideway 221 which carries the slides G and 220 is made movable, being mounted on a slide 230 which has movement on a vertical slideway 231 carried by fixed brackets 232, 232'. Each slide 230 is driven by its own cam 233, the cams 233 being fixed on the upper cam shafts 28 and 34. The transmission shown is (Fig. 11) by a lever arm 234 carrying the cam roller turning on a shaft 235 and having an arm 236 which connects by a link 237 with the slide 230.

The folder plate or seam ironer $q$ which flattens the rolled flaps to complete the lock seam, is mounted on a slide 240 moving in a longitudinal slideway 241 and operated (Fig. 27) from a cam 242 on the shaft 28, the cam groove acting on a roller carried by a lever 243 the movement of which is transmitted to the slide 240 in any suitable way, the transmission shown being by means of a link 244, elbow lever 245 and link 246.

*Package centering.*—The plungers $o$ $o$ which preliminarily center the package in its position $a'$ are carried on slides 190, 190 which move transversely of the machine. Their movements might be imparted by cams, but as it is desirable to have them enter into engagement with the package at about the time that the lock folders advance, they are conveniently advanced by connection with the lock folder slides G; and as it is desirable to keep them in engagement with the package to prevent its possible displacement during the return movements of the lock folders, it is desirable to have them held in their advanced positions by some form of lock or catch so that they may execute a quick return movement under spring pressure at the end of the retracting movements of the folders F. This is conveniently accomplished by connecting to each slide 190 a retracting spring 191 (Fig. 5) and providing a sliding spring catch 192 mounted on the frame to engage a pin 193 on the slide 190 when the latter is advanced into engagement with the package, as shown in Fig. 5. The advance movement of the slide is accomplished by a drop portion 194 the face of which, 195, toward the middle of the machine, is adapted to act upon a pin 196 projecting from the slide 190, so that as the slide G advances, this face strikes this pin and advances the slide 190 until the pin 193, in moving forward, engages the inclined top of the catch 192 and, pressing this down, passes over it, and the catch, springing up, enters behind the pin and holds the slide 190 forward with the plunger $o$ in engagement with the package, as shown in dotted lines in Fig. 5. At the end of the return movement of the folders F, a cam 197 carried on the drop portion 194 engages a pin 192' on the catch 192 and presses it down sufficiently so that the pin 193 escapes from it, whereupon the slide 190 is quickly retracted by its spring 191. The cam 197 does not touch the pin 193, being in a plane nearer the beholder in Fig. 5, so as to clear the catch 192 and encounter only the pin 192'. Thus the centering plungers O O remain in their advanced positions, holding the package between them during the operations of folding down the upstanding flaps $f'$ $f''$, and during the operation of the lock folders F F, and during the withdrawal of these lock folders, and until the seam ironer $q$ has advanced and flattened and is holding the top seam. By holding the package centered until the lock folders F have receded out of contact with the wrapper, there is avoided any possibility of displacing the package in the pocket by reason of one lock folder gripping the wrapping paper more tightly than the other.

The centering plungers $s$ which act to again center the package in its next position $a^2$ and to flatten its ends if necessary, are carried, as already described, by arms $s'$ projecting from slides $t$ $t$. They are best made, as shown in Fig. 27, with a rod 112 to pass through a socket in the end of each arm $s'$ and be fastened thereto by a set screw 113.

*End folding.*—The end folding means operate upon the package in the position $a^3$. The plunger H is carried on an upright slide 250 moving in a slideway 251 (Fig. 10) and driven from a cam 252 (Figs. 1, 25 and 34) on the shaft 28, the transmission being through a lever 253 carrying the cam roller and connecting at its free end by a link 254 with a lever arm 255, the hub 256 of which turns on a shaft 295 and carries two shorter

arms 257 the free ends of which carry a connecting pin 259 engaging a link 258 (Fig. 10) which extends down to and is jointed to the slide 250. The plunger H is cushioned on a spring 260 so that it may exert yielding pressure against the package. If the package happens to be of less than maximum size, so that it did not push the false bottom C' fully down, this plunger forces it to the bottom of the pocket.

The end folders are best shown in Fig. 25. The first folder blades I I have both up and down and in and out motion. They are shown mounted on upright rods 265 sliding in guides 266 and having at their upper ends rollers 267 entering horizontal slots 268 in a crosshead 269, by which the up and down movements are imparted. These parts are duplicated at the opposite side to operate on the opposite end of the package. The two crossheads 269 are conveniently driven by the same cam 252 by connecting to the opposite ends of the connecting pin 259 two links 270 the lower ends of which are pivoted to the cross heads 269. Thus, as the plunger H descends upon the package, the folding blades I I descend from their upper position, shown in dotted lines in Fig. 25, to a lower position on opposite sides of the end of the package. These blades then move toward each other to fold in the ends of the wrapper. This movement is imparted by a cam 275 on the shaft 34 acting through a lever 276 (Fig. 34) one arm of which carries the cam roller, and the opposite arm is connected by a link 277 to lever arm 278 on a tubular hub 279 from which project downwardly two arms 280 the lower ends of which are coupled by links to horizontal slides 281 on opposite sides. These slides carry the upright guides 266 for the square sliding rods 265 of one pair of folders I (those at the left in Fig. 25). The opposite movement to the other (right-hand) pair of folders is imparted by forming each slide 281 with rack teeth engaging through a pinion 282 with rack teeth on another slide 283 which carries the upright guides 266 of the rods 265 of these other folders. Thus the folders move in opposite directions toward and from each other.

The second folder J at each end of the package has a simple vertical movement, being mounted on a slide 290 and driven by a cam 291 on shaft 28, the transmission being through lever 292, link 293 and lever arm 294, the tubular hub of which is pinned on the shaft 295, on which is pinned a similar hub 296, these two hubs carrying arms 297 which connect by links 298 with the slides 290.

The fourth slide K at each end, which rises from below, has also a simple vertical reciprocating movement imparted by a cam 300 (Fig. 25) on the shaft 32, the transmission being through a lever 301, link 302, lever 303 and link 304 to the slide 305 which carries the folder K; the lever 303 having its arm 303' duplicated on opposite sides to impart movement to the two slides for the two folders at opposite ends of the package.

*End heaters.*—As the last folder K begins to recede, the hot iron or heater L at each end advances, moving so close to the end of the package before the folder K passes so far down as to release the last fold that, if the latter should tend to turn outward when no longer held by the last folder, the proximity of the heater would prevent the end folds springing open. As soon as the receding folder K is out of the way (the folders I I J having previously been retracted), the heater L completes its movement and presses firmly against the end of the package so as to press all the folds flat, and remains against them for an appreciable time sufficient to heat the folds and give them a set in their flat or folded form. Thus, the ends of the package are embraced between the flat faces of the two opposite heaters L L. These heaters are both operated by a single cam 310 by mechanism shown in Fig. 33. The transmission to each heater is through one of two levers 311, link 312, elbow lever 313 and link 314, to the slide $t$ carrying the heater L. This heater may be heated in any suitable way, preferably by electric heating means of any of the numerous known constructions of electric heaters. Electric current is carried to the heaters through flexible wires or cables such as shown at 315 in Fig. 33. The effect of the heaters is to prevent the end flaps of the wrapper from turning out when released by the retractile movement of the heaters.

To give double assurance that the end flaps shall not spring outwardly, and particularly to hold them against such action after the package passes beyond the position $a^3$, stationary guide plates 316, shown separately in Fig. 43, are applied in the path of travel of the packages in positions to bear upon the ends of the latter, as shown in plan in Fig. 16. The entering ends 317 of these plates are curved, so as to make gradual engagement with the end flaps. The plates are formed with notches coinciding to constitute a substantially circular opening 318 (Fig. 43), which opening coincides with the position of the central portion of the end of the package when the latter is at its next stopping point $a^4$. The guide plates 316 may be extended along the path of travel of the packages as far as may be found necessary, being carried preferably to or past the position $a^5$.

*End gumming.*—The application of gum, water or other liquid to the ends of the packages preliminary to applying the end

labels thereto, is accomplished by mechanism best shown in Figs. 16–19. On each side of the path of the pockets is a vessel 320 containing thin glue, paste or other adhesive, or even water. In these two vessels turn cylinders 321 mounted on a transverse shaft 322 which may be driven at any desired speed by a belt on one of the pulleys 323 (Fig. 2). The transferring rollers N, already described, are mounted each on a bracket projecting from a reciprocating slide 324 moving longitudinally of the machine between the positions shown in full and dotted lines in Fig. 16. The slides 324 are reciprocated by mechanism driven from a cam 325 (Fig. 2) on the shaft 34, the cam roller being carried by a lever 326 hung on pivot 327 (Fig. 3), its free lower end connecting by a link 328 with an arm 329 (Fig. 2) of the lever 330, the outer end of the arm of which connects by a link 331 to one of the slides 324; the lever 329, 330, has also an arm 332 which engages through a pin and slot coupling with a similar arm on another lever 330′ (Fig. 2) which communicates like movement through another link 331′ to the other of the slides 324, so that these two slides move together and to like extent. When the roller N is in contact with the cylinder 321, as seen in dotted lines in Fig. 16, it is desirable that it should be revolved otherwise than by such contact, and to this end its shaft carries on the opposite end a friction roller 333 which in such position bears against a friction drive wheel 334 fixed on the shaft 322. As the rollers N are carried away from cylinder 321 they pass under the pads M and thereby transfer the glue or other liquid thereto; in this position it is desirable that the rollers N should roll against the pads M, and for this purpose a stationary strip or friction rack 335 is provided on each side in rolling contact with the friction roller 333, so that as soon as this roller parts from the drive wheel 334, it travels in tractive contact with the strip 335, whereby it is frictionally rotated, thus imparting the desired rotation to the transferring roller N.

The applying pads M are mounted on crank arms on rock shafts M′, whereby they swing down from the positions shown in dotted lines in Fig. 18 to the positions shown in full lines where they enter the openings 318 in the guide plates 316, and press against the end flaps of the package so as to apply adhesive (or other liquid) thereto, dwelling a brief instant in contact therewith and then swinging back to their dotted line positions. These swinging movements are imparted by a cam 336 fixed on shaft 34 acting through lever 337 (Fig. 3) which connects by link 338 to a vertically moving slide 339 (Fig. 18) sliding in a fixed frame 340 and having on its opposite sides upright racks 341 which mesh with pinions or sectors 342 (Figs. 18 and 16), which pinions are fast on the ends of the shafts M′. Thus the cam action drives the slide 339 up and down, and its racks impart the necessary rotation of about 90 degrees at each movement of the rock shafts.

*Label affixing.*—The mechanism for applying the labels to the ends of the package is best shown in Figs. 17 and 19, and the driving means therefor in Fig. 32. The operation of this mechanism has already been explained. Each of the slides Q, which carry the carriers Q′ for the magazines P, is reciprocated by movement taken from a cam 350 on the lower shaft 32, the cam roller being carried on a lever 351 having a slot and pin connection with another lever 351′, which levers transmit movement to the respective slides through links 352, elbow levers 353 and links 354, Fig. 32, (the corresponding connections with the opposite slide being shown in Fig. 3). For turning little by little the screw $P^3$ for propelling forward the follower P′, the square shaft $P^4$ attached thereto passes with a sliding connection through a square hole in the hub of a worm wheel $P^5$ which is turned by a worm 360 (Fig. 17) on the shaft 362 on which is a pulley 361 driven by a belt 363 from any convenient source, as, for example, a pulley 364 on one of the cam shafts 28 and 34 (see Fig. 3).

*End pressing.*—After the labels are affixed the next feeding movement carries the package with its end labels beyond the holes 318 and into engagement with the continuous portions of the guide plates 316 which hold the labels pressed against the end flaps, as well as holding the latter pressed against the package.

In addition to this passive holding means, an active means is provided for pressing repeatedly against the end labels and end flaps during the travel of the package to the outlet position $a^5$. The mechanism shown for this purpose comprises the perforated pads *y y* already described, carried by a movable frame T which is mounted on a slide 370 moving in fixed guides 371 and moved by a cam 372 on the bottom cam shaft 32, the cam movement being imparted by the means shown in Fig. 24, comprising a lever 373 (and for the other slide a like lever 373′ connected thereto), link 374, elbow lever 375, 376, and link 377 connecting to the slide 370. One suitable construction of the pads *r* is that shown in Fig. $24^a$, each pad being hollow and having a socket portion connecting with sections of pipe $T^2$, whereby air under pressure from a flexible hose $T^3$ (Fig. 24) is communicated to the successive pads. The operation is as already described.

The means for operating the ejecting pusher V is best shown in Fig. 3, and com-

prises a cam 380 driving a lever 381 the opposite arm of which is connected by link 382 to an elbow lever 383 which, through a link 384, drives a slide 385 on the end of which is fastened the pusher V. The slide 385 (Fig. 2) is carried in a slideway 386. By pushing the packages out endwise along a rearward trough U (best shown in Figs. 2 and 3), their ends are pressed close together, whereby the time during which the end flaps and labels are held in close contact is prolonged, thus insuring more effectually against any possible separation.

The machine thus described is very effective in its operation, performing with certainty the difficult task of applying around somewhat yielding packages of granular material, a wrapper of thin and fragile fabric, such as glassine paper, accommodating the operations to variations in the sizes of the packages and accomplishing the wrapping with a neatness and exactness far surpassing in quality any possible wrapping by hand, while proving in actual practice a very economical means for accomplishing the wrapping operation. It will be understood from the foregoing description that the machine automatically takes care of variations in thickness of the packages, and applies the more or less fragile outer wrapper with a precisely uniform snugness, notwithstanding such variations. This result is due, in considerable part, to the co-operation of the plunger *m*, which descends to a uniform level with the frictionally-sustained false bottoms C' which resist the forcing down of the packages by said plunger and hold the packages at the precise level to which the plunger forces them, so that their tops are left at uniform heights in the pockets for the most effective coaction with the subsequently-acting folders; and to the action of the rotary lock seam folders or twisters F which grip the superposed top flaps with a yielding tension, allowing for a certain slip through them of the flaps in rolling, and thereby drawing the wrapper uniformly snug around the package, irrespective of the precise size.

While the machine has been described with great precision with respect to the particular embodiment of the invention illustrated, it is to be understood that the invention may be varied to a considerable extent in mechanical respects, within the scope of the appended claims.

We claim as our invention:—

1. In a wrapping machine, feeding means for intermittently advancing a strip of paper, a table receiving the paper fed, means for cutting off the paper to leave a sheet on said table, means for folding the sheet engaging it while on said table, and means for temporarily holding such sheet against displacement, operative to lightly engage the sheet before it is cut off, and to hold it until drawn therefrom by the folding means.

2. In a wrapping machine, feeding means for intermittently advancing a strip of paper, a table receiving the paper fed, means for cutting off the paper to leave a sheet on said table, and means for temporarily holding such sheet against displacement, consisting of movable pressers, and means for dropping them onto the paper, after feeding, and before the cutting operation, and for lifting them before the next feed, and folding means engaging the paper on said table while held by said pressers.

3. In a wrapping machine, a table having an opening and means for moving the article to be wrapped through said opening, means for feeding a strip of wrapping paper onto said table over said opening, means for cutting off individual wrappers therefrom, and pressers for holding the wrapper, engaging its opposite end portions, movable into engagement therewith after it is fed, and before it is cut, and pressing lightly against it so that, as the article is moved through said opening, the wrapper is drawn from the pressers.

4. In a wrapping machine, a table formed of two movable plates having an opening between them, means for moving the article to be wrapped through said opening, means for feeding the wrappers onto said table over said opening, means for bridging said opening during the feeding movement, and means for subsequently moving said plates to fold the wrapper over the top of the article.

5. In a wrapping machine, a table having an opening and means for moving the article to be wrapped through said opening, means for feeding the wrappers onto said table over said opening, a movable plate bridging said opening, adapted to temporarily support the wrapper, and means for retracting said plate while the wrapper is still feeding forward.

6. In a wrapping machine, a table comprising front and rear movable plates, with an opening between them, means for moving the article to be wrapped, down through said opening, means for feeding the wrappers onto said table over said opening, and a plate moving during the advance of the paper under the front plate and directing the paper over the rear plate, and the front and rear plates movable to fold the flaps of the wrapper over the top side of the article.

7. In a wrapping machine, a table comprising front and rear plates with a gap or opening between them, means for feeding wrappers over said table, means for moving an article to be wrapped down through said opening, whereby to apply the wrapper around three sides of the article, means for

moving said plates successively over the top of the article, to fold the flaps of the wrapper over the fourth side of the article, and means for lowering the rear plate to receive the wrapper, and lifting it before it moves over the top of the package.

8. In a wrapping machine, means for feeding successive articles to be wrapped into position, wrapping mechanism adapted to apply a wrapper around the article in another position, a plunger adapted to engage the article and transfer it from the first-named to the second-named position, and means for feeding an insert onto the article and between it and said plunger in said first-named position, whereby such insert will be enclosed between the article and wrapper.

9. In a wrapping machine, a table having an opening, means for feeding wrappers onto said table, means for feeding successive articles to be wrapped to a position over said opening, means for moving an article down through said opening, whereby to partly wrap the wrapper around the article, means beneath said opening for receiving the article, and means for completing the wrapping, combined with means for feeding an insert onto the article while in position over said opening, whereby such insert will be enclosed between the article and wrapper.

10. In a wrapping machine, the combination therewith of a stack for holding folded inserts, having a bottom opening to permit the bottom insert to partly open, and means for feeding the inserts from such stack consisting of a reciprocating slide movable a distance approximately twice the dimension of the folded insert, and adapted to engage a fold in the insert to push the latter from the bottom of the stack to position to be enclosed between the article to be wrapped and its wrapper.

11. In a wrapping machine, a table having an opening, means for feeding wrappers onto said table, means for feeding successive articles to be wrapped to a position over said opening, means for moving an article down through said opening, whereby to partly wrap the wrapper around the article, said means having a uniform stroke, a pocket beneath said opening for receiving the article, adapted to accommodate packages of varying thickness, whereby successive packages have their tops at uniform levels and their bottoms at levels which may vary, and means for completing the wrapping of the packages while in said pockets, said means adapted to operate notwithstanding variations in level of the bottoms of the packages in said pockets.

12. The combination of claim 11, the means for forcing the article down into the pocket being a plunger, and the pocket having a frictionally-mounted false bottom.

13. The combination of claim 12, with a yielding buffer to check the descent of the false bottom at the end of its movement.

14. The combination of claim 11, with a chain carrier for a plurality of such pockets, and a stationary cam traversed by said carrier and engaging the pockets to preliminarily raise their false bottoms.

15. In a wrapping machine, a series of pockets having movable false bottoms, a chain carrying said pockets, guiding means for the pockets, and stationary means for raising the false bottoms successively as the pockets advance.

16. In a wrapping machine, a series of pockets having movable false bottoms, a chain carrying said pockets, and guiding rails extended along the path of travel of the pockets, the pockets having rollers engaging said rails.

17. The combination of claim 15, the stationary means comprising a cam bar extended in the path of the pockets.

18. The combination of claim 16, the pocket having a guiding base, the false bottom having sliding pins movable therein, and the pins having rollers, and a stationary cam bar extended in the path of the pockets engaging said rollers to raise the false bottoms.

19. In a wrapping machine, means for feeding successive articles singly to position, wrapping mechanism for carrying a wrapper of width exceeding the length of the articles partially around an article, centering means entering the wrapper from opposite sides to engage the opposite ends of the article, and operative to center the article within such wrapper, means for subsequently completing the wrapping to form the wrapper into a tube with open ends, and means for retracting such centering means beyond the ends of the wrapper.

20. In a wrapping machine, means for feeding successive articles to position to be engaged by wrapping mechanism, comprising a chute receiving a plurality of articles, a reciprocating plunger movable to advance said articles lengthwise along said chute to bring the terminal article into position, a pocket, means for carrying a wrapper over the pocket, and means for transferring such terminal article into the pocket, thereby partly enclosing it in the wrapper, and centering means acting on the article after it is carried into the pocket, for insuring that the article shall be centered with the pocket.

21. The combination of claim 19, with means for subsequently contracting the tubular wrapper around the centered article.

22. In a wrapping machine, means for folding a wrapper around three sides of the article, fingers movable into place over the fourth side, means for folding the wrapper over such fingers, and means for retracting such fingers.

23. The combination of claim 22, with means for subsequently contracting the wrapper.

24. In a wrapping machine, a table comprising front and rear plates with a gap or opening between them, means for feeding wrappers over said table, means for moving an article to be wrapped down through said opening, whereby to apply the wrapper around three sides of the article, fingers entering beneath said opening from opposite sides, and means for moving said plates successively over the top of said fingers, to fold the flaps of the wrapper over the fourth side of the package.

25. In a wrapping machine, a table having an opening, means for feeding wrappers onto said table, means for feeding successive articles to be wrapped to a position over said opening, means for moving an article down through said opening, whereby to partly wrap the wrapper around the article, fingers entering above the article, and means for folding the wrapper flaps down upon said fingers to surround the article.

26. In a wrapping machine, means for folding a wrapper around three sides of the article, fingers movable from opposite ends of the package toward each other over the fourth side, means for folding the wrapper over such fingers, and means for retracting such fingers.

27. In a wrapping machine, means for folding a wrapper around three sides of the article, fingers movable from opposite ends of the package toward each other over the fourth side, means for folding the wrapper over such fingers, and means for retracting such fingers, with means for contracting the wrapper movable during and after the retracting movement of the fingers, and adapted to draw the wrapper snugly around the article.

28. In a wrapping machine, means for applying a wrapper around three sides of an article and for folding the flaps of the wrapper one upon the other over the fourth side thereof, combined with means for interfolding said flaps to form a lock fold, comprising fingers entering from the end, embracing said flaps between them, and thereupon turning to roll the flaps together.

29. In a wrapping machine, means for applying a wrapper around three sides of an article and for folding the flaps of the wrapper one upon the other over the fourth side thereof, combined with means for interfolding said flaps to form a lock fold, comprising fingers entering from the end, embracing said flaps between them, and thereupon turning to roll the flaps together, and means for flattening the rolled portion of the flaps to form such lock fold.

30. In a wrapping machine, the combination with means for applying a wrapper around an article, of a lock folding means comprising fingers engaging the superposed flaps of the wrapper from opposite ends and turning to roll said flaps together and thereafter retracting endwise, and means for holding the lock fold during their retracting movement.

31. In a wrapping machine, the combination with means for applying a wrapper around an article, of a lock folding means comprising fingers engaging the superposed flaps of the wrapper from opposite ends and turning to roll said flaps together, a member engaging the lock fold between said fingers to hold it, and means for retracting the fingers endwise.

32. The combination of claim 31, said member and fingers being correlated, whereby the member extends its engagement with the lock fold as the fingers withdraw.

33. The combination of claim 31, said member comprising a plate having a projecting middle portion and tapered sides, the latter adapted to extend the engagement of the plate with the lock fold in proportion as the fingers withdraw.

34. In a wrapping machine, the combination with means for applying a wrapper around an article, of a lock folding means comprising fingers engaging the superposed flaps of the wrapper from opposite ends, the fingers at each end relatively movable to grip the flaps yieldingly between them, and turning to roll the flaps together to form the lock fold, and subsequently retracting endwise.

35. In a wrapping machine, the combination with means for applying a wrapper around an article, of means for lock folding the superposed flaps consisting of fingers engaging the flaps from opposite ends, each pair of fingers movable endwise to receive the flaps between them, then moving together to yieldingly grip the flaps, then rotating to roll the flaps together, and finally retracting endwise to disengage them from the lock-folded flaps.

36. In a wrapping machine, the combination with means for applying a wrapper around an article, of means for lock folding the superposed flaps consisting of fingers engaging the flaps from opposite ends, each pair of fingers consisting of relatively movable tubular sections moving together endwise to engage the flaps, then executing a relatively rotative movement to yieldingly grip the flaps between their edges, then rotating to roll the flaps together, then retracting by an endwise movement, and finally executing a relative rotary movement to separate them before the next advance movement.

37. In a wrapping machine, the combination with means for applying a wrapper around an article, of means for lock folding

the superposed flaps consisting of fingers engaging the flaps from opposite ends, each pair of fingers movable endwise to receive the flaps between them, then moving together to yieldingly grip the flaps, then rotating to roll the flaps together, whereby the wrapper is drawn firmly around the article, the grip of said fingers upon the wrapper permitting the flaps to slip through as the wrapper is drawn sufficiently snug, the fingers then retracting endwise, and means for holding the lock fold as the fingers withdraw.

38. In a wrapping machine, the combination with means for applying a wrapper around an article, of means for lock folding the superposed flaps consisting of fingers engaging the flaps from opposite ends, each pair of fingers movable endwise to receive the flaps between them, then moving together to yieldingly grip the flaps, then rotating to roll the flaps together, whereby the wrapper is drawn firmly around the article, and the lock folders moving bodily toward the article during this rolling movement, and the fingers finally retracting endwise.

39. In a wrapping machine, the combination with means for applying a wrapper around an article, of lock folding means comprising pairs of fingers entering from opposite ends to engage and fold the superposed flaps, each pair of fingers movable endwise to advance and retract, a rack and pinion for rotating the fingers, cam means for relatively moving the fingers of each pair to cause them to grip the flaps, and driving means for moving the fingers endwise and for sliding said rack.

40. The combination of claim 39, with a carrying slide on which the fingers and their mountings are carried, and means for moving it to cause the lock seam folders to approach the article during the rolling of the lock seam.

41. In a wrapping machine, the combination with means applying a wrapper around an article, and fingers movable over the article, the wrapper flaps being folded down on said fingers, of means for lock folding the superposed flaps, comprising pairs of fingers entering from opposite ends to engage the said flaps, and then rotating to roll the flaps together, the fingers retracting as the folders turn, to contract the wrapper around the article.

42. The combination of claim 41, the fingers being in pairs with a space between each pair, and the lock-folding means entering the spaces between the fingers.

43. In a package wrapping machine, means for feeding successive packages, a pocket, means for depositing a single package therein and applying a wrapper around the package, and plungers movable within the opposite projecting ends of the wrapper, to engage and press against the opposite ends of the package, to flatten and true its ends preparatory to end-folding the wrapper.

44. In a package wrapping machine, a pocket, having open ends and top, carrying means for moving it sidewise, means for feeding a wrapper over the pocket and means for depositing a package therein and for carrying the wrapper around the package with its side flaps overlapped on top of the article, a plunger movable against the open top of the pocket to press against the upper side of the package, and hold it in shape and hold its wrapper flaps in place during the end-folding of the wrapper, and end folders movable at the open ends of the pocket to fold in the ends of the wrapper while the package is so held.

45. In a package wrapping machine, a pocket, means for depositing a package therein, means for applying a wrapper around the package, operative to form such wrapper into an open ended tube, end folders movable to fold the open ends of the wrapper in successive folds against the ends of the package, and heated plates movable against the folded end flaps of the wrapper timed to advance into contact therewith as the end folders recede, so as to prevent the unfolding of the flaps adapted to soften the paper of the end flaps and render them limp, whereby their tendency to unfold is overcome, and means for subsequently cementing the end flaps in place.

46. In a wrapping machine, a pocket, means for advancing it to successive stations, means for depositing an article therein and applying a wrapper around it, means for folding in the ends of the wrapper, means for holding the end folds in place, and means at a later station for subsequently applying adhering labels to the opposite ends of the wrapped article, in position to seal the end flaps, and means extended along the path of the pockets for pressing the ends in the subsequent travel of the article until the adhesive has time to set.

47. In a wrapping machine, means for folding in the ends of the wrapper at the ends of the wrapped article, and means at each end for applying adhesive to the end folds comprising a movable pad, with means for applying adhesive to the pad, and means for moving the pad to transfer the adhesive therefrom to the end folds, and means for subsequently applying a label against the adhesive-coated end folds.

48. In a wrapping machine, means for folding in the ends of the wrapper at an end of the wrapped article, with means for moistening such end folds, means for holding

such folds in place, and means for subsequently applying a gummed label against the moistened end folds.

49. In a wrapping machine, means for feeding an article to a wrapper wider than the length of the article, and for folding such wrapper around three sides of the article with its edge portions projecting beyond the ends of the article, means engaging the ends of the article to hold it against endwise displacement with respect to the wrapper, and means for subsequently folding the wrapper around the fourth side of the article.

50. In a wrapping machine, means for folding a wrapper wider than the length of the article around three sides of an article, centering plungers movable from beyond the edges of the wrapper toward each other to grasp the article between them and insure its central position with respect to the wrapper, means for subsequently completing the folding of the wrapper around the fourth side of the article, and means for then retracting the plungers beyond the wrapper.

51. In a wrapping machine, means for folding a wrapper around four sides of an article, with its flaps overlapping, means for folding together said flaps, and centering means for holding the article against endwise displacement during the operation of said means for folding together said flaps.

52. In a wrapping machine, means for folding a wrapper around four sides of an article, with its flaps overlapping, means for folding together the overlapping flaps to contract the wrapper about the article, comprising lock seam folders receding by an endwise movement after such folding operation, and centering means for holding the article against endwise displacement during such receding movements of said lock seam folders.

53. In a wrapping machine, means for holding a wrapper around four sides of an article, with its flaps overlapping, means for folding together said flaps, and a presser plate movable to fold down and hold such folded flaps, with centering means adapted to hold the article against endwise displacement during the folding together of said flaps, and until said presser plate engages and holds the folded seam.

54. In a wrapping machine, a pocket, means for feeding a wrapper over the pocket, means for plunging an article down into the pocket, thereby carrying said wrapper around three sides of the article, and means for folding the wrapper flaps on the fourth side of the article, with centering means comprising plungers movable to engage the ends of the article between them, and adapted to hold it against endwise displacement during the last-named folding operation.

55. In a wrapping machine, means for applying a wrapper around an article and folding in the ends of the wrapper, combined with means for directing jets of air against such ends to press in the end flaps while drying.

56. In a wrapping machine, means for applying a wrapper around an article and folding in the ends of the wrapper, means for applying adherent labels to the ends of the wrapped article, and means for directing jets of air against the labeled ends to press them to place while drying.

57. In a wrapping machine, means for applying a wrapper around an article and folding in the ends of the wrapper, combined with reciprocating pads for repeatedly pressing against the ends of the wrapper, and means for directing jets of air against such ends as the pads recede.

58. In a wrapping machine, means for applying a wrapper around an article and folding in the ends of the wrapper, means for applying adherent labels to the ends of the wrapped article, and reciprocating pads for repeatedly pressing against the ends of the wrapped article, and means for directing jets of air against such ends as the pads recede.

59. In a wrapping machine, means for applying a wrapper around an article and folding in the ends of the wrapper, means for applying adherent labels to the ends of the wrapped article, and a reciprocating pad having jet perforations and means for leading compressed air thereto, said pad adapted to press against the end of the wrapped article, whereby the air jets blow against such end as the pad recedes.

60. In a wrapping machine, means for conveying an article to successive stopping positions, and means for applying a wrapper around the article and folding in the ends of the wrapper, combined with reciprocating pads movable against such ends in the successive stopping positions to repeatedly press the folded ends.

61. In a wrapping machine, means for conveying an article to successive stopping positions, and means for applying a wrapper around the article and folding in the ends of the wrapper, combined with reciprocating frames and pads thereon, said pads located at the successive stopping positions and adapted to repeatedly press the folded ends.

62. In a wrapping machine, means for conveying an article to successive stopping positions, and means for applying a wrapper around the article and folding in the ends of the wrapper, combined with reciprocating pads movable against such ends in the successive stopping positions, and said pads having jet perforations, and means for conducting compressed air to the pads to be discharged as jets from said perforations against the folded ends.

63. In a wrapping machine comprising a

series of pockets, means for depositing articles therein and means for applying wrappers around the articles, the pockets having open ends, combined with a reciprocating ejector movable through the pocket to push out the package therefrom, and a delivery trough receiving successive packages therefrom endwise, whereby the folded ends of the wrappers are held flat.

64. In a wrapping machine, means for feeding a strip of wrapping paper, a table for holding it, means for carrying the wrapper around the article to be wrapped, a shear for cutting off the wrapper, and pressers connected with the shear, moved into contact with the wrapper in advance of the cutting operation, and adapted for gently holding the severed wrapper, while the latter is pulled away during the wrapping operation.

65. In a wrapping machine, means for feeding a strip of wrapping paper, a table for holding it, a cutter for severing one wrapper after feeding, means for carrying the wrapper around the article to be wrapped, comprising a plunger for forcing down the article, and pressers for momentarily holding the wrapper, said pressers operatively connected to said plunger to be lowered into contact with the fed wrapper during the descent of the plunger, timed to engage the wrapper before the cutter acts, and lifted during the ascent of the plunger.

66. In a wrapping machine, lock-folding means comprising fingers adapted to enter from the end and embrace superposed flaps of the wrapper between them, combined with means for relatively moving said fingers to so embrace such flaps, a pinion connected to the fingers, a reciprocating rack engaging such pinion, and means for longitudinally reciprocating the fingers.

67. In a wrapping machine, lock-folding means comprising fingers adapted to enter from the end and embrace superposed flaps of the wrapper between them, combined with means for reciprocating said fingers longitudinally, and means for rotating them.

68. In a wrapping machine, lock-folding means comprising fingers adapted to enter from the end and embrace superimposed flaps of the wrapper between them, combined with means for reciprocating said fingers, comprising a longitudinally-movable slide carrying them, and means for rotating such fingers.

69. In a wrapping machine, lock-folding means comprising fingers adapted to enter from the end and embrace superposed flaps of the wrapper between them, combined with means for reciprocating such fingers in longitudinal direction, an elongated pinion connected to the fingers, and a reciprocating rack engaging said pinion for rotating the fingers in different longitudinal positions thereof.

70. In a wrapping machine, lock-folding means comprising fingers adapted to enter from the end and embrace superposed flaps of the wrapper between them, combined with means for longitudinally reciprocating such fingers and for rotating them, and means for relatively rotating the fingers to embrace between them the flaps, said latter means comprising a longitudinally-movable part, and parts connected to the respective fingers, the respective parts having oblique engaging faces whereby the longitudinal movement of said part acts through such faces to impart a rotary displacement to one of the fingers relatively to the other.

71. In a wrapping machine, lock-folding means comprising fingers adapted to enter from the end and embrace superposed flaps of the wrapper between them, combined with means for longitudinally moving such fingers and for rotating them, and means for lowering the fingers during their rotation and lifting them after their backward reciprocating movement.

72. In a package wrapping machine, means for folding a wrapper around three sides of the package, centering plungers acting against the ends of the package to be wrapped to center it and hold it during part of the wrapping operation, longitudinally-moving slides carrying such plungers, means for advancing such slides, means for completing the folding of the wrapper around the fourth side of the package, and means for more quickly retracting such slides to withdraw the plungers beyond the projecting ends of the wrapper.

73. In a wrapping machine, centering plungers acting against the ends of the article to be wrapped to center it and hold it during part of the wrapping operation, longitudinally-moving slides carrying such plungers, means for advancing such slides, comprising cam-driven slides adapted, in advancing, to encounter and advance said plunger slides, a catch adapted to engage said plunger slides and hold them in the advanced positions of the plungers, a trip device movable during the return movement of said cam-driven slides to release said plunger slides, and springs for thereupon quickly retracting the plunger slides.

74. In a wrapping machine, means for feeding a wrapper beneath a package, means for forcing the package downward, comprising a plunger having a uniform stroke, successive pockets for receiving the packages when thus forced down, whereby the wrapper is folded around three sides of the package, each pocket having a frictionally-mounted false bottom adapted to resist the descent of the package and hold it where left by the movement of the plunger, so that successive packages are fed into successive pockets with their top sides at uniform

heights, top folders for folding down the upstanding flaps, and lock seam folders adapted to engage such flaps and fold them together to form a lock fold on top of the package.

75. The combination of claim 74 further characterized in that the lock seam folders engage the flaps of the wrapper with a yielding tension adapted to draw the wrapper around the package with uniform snugness irrespective of the size of the package.

76. The combination of claim 19, the means for completing the wrapping after the action of the centering means comprising folders turning in the projecting ends of the wrapper against the ends of the enclosed article.

77. In a wrapping machine, means for folding a wrapper around three sides of an article, and for turning its end portions down upon the fourth side as flaps overlapping along such side, and rotatable means for engaging the overlapping flaps, said means thereupon rotating to fold them together, and thereby operative to contract the wrapper about the article.

78. In a wrapping machine, means for folding a wrapper around four sides of an article, with its flaps overlapping along one side, and means for rotating the overlapping flaps to fold them together, means advancing to hold the folded flaps as the rotating means are withdrawn, and means for folding in the end portions of the wrapper against the ends of the article while the flaps are so held.

In witness whereof, we have hereunto signed our names.

PAUL H. GRIMM.
FRANK L. COCKS.

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## Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,590,366, granted June 29, 1926, upon the application of Paul H. Grimm, of Glen Cove, and Frank L. Cocks, of Brooklyn, New York, for an improvement in "Package-Wrapping Machines," errors appear in the printed specification requiring correction as follows: Page 9, line 90, for the numeral "99" read *89*, and in the same line for the word "carries" read *carried;* page 10, line 123, for the article "a" read *an;* page 11, line 5, strike out the word "bracket"; same page, line 20, for the numeral "117" read *171;* page 13, line 59, for the numeral "397" read *297;* page 20, line 50, claim 68, for the word "superimposed" read *superposed;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3d day of August, A. D. 1926.

[SEAL.]

M. J. MOORE,
*Acting Commissioner of Patents.*

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[SEAL.]

M. J. MOORE,
*Acting Commissioner of Patents.*