

April 25, 1939.

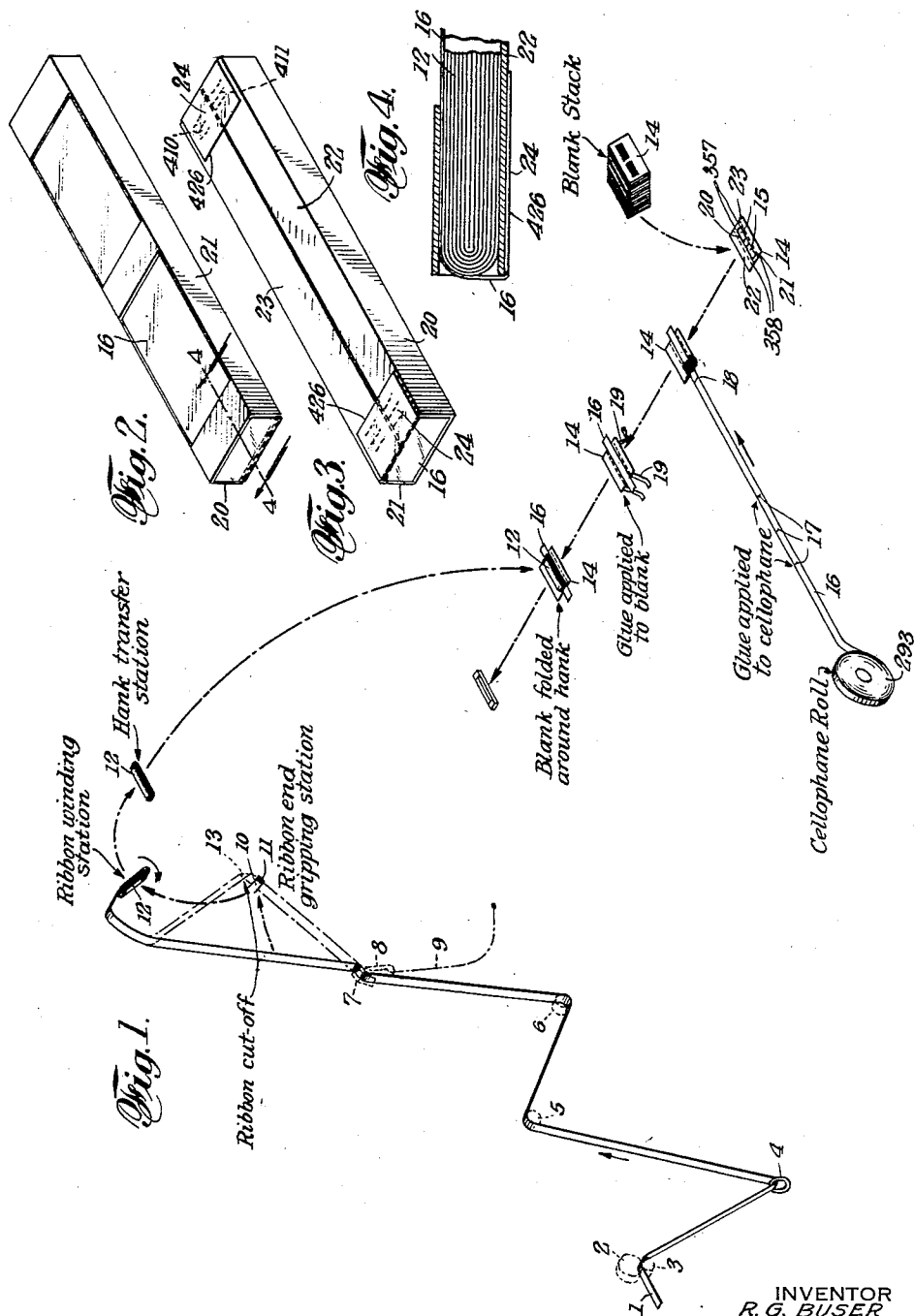
R. G. BUSER

2,155,641

PACKAGING OF RIBBON

Filed May 3, 1935

16 Sheets-Sheet 1



INVENTOR
R. G. BUSER
BY *Philip S. McGowan*
ATTORNEY

April 25, 1939.

R. G. BUSER

2,155,641

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16 Sheets-Sheet 2

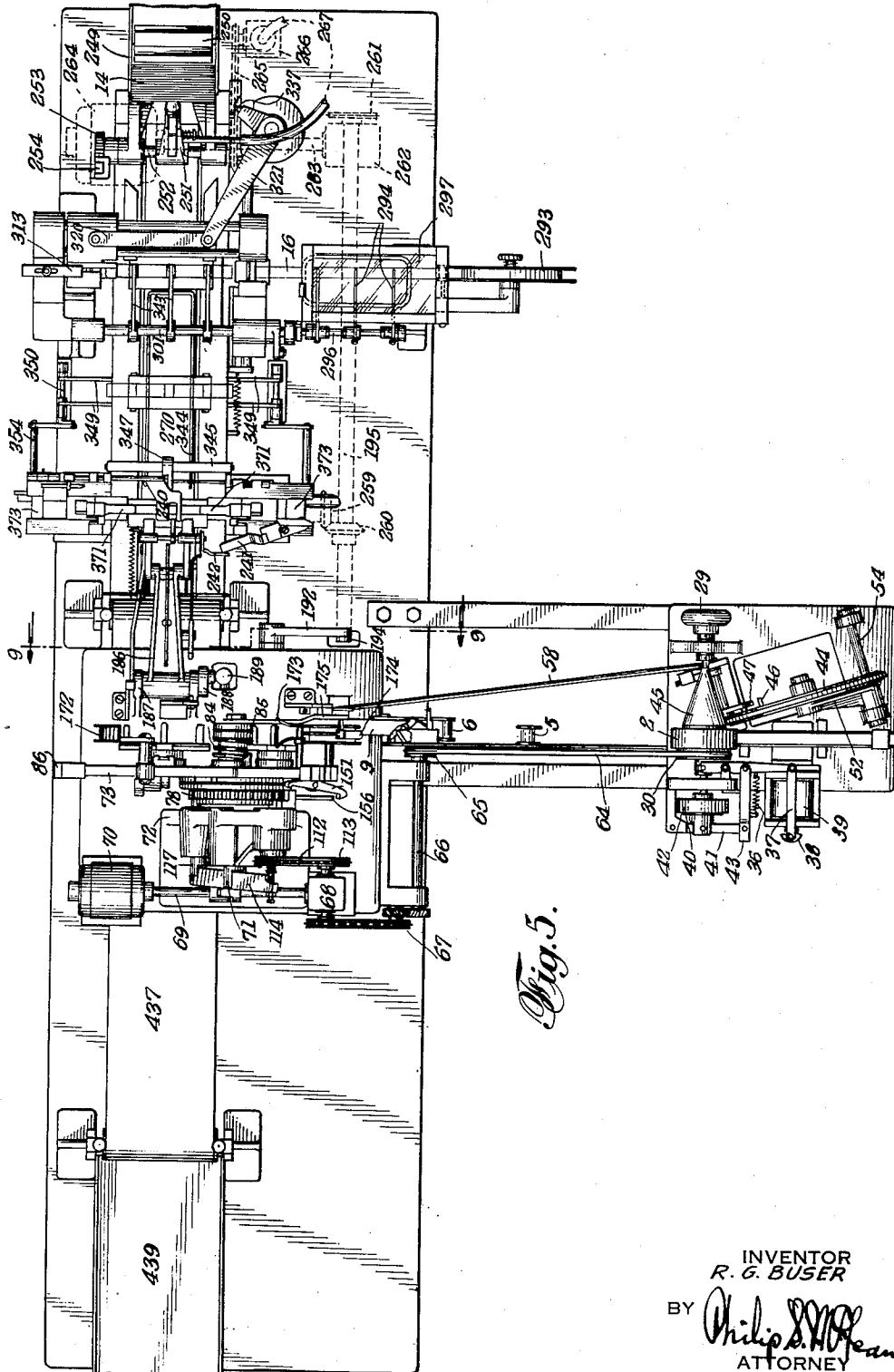


Fig. 5.

INVENTOR
R. G. BUSER

BY *Philip S. H. H. H.*
ATTORNEY

April 25, 1939.

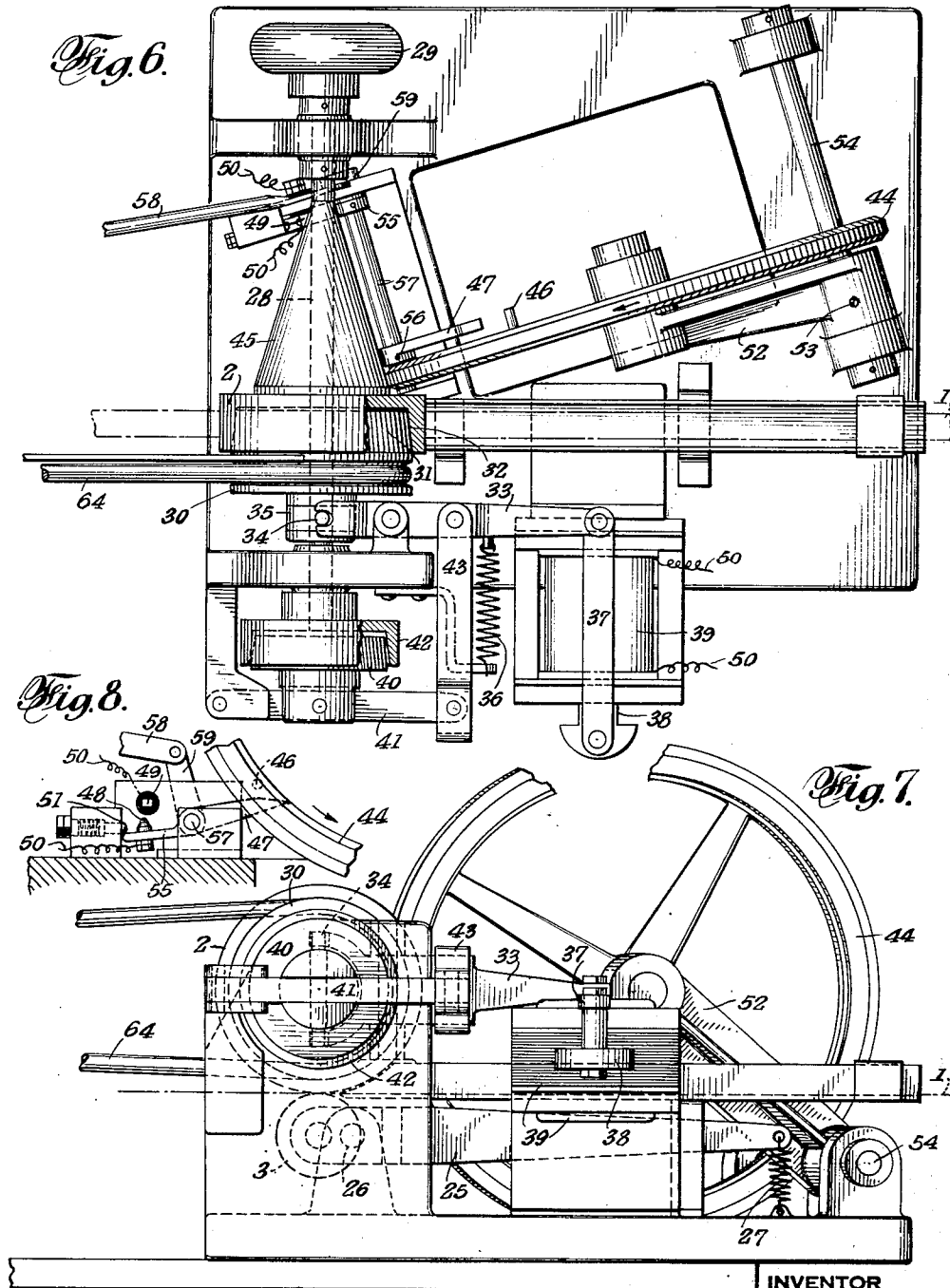
R. G. BUSER

2,155,641

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16 Sheets-Sheet 3



INVENTOR

R. G. BUSER

BY

Philip S. M. R. M.
ATTORNEY

April 25, 1939.

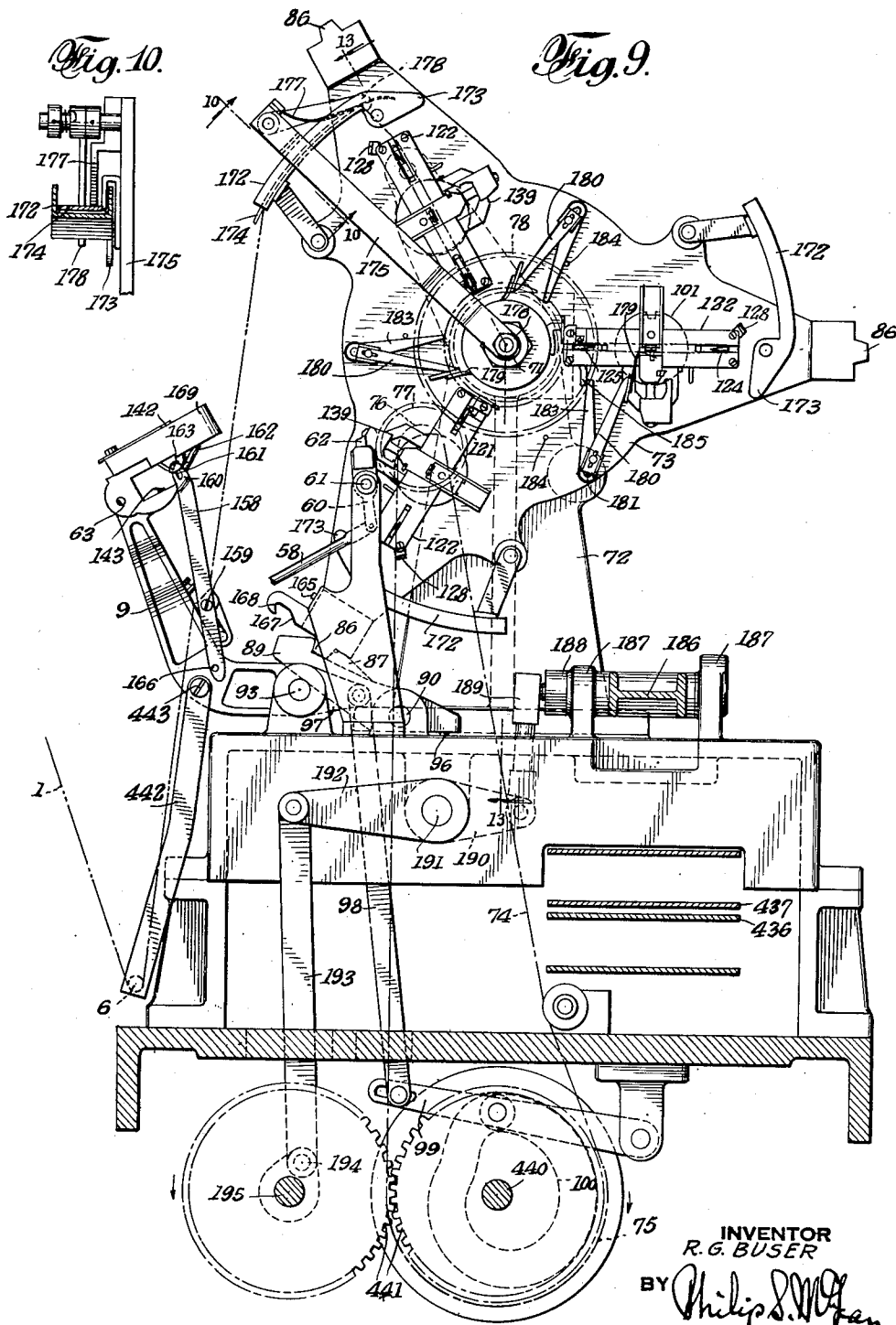
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16 Sheets-Sheet 4



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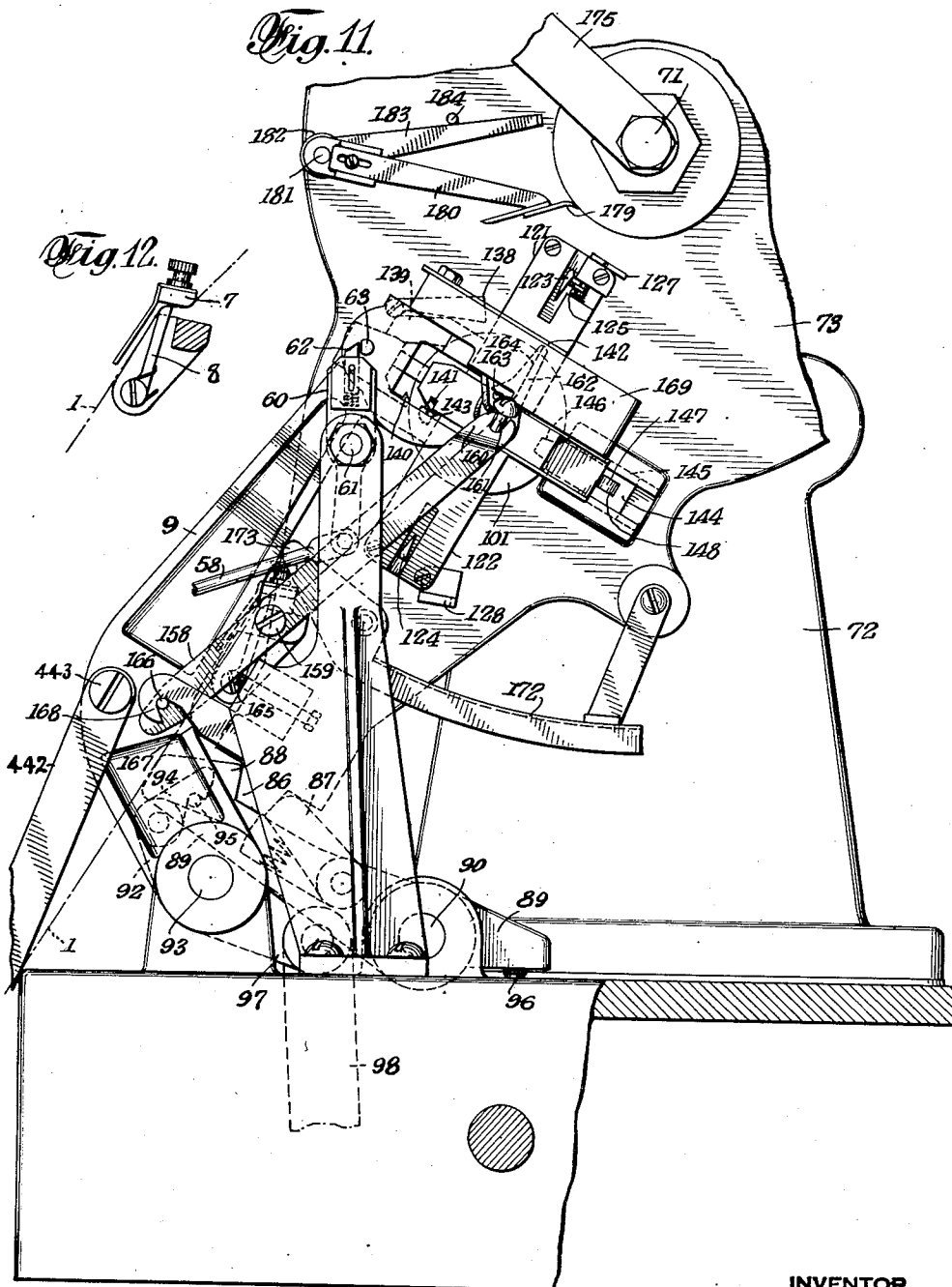
R. G. BUSER

2,155,641

PACKAGING OF RIBBON

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16 Sheets—Sheet 5



INVENTOR
R. G. BUSER
BY *Philip S. McLean*
ATTORNEY

April 25, 1939.

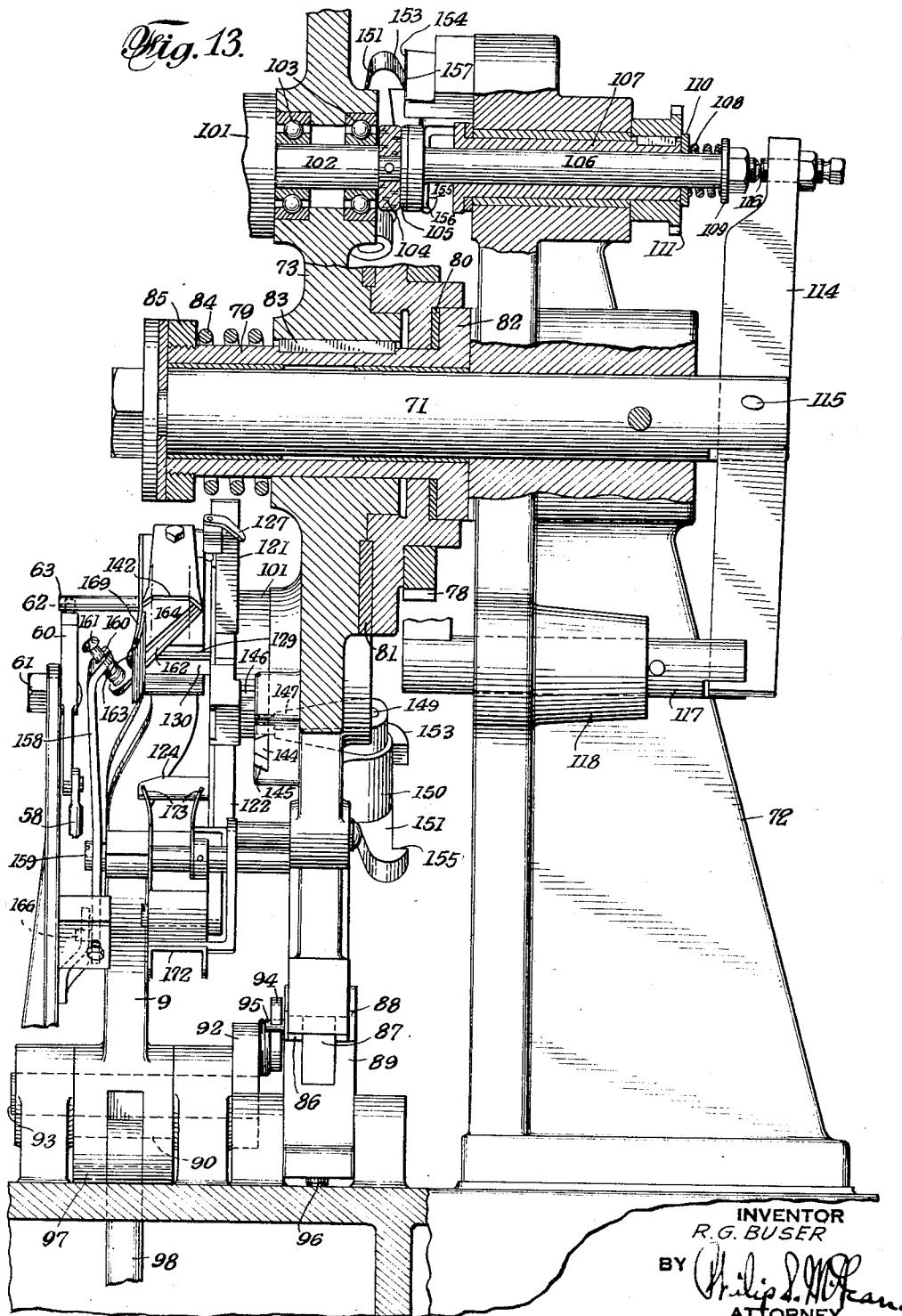
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16 Sheets-Sheet 6



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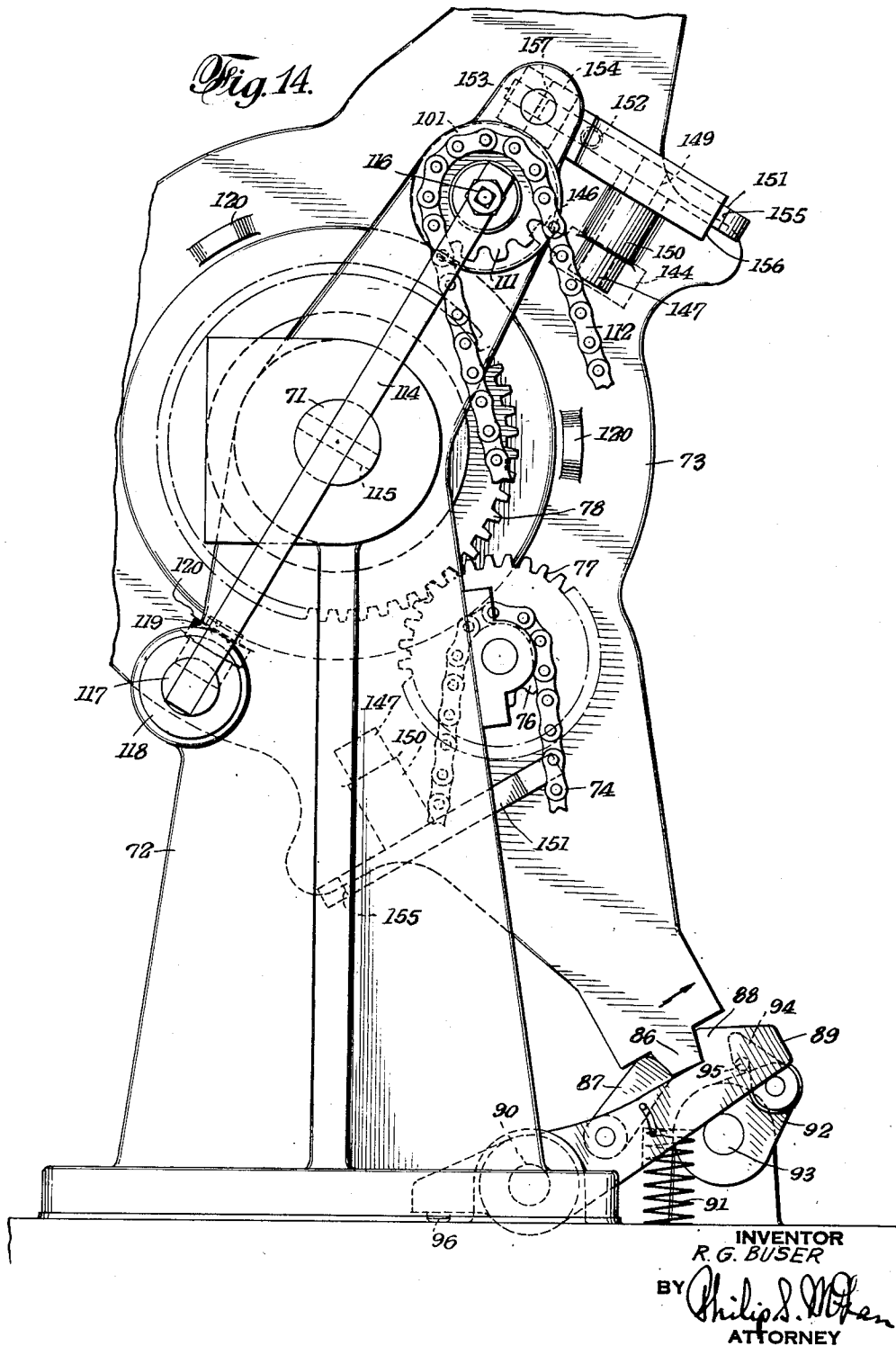
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16 Sheets-Sheet 7



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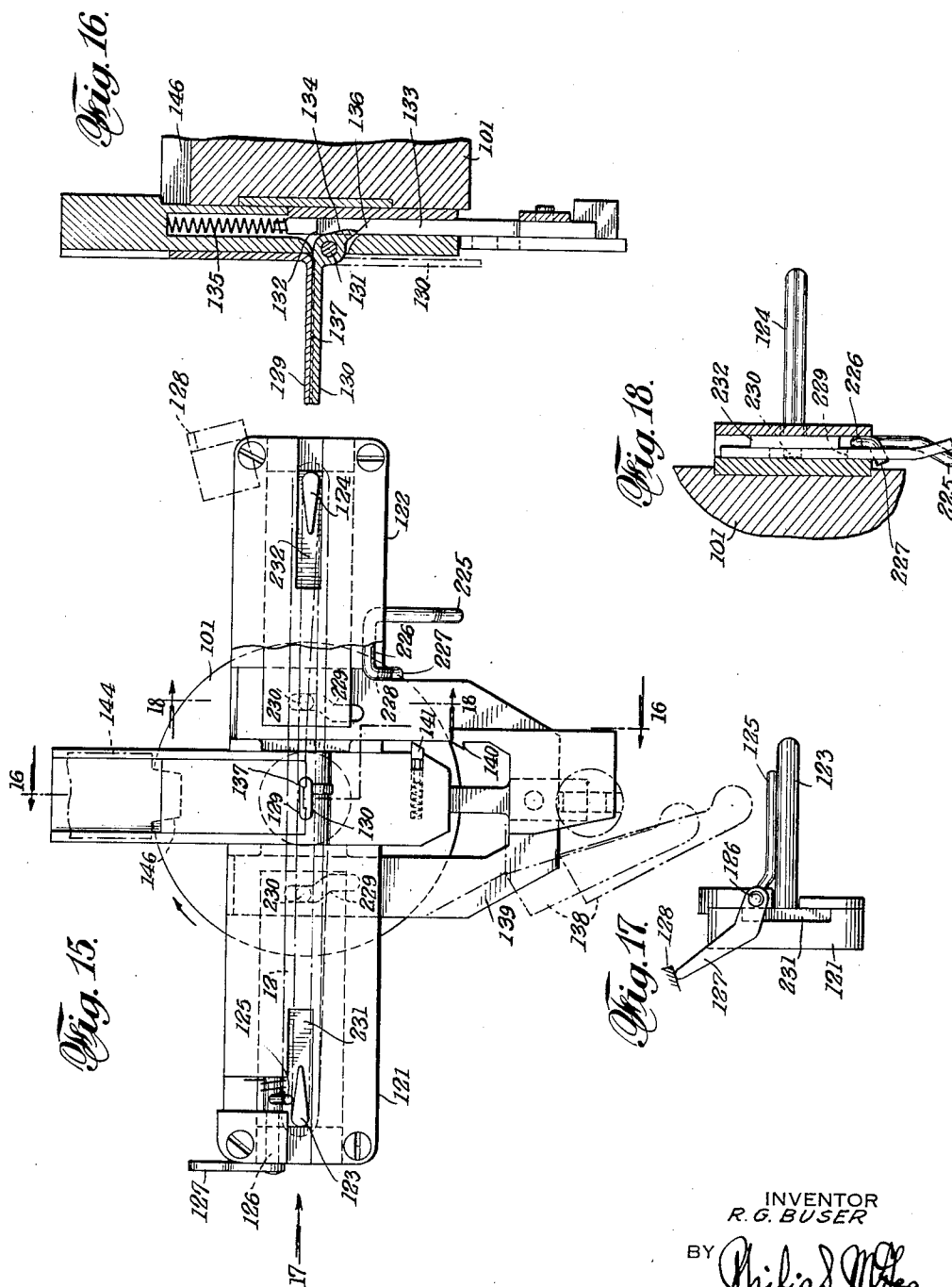
R. G. BUSER

2,155,641

PACKAGING OF RIBBON

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16 Sheets-Sheet 8



INVENTOR
R. G. BUSER
BY *Philip S. [Signature]*
ATTORNEY

April 25, 1939.

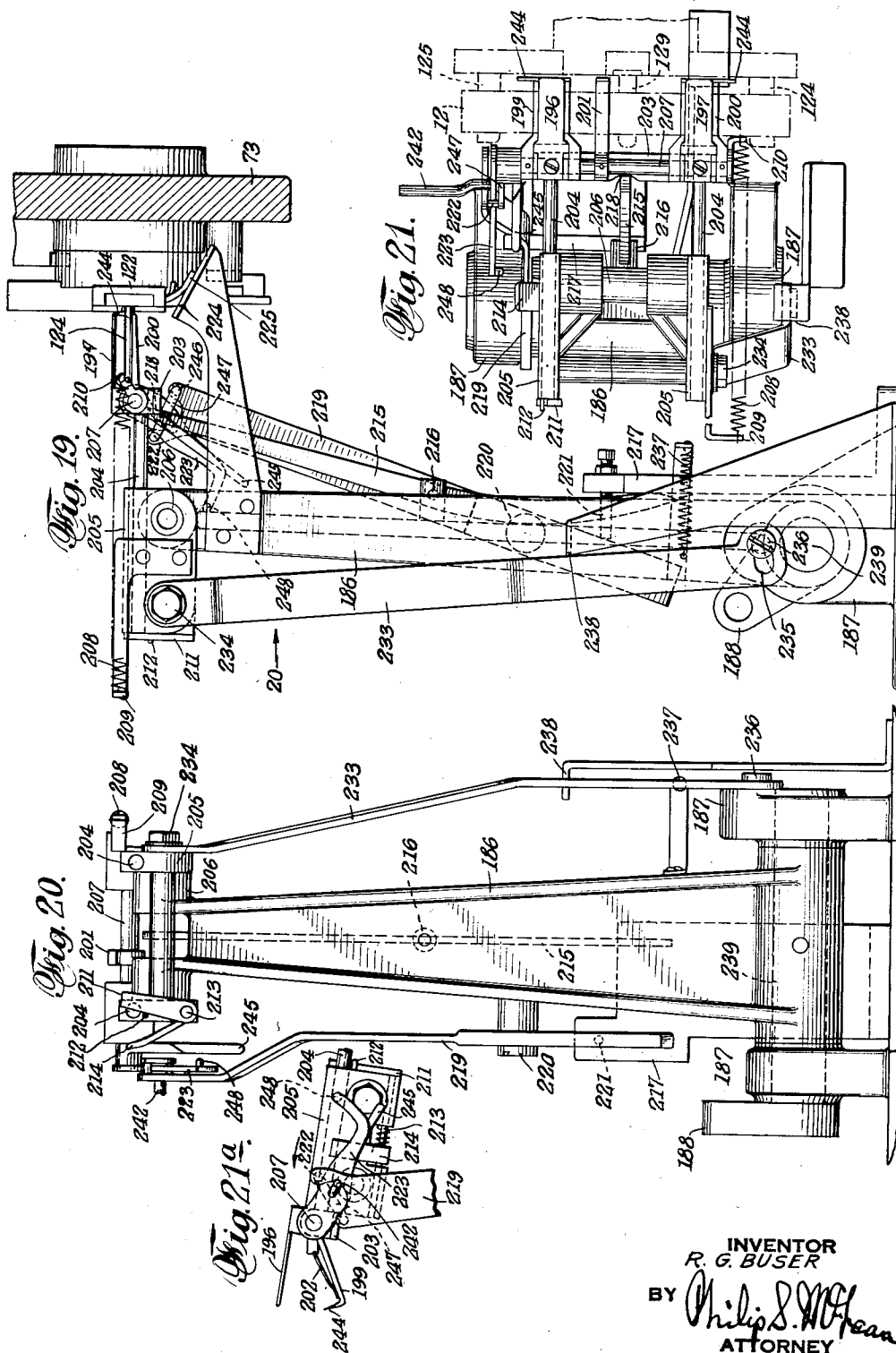
R. G. BUSER

2,155,641

PACKAGING OF RIBBON

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16 Sheets-Sheet 9



INVENTOR
R. G. BUSER
BY *Philip S. McLean*
ATTORNEY

April 25, 1939.

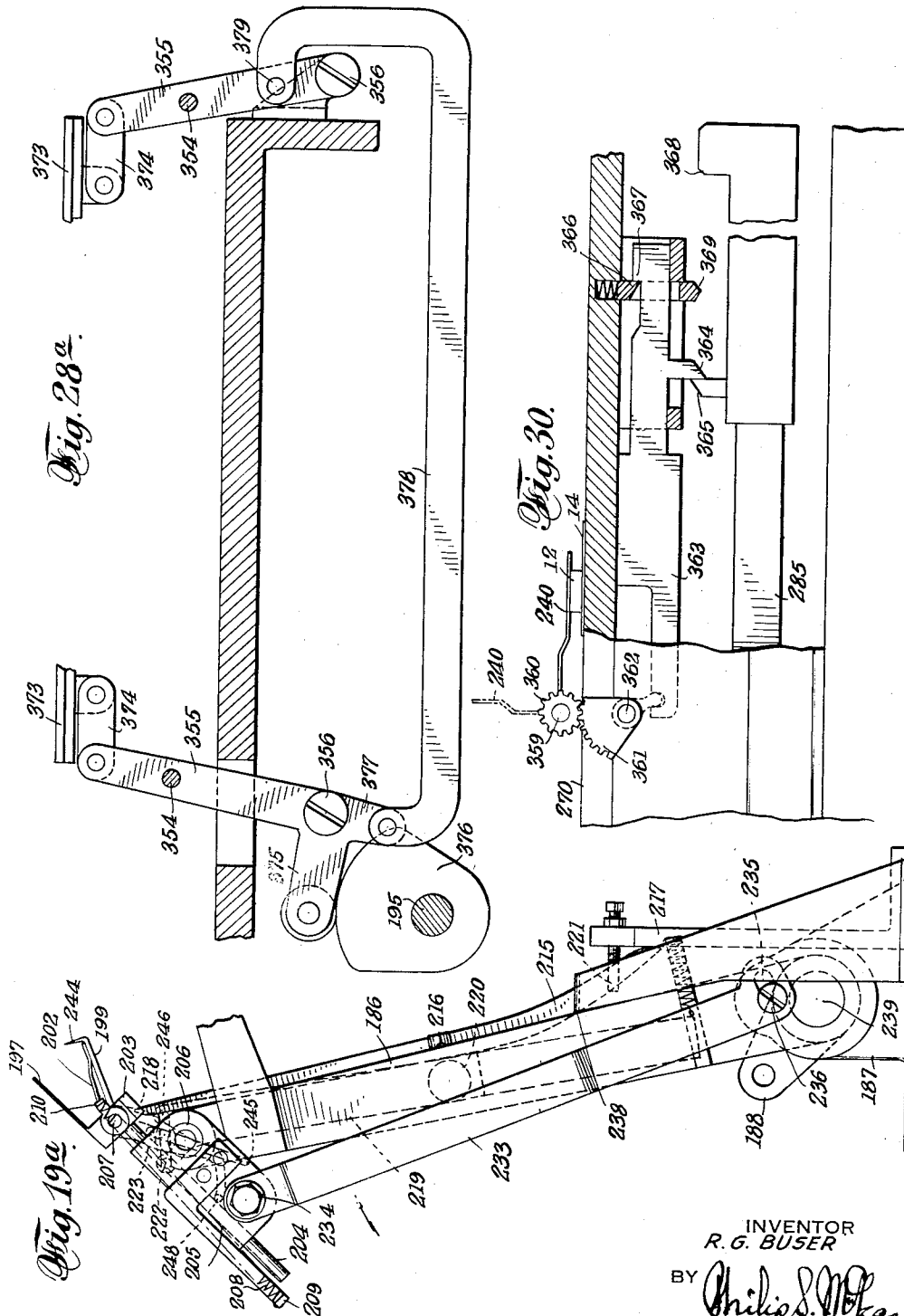
R. G. BUSER

2,155,641

PACKAGING OF RIBBON

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16 Sheets-Sheet 10



INVENTOR
R. G. BUSER
BY *Philip S. McKen*
ATTORNEY

April 25, 1939.

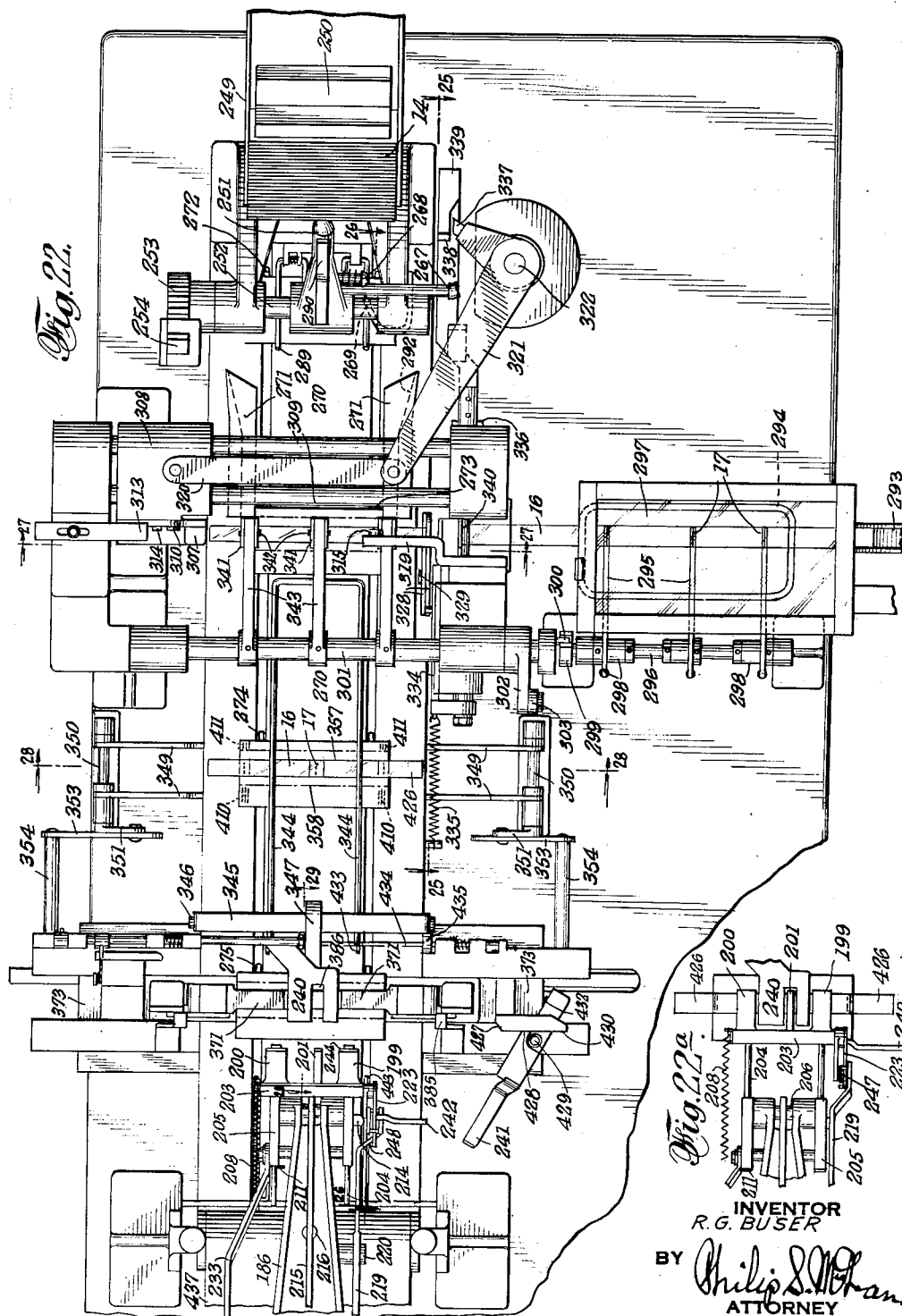
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PACKAGING OF RIBBON

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16 Sheets-Sheet 11



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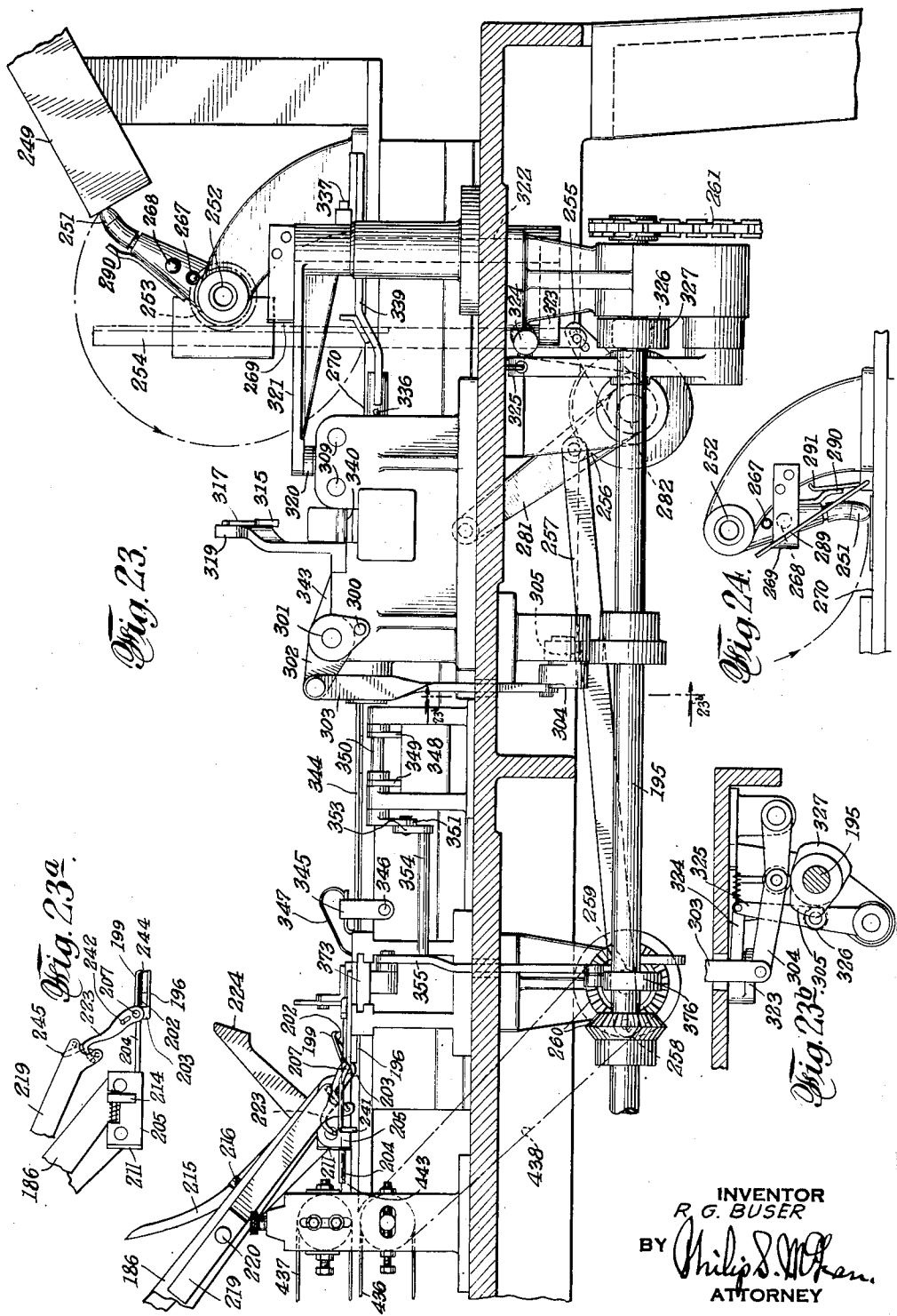
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PACKAGING OF RIBBON

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16 Sheets-Sheet 12



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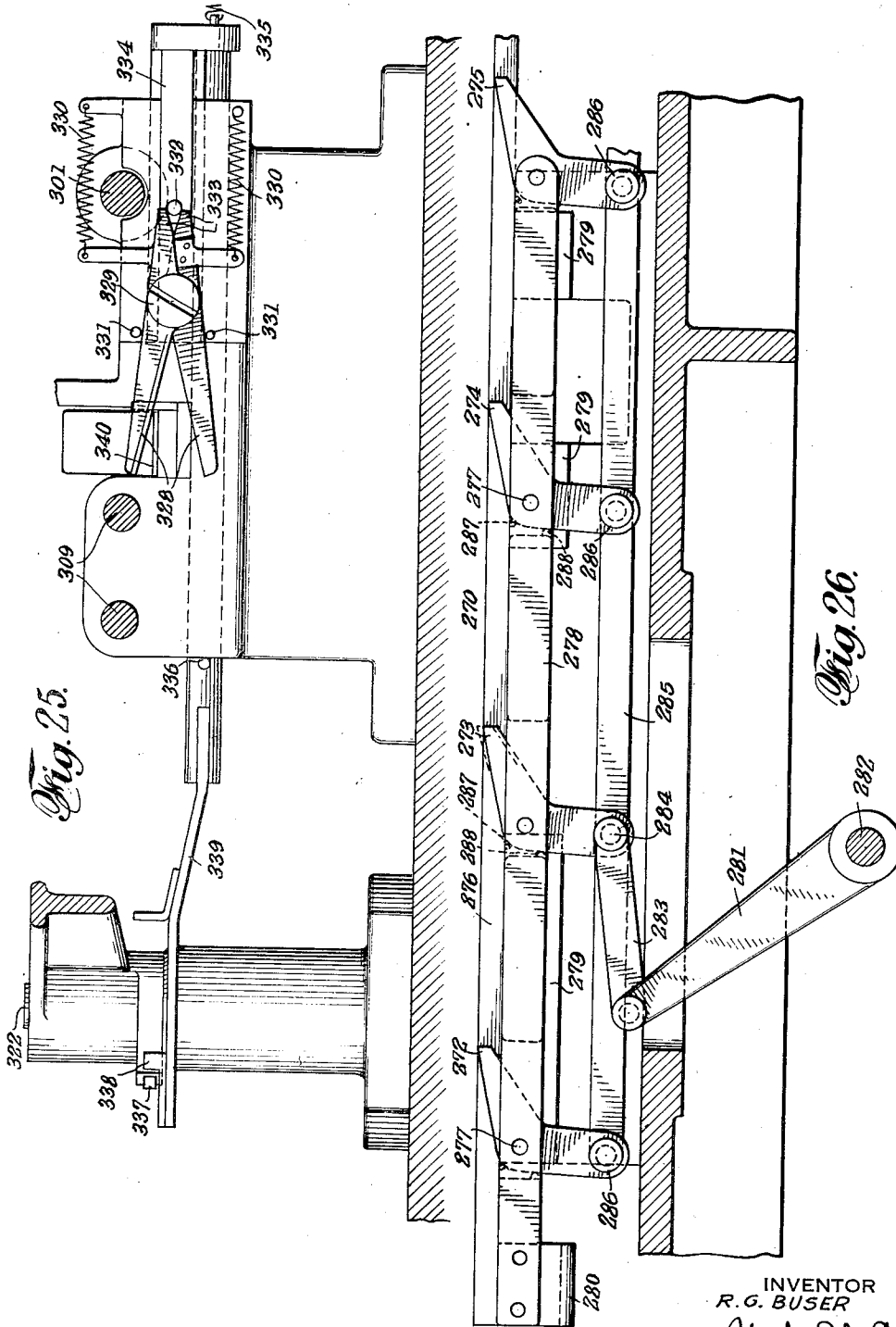
R. G. BUSER

2,155,641

PACKAGING OF RIBBON

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16 Sheets-Sheet 13



INVENTOR
R. G. BUSER
BY *Philip S. McFarlan*
ATTORNEY

April 25, 1939.

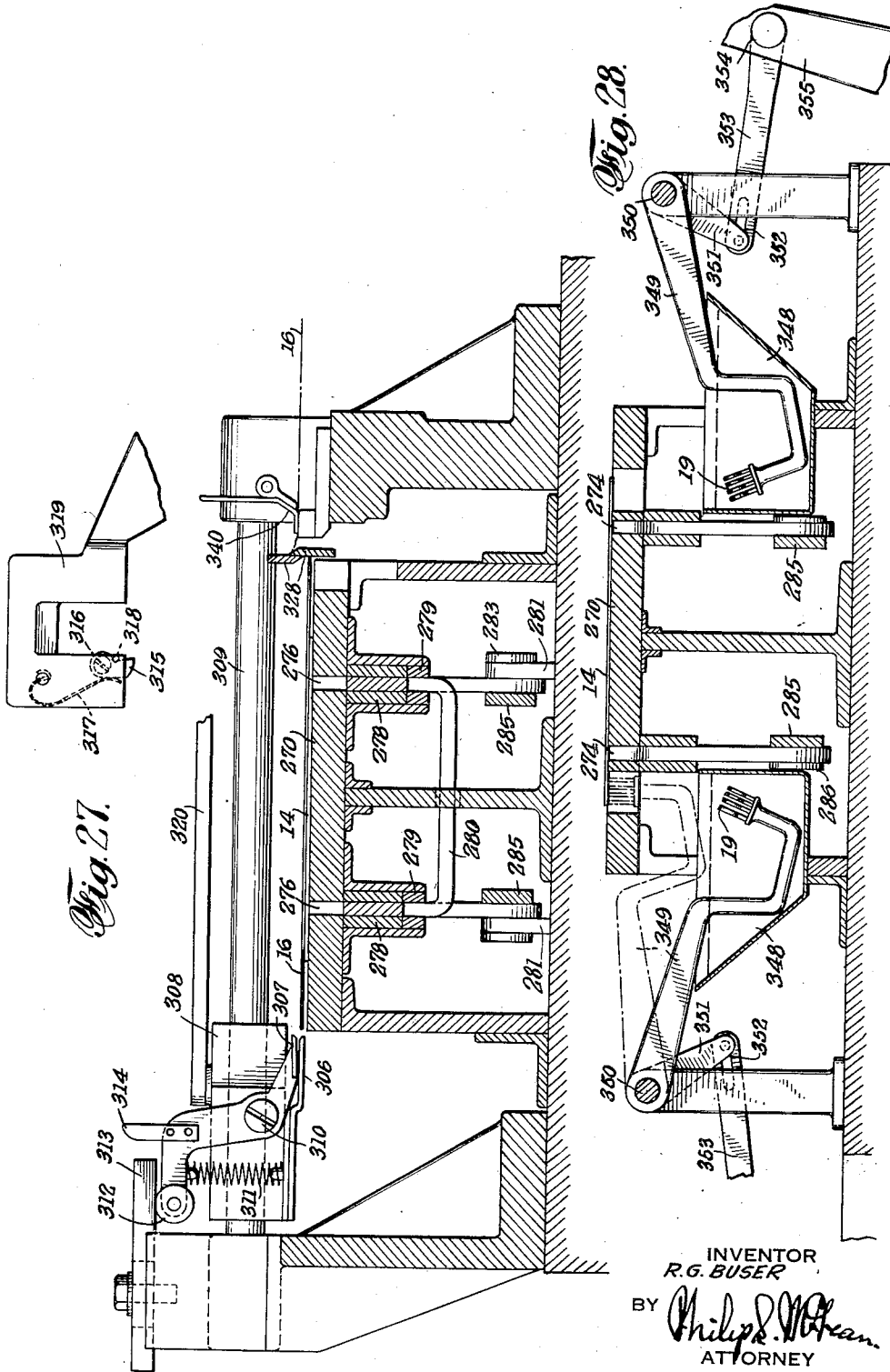
R. G. BUSER

2,155,641

PACKAGING OF RIBBON

Filed May 3, 1935

16 Sheets-Sheet 14



INVENTOR
R. G. BUSER
BY *Philip R. McMan*
ATTORNEY

April 25, 1939.

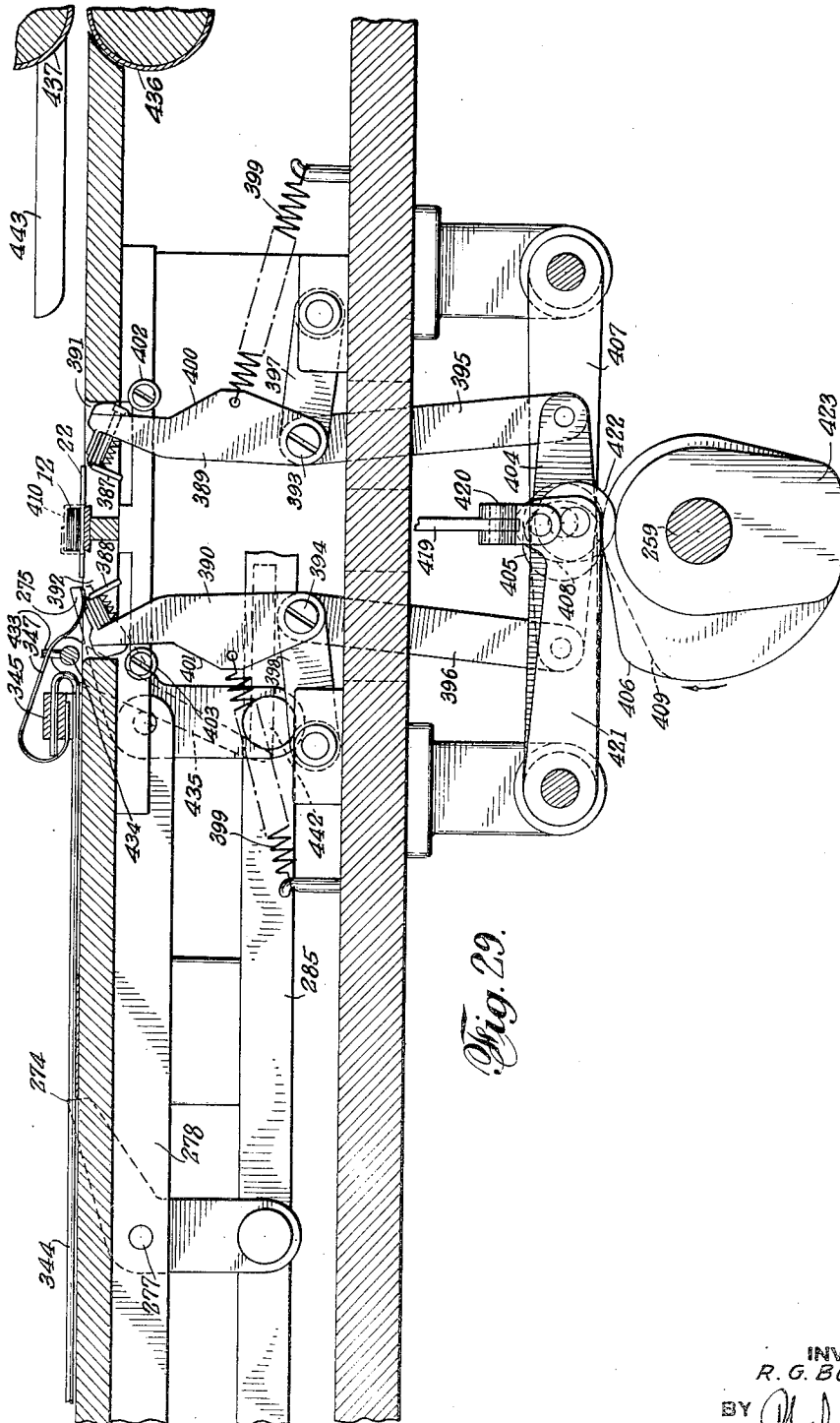
R. G. BUSER

2,155,641

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16 Sheets-Sheet 15



INVENTOR
R. G. BUSER
BY *Philip S. [Signature]*
ATTORNEY

April 25, 1939.

R. G. BUSER

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PACKAGING OF RIBBON

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Fig. 31.

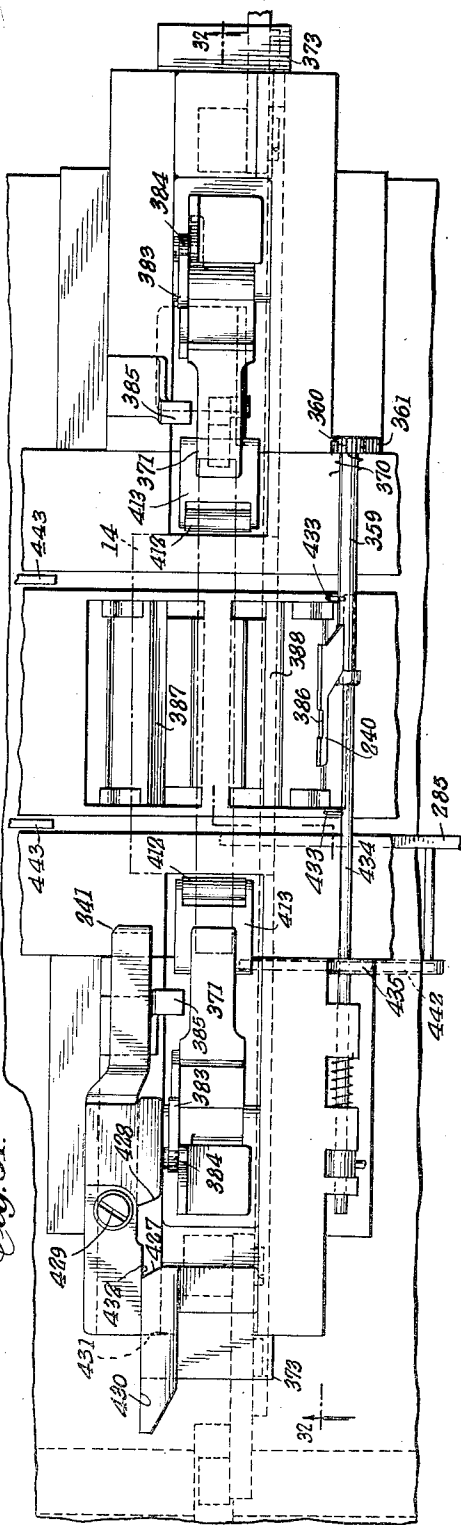
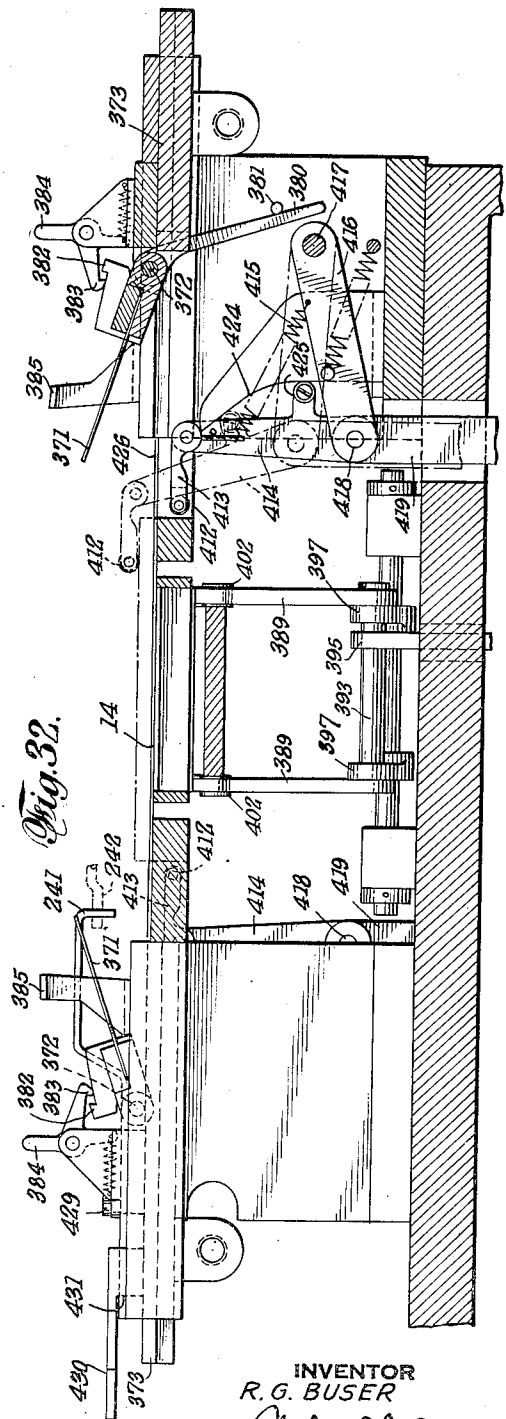


Fig. 32.



INVENTOR
R. G. BUSER
BY *Philip S. [Signature]*
ATTORNEY

UNITED STATES PATENT OFFICE

2,155,641

PACKAGING OF RIBBON

Raymond G. Buser, Paterson, N. J.

Application May 3, 1935, Serial No. 19,671

11 Claims. (Cl. 93—2)

This invention relates to the packaging of ribbon, tape and other materials.

Objects of the invention are to provide practical and efficient apparatus for measuring predetermined lengths of the material, winding such lengths in convenient hanks and then enclosing such hanks in boxes or covers.

Special objects are to make these finished packages as attractive as possible, to entirely enclose and protect the goods and, at the same time, to so display the goods that they may be judged for color, texture, etc.

Other objects and the many novel features of the invention are set forth or will appear hereinafter in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate the invention as now embodied in the commercial form, but the structure may be modified in many respects all within the true intent and scope of the invention.

Fig. 1 is a diagrammatic view illustrating in a general way the successive steps of measuring, winding and packaging as accomplished by the present machine.

Figs. 2, 3 and 4 are views illustrating the completed package; Fig. 2 showing the front or face of the package with the transparent windows exposing the ribbon, tape or other material; Fig. 3 illustrating the back of the package with the ends of the transparent window material sealing the overlapped back portions of the box or cover material and Fig. 4 being an enlarged broken sectional detail as on line 4—4 of Fig. 2.

Fig. 5 is a broken plan view of the complete machine.

Fig. 6 is an enlarged broken and partly sectional plan view of the ribbon or tape measuring mechanism.

Fig. 7 is a side elevational view of the same.

Fig. 8 is a fragmentary part sectional view of the automatic switch for stopping the mechanism after measuring a predetermined length of material.

Fig. 9 is a cross-sectional view of the machine as on substantially the plane of line 9—9 of Fig. 5.

Fig. 10 is a broken cross-sectional detail of guiding and holding means for the tape or ribbon, substantially as on line 10—10 of Fig. 9.

Fig. 11 is a further enlarged broken part sectional detail of one of the winders on the rotating head, illustrating the arm which carries the tape into the bite of the winder swung inwardly from the position in which it is shown in Fig. 9.

Fig. 12 is a fragmentary view of the tape guide on the swinging arm.

Fig. 13 is a broken vertical sectional view of the rotary carrier head and the means for imparting rotation to the winders on this head, this view being taken substantially as on line 13—13 of Fig. 9.

Fig. 14 is a broken rear elevation of the carrier head showing in particular the drives for this carrier and for the winder operating clutch.

Fig. 15 is a broken face view of one of the winders with certain associated parts indicated in broken lines.

Fig. 16 is a broken sectional view of the same as on substantially the plane of line 16—16 of Fig. 15.

Fig. 17 is a view in the direction of arrow 17 of Fig. 15, showing one of the winder posts and the associated clamp for gripping the strip material on the post.

Fig. 18 is a broken sectional detail as on line 18—18 of Fig. 15.

Figs. 19, 19a, 20, 21, 21a, are broken detail views of the swinging transfer arm for taking the hank off the winder and for depositing it in reversed relation on the wrapper or box blank prepared and positioned for the same, Fig. 19 showing this transfer arm in cooperative relation with the winder, Fig. 20 being a view looking in the direction of arrow 20 in Fig. 19, Fig. 21 being a broken plan looking down on the parts appearing in Fig. 19 and Figs. 19a and 21a being broken details of opposite sides of the transfer arm showing the gripper in the open relation, approaching the winder.

Fig. 22 is a broken plan view showing at the right the oscillating suction arm for transferring cover blanks from a magazine to a guideway, to the left of this, the means for applying the transparent window strip material over the window openings in the blanks, next to the left, the mechanism for applying adhesive to the cover blanks and finally at the extreme left, the hold-down and folder mechanism and the related transfer arm.

Fig. 22a is a broken plan view showing the gripper in the act of depositing the hank on the wrapper blank.

Fig. 23 is a broken and part sectional and side elevational view of the cover operating devices last described and showing the gripper in the open relation illustrated in Fig. 22.

Fig. 23a is a broken side elevation showing the gripper in the position illustrated in Fig. 22a.

Fig. 23b is a broken cross-sectional detail as on

line 23b—23b of Fig. 23, showing certain of the cam mechanisms.

Fig. 24 is a broken detail showing the swinging blank transfer arm in lowered position placing one of the blanks on the guideway for the same.

Fig. 25 is a broken cross-sectional view substantially as on line 25—25 of Fig. 22, showing particularly the cut off mechanism for the window strip material.

Fig. 26 is a broken part sectional detail of a reciprocating feed mechanism for the cover blanks, this view being taken on the general plane of line 26—26 of Fig. 22.

Fig. 27 is a broken part sectional view illustrating features of the blank feeder and the cut-off and feed mechanism for the window strip material, this view being taken substantially as on line 27—27 of Fig. 22.

Fig. 28 is a broken cross-sectional view substantially as on line 28—28 of Fig. 22, showing in particular the mechanism for applying adhesive to the corners of the cover blank.

Fig. 28a is a broken cross-section on approximately the line 32—32 of Fig. 31 and showing in particular the mechanism for operating the side folders.

Fig. 29 is a broken cross-sectional view, substantially as on line 29—29, Fig. 22, showing in particular the box blank folding fingers at this station.

Fig. 30 is a broken detail view of the mechanism for holding the hank while the folds are being made.

Fig. 31 is a broken plan showing details at the cover folding and securing station.

Fig. 32 is a broken cross-sectional view of the folding and cover securing parts as on substantially the plane of line 32—32 of Fig. 31.

Fig. 1 illustrates in diagrammatic fashion how the strip 1, which may be ribbon, tape, braid, cord or other material, is fed out in measured length by cooperating rolls 2, 3, is lightly tensioned, as by a ring 4, hanging in a loop of the same, passed over a guide roll 5, and thence beneath the guide 6, into the bite of cooperating gate members 7, 8, on a swinging arm 9. This arm (details of which appear in Figs. 9 and 11) has a movement which carries the strip over into the grip of cooperating jaws 10, 11, of a winder mounted on a carrier, which is then indexed to carry the winder up into the upper position shown. At this station, the winder is automatically clutched to a turning shaft and caused to thereby rapidly wind the strip into a flat hank, such as indicated at 12. As the winding of the length of material which has been fed is nearly completed, the arm 9 swings inward toward the carrier on its next stroke, carrying a bight of the strip over into the grip of jaws 10, 11, of the next winder on the carrier head and operates after thus placing the strip in the grip of this winder to sever the strip as indicated in broken lines at 13.

The winder is brought to a stop after completing the winding of the hank and the carrier head then advances another step to bring the hank to a transfer station.

While the above described operations are going on, a cover or box blank 14 is transferred from a stack indicated at the right in Fig. 1, down on to a guideway along which it advances into position to receive the hank.

These cover blanks are shown as having openings 15, to be covered by transparent window material.

At one station on the guideway, a strip of transparent cover material 16, such as "Cellophane" or the like, is fed out from a roll or other source, has dabs of adhesive applied to the underside of the same at 17, in a position to engage solid portions of the cover blank at opposite ends of the windows therein and as this window strip is fed out over the cover blank, it is severed at 18, and the adhesive portions pressed down on the cover blank.

At the next station on the guideway, adhesive is applied by fingers 19 to the four underneath corner portions of the cover blank.

The next step of advancement brings the box blank into position to receive the hank directly on top of the applied window strip. At this station, while the hank is held down, the side portions of the box blank designated 20 and 21, Fig. 3, are folded up about the edges of the hank and the back flap portions 22, 23, folded in one over the other. The adhesive applied to the corner portions of the inner back flap 22 serves for securing the flaps together and the adhesive applied to the corner portions of the outer back flap 23 serves for securing the end flaps 24, of the window strip as these are folded upward and inward over the back of the package.

The final result is thus the package illustrated in Figs. 2, 3 and 4, in which the hank of material is fully enclosed and protected within a closely surrounding attractive wrapper or box having the windows in the front of the same through which the wrapped material can be seen and inspected.

Measuring mechanism

The strip 1 which is to be packaged, passes from a roll or other source (not shown) between gripping rolls 2, 3, Figs. 6 and 7, the upper of which is driven and the lower of which is spring pressed toward the first by being journaled in a lever 25, pivoted at 26, and acted on by spring 27. The driven roll 2 is fixed on shaft 28, Fig. 6, having at one end a hand wheel 29, by which it may be turned for adjustment or other purposes.

Driving of the measuring and feeding roll 2, is effected by a pulley 30, journaled on the shaft 28, and having a cone clutch element 31, to match the corresponding cone clutch element 32, Fig. 6, in the adjacent face of the roll 2. The pulley 30, is shifted to engage and disengage the clutch elements by means of a forked lever 33, engaged with pins 34, on a collar 35, rotatably held on the hub of the pulley, said lever being acted on by a spring 36, to hold the clutch normally engaged and having attached to its free end a link 37, connected to the core 38, of a solenoid 39, which when energized will shift the lever reversely, to throw out the clutch.

To prevent over-running of the material, the measuring rolls are positively stopped when the driving clutch therefor is thrown out, by means of a brake disc 40, carried by the pivoted lever 41, Fig. 6, and coned to fit in a similarly conical seat in the face of the brake disc 42, on the end of the roll shaft 28, lever 41 being connected with the clutch lever 33, by link 43, so that the movement of the non-rotating brake disc 40, will be directly opposite to the movements of the pulley and clutch 30, 31. In Fig. 6, the pulley clutch 31 is engaged to drive the measuring roll 2 and the brake clutch at 40, 42, is disengaged. With energization of the magnet 39, it will be apparent that the pulley clutch will be disengaged to uncouple the driving force and that the non-ro-

tating brake disc 40, will be coupled to the rotary brake disc 42, to immediately stop rotation of the measuring roll. The magnet 39 accordingly, when energized, is effective to immediately stop operation of the measuring rolls and when de-energized, permits the measuring rolls to operate.

To control the stopping magnet 39, there is provided in the illustration, a gage wheel 44, having a rubber or other friction faced rim tracking on the cone 45, at the back of the measuring roll 2, Fig. 6, and carrying a pin 46, which as indicated in the detail view, Fig. 8, will engage the tip of a lever 47, to rock the latter sufficiently to carry the contact 48, into engagement with a relatively stationary contact 49. Suitable wiring 50 connects these contacts with the magnet 39. The tail of the contact lever is shown engaged by a spring pressed detent 51, which will cause this switch lever to snap over from one position into the other, after it is started in either a switch closing or a switch opening direction.

By shifting the gage wheel 44, along the cone 45, Fig. 6, the number of turns which the measuring roll 2 will make before it is stopped, may be predetermined to fix the length of material which will be advanced for each package. For this purpose, the gage or trip wheel 44 is shown journaled on the end of an arm 52, which can be adjustably secured at 53, along a supporting shaft 54, substantially parallel with the face of the cone. Similarly, the trip lever 47 is indicated as a part separate from the actual switch lever 55, and as adjustably secured at 56, along the shaft 57, carrying the switch lever, which shaft also is substantially parallel with the face of the cone. By setting the trip wheel 44 and the trip lever 47, at different positions along the mounting shafts 54 and 57, the switch may be operated at a greater or less number of turns of feed roll 2 and a consequently greater or less length of strip material be fed.

The switch described is thus closed to stop the strip feed for each rotation of the trip wheel 44. To open this switch, a link 58 is extended from an arm 59, of the switch lever 55, back to a trip lever 60, Figs. 5, 9 and 11, pivoted at 61, and carrying an inclined detent tooth 62, adapted to be picked up by a pin 63, on the back stroke or outward movement of the swinging arm 9, which carries the strip into the bite of the spinner on the carrier head. In the inward movement of the arm 9, Fig. 9, the pin 63 will ride over and take a position behind the inner face of the spring pressed tooth 62, Fig. 11. Then upon outward movement of this arm, this pin will rock the upper end of trip lever 60, outwardly to thereby pull the rod 58, inwardly causing the latter to rock the switch lever back into the open circuit position indicated in Fig. 8.

The belt 64 which operates the feed roll pulley 30, is shown in the general plan view, Fig. 5, as running from a pulley 65, on shaft 66, driven by chain and gear connections 67, from a reduction gear box 68, coupled by shafting 69, to motor 70.

Winding mechanism

Upon a horizontal shaft 71, carried by a standard 72, Figs. 9, 11, 13, there is rotatably mounted a three-armed carrier wheel or head 73, and on the arms of this carrier are mounted the so-called winders or spinners which take the strip and wind it into flat hank form.

This carrier is indexed to carry the winders

into receiving, winding and delivering positions by the drive gearing shown particularly in Figs. 9, 13 and 14, and comprising a chain 74, operating from sprocket 75, over a pinion sprocket 76, carrying spur pinion 77, in mesh with spur gear 78, which as illustrated in Fig. 13, is loose on the hub 79, of the carrier head but is frictionally coupled to this hub and to the back of the carrier by friction washers 80, 81, between opposite sides of said gear element and the hub flange 82 and the back of the carrier. In the particular showing in Fig. 13, the carrier head is slidably keyed on its hub at 83, and is pressed backward to yieldingly engage these clutch elements by a spring 84, about the hub, interposed between the face of the carrier and an adjustable screw abutment 85, on the outer end of the hub. This frictionally coupled form of drive permits the gear 78, to run continuously and the carrier head to be turned intermittently as permitted by the control mechanism now to be described.

Each arm of the carrier head is shown as having a lug or tooth 86, adapted to ride over a spring tensioned dog or pawl 87, Figs. 11 and 14, into engagement with a fixed tooth 88, on the end of a holding lever 89, pivoted at 90, and yieldingly supported in the carrier holding relation by spring 91.

This latch or holding mechanism is linked up with the swinging strip placing arm 9 so that upon the outward retreating movement of this arm, the carrier head will be freed and permitted to rotate to the next station.

This is accomplished in the illustration by providing an arm 92, on the end of rock shaft 93, which carries the swinging arm and by providing on the arm 92, Figs. 9, 11, 13, 14, a spring pressed hook 94, to pass up over a pin 95, on the holding lever 89, on the inward stroke of the arm 9, and on the outward stroke of this arm to pull the holding lever down far enough to release the tooth 88, from lug 86. Because of the difference of centers 90, 93, the hook 94, will release pin 95, after lever 89 has let go of the carrier lug 86, permitting lever 89, to snap back upward into position ready to catch the lug 86, on the next arm of the carrier. Lever 89 is shown as having a stop 96, located at the far side of the center 90, to properly limit the return movement of said holding lever.

Movement is imparted to the swinging arm 9, in the illustration, by means of a rocker arm 97, on the rock shaft 93, connected by link 98, to a lever 99, actuated by cam 100, Fig. 9.

The winders are alike and consist in each instance of a hub 101 carried by a spindle 102, freely journaled at 103, Fig. 13, in an arm of the carrier, said hub carrying strip holding and reeling devices and the spindle carrying at the back a frictional clutch member 104, engageable by the rotating disc 105, on the end of a shaft 106.

This shaft 106, Fig. 13, has a longitudinal clutching and unclutching movement in the rotary bushing 107, and is yieldingly clutched to that bushing by spring 108, engaged between a flange 109, on the end of the shaft and a clutch washer 110, pressed by said spring against the adjacent end of the bushing. Figs. 9 and 14 illustrate how rotation is imparted to the bushing 107, by means of a sprocket pinion 111, on the outer end of the bushing over which passes the chain 112, Fig. 5, down to a driving sprocket 113, on the gear box 68.

The shaft 106 is shifted inwardly to drive the

winder as in Fig. 13 by means of a walking beam lever 114, pivoted intermediate its ends at 115, having an adjustable abutment 116, at one end engaging the end of shaft 106, and engaged at its opposite end by a push rod 117, slidably mounted in a bearing 118, in the supporting standard and carrying the roller 119, engageable by the cams 120, Fig. 14, on the back of the carrier head. As will be clear from Fig. 14, these cams are positioned to rock the lever 114, and effect the driving relation shown in Fig. 13, when a winder spindle on the carrier comes into register with drive shaft 106 and the carrier is locked in this position.

Details of the strip holding and supporting portions of the winder appear in Figs. 15, 16, 17, 18, where it will be seen that the hub portion 101, carries outstanding arms 121, 122, provided with opposite and inwardly tapering strip supporting posts 123, 124. Cooperating with the first of these posts 123, is a spring pressed holding finger 125, pivoted at 126, and having an extending arm 127, adapted in the rotation of the winder, Fig. 9, to strike an abutment 128, which effects the release of this finger from the holding post 123, each time the latter approaches and crosses the line of the strip being wound, at the top in Fig. 9.

The gripper for holding the inner end of the strip consists in the illustration of a fixed outwardly projecting jaw 129, intermediate the posts 123, 124, and a companion jaw 130, pivoted at its inner end at 131, Fig. 16, and normally held in the jaw closed relation by the shoulder 132, of a slide 133, acting on the inwardly extending tail portion 134, of said movable jaw, this slide being acted on in a jaw closing direction by a spring 135. A shoulder 136, on slide 133, opposite the shoulder 132, by acting on the angularly projecting lug or tail portion 134, serves to throw the jaw open to the dotted line position of Fig. 16, when the slide is forced inwardly. As shown most clearly in Fig. 15, the jaws may have a mating or tongue and groove engagement one in the other as at 137, to insure firm grip on the strip material.

Opening of the jaws on the winder to take hold of the strip is effected as a part of the movement of the swinging arm 9, which deflects the strip inwardly into the plane of these jaws. For the purpose, there is provided on the swinging arm 9, Figs. 11 and 15, a pivoted spring pressed dog or pusher 138, which in the inward movement of the swinging arm engages an end portion 139, of the jaw opening slide to force this slide inward far enough for a hook 140, on the same to catch behind a spring pressed detent 141, which will temporarily hold the slide in the jaw open relation while the pusher 138, slips on past the corner of the shoulder 139, as indicated in broken lines, Fig. 15.

While the jaw 130, is thus fully open as in broken lines Fig. 16, the strip engaging edge 142, Figs. 9 and 13, on the swinging arm 9, has deflected the strip inwardly against the fixed jaw 129. As this takes place, an abutment 143, Figs. 9 and 11, forces back the spring detent 141, releasing the slide 133, and thereby causing the movable jaw to snap closed on the strip against the fixed jaw.

While these several operations are taking place, the winder is locked on the carrier head in the position shown in Fig. 11, and at the bottom in Fig. 9, with the generally flat faces of the jaws 129, 130, substantially parallel with what will be the inwardly deflected portion of the strip,

Fig. 1. Securing of the winder in this relation is effected in the illustration by a locking slide 144, operating in a guide 145, Fig. 11, in the carrier head and engaging a locking notch 146, in the hub of the winder.

The slide 144 for locking each winder is controlled by a rocker arm 147, Figs. 11 and 13, projecting from the back of the carrier into an opening 148, in the slide, said rocker arm being on one end of a short rock shaft 149, journaled at 150, and carrying at the opposite end a rock lever 151. The latter as indicated in Figs. 13 and 14 is acted on by a spring 152, applying its force to cause the locking slide to be thrust inwardly into holding engagement with the hub of the winder.

Release of the slide 144, which holds the winder, is effected at the upper, winding station as indicated in Figs. 13 and 14, by having the inclined nose 153, of the slide controlling rock lever 151, ride up over a stationary shoulder or abutment 154.

To lock the winder again after a hank is wound on at the upper, winding station and to prevent the head from turning before this operation is completed, the carrier head is permitted a slight movement after the locking lever 89, Fig. 14, is pulled down to release the head. At the moment the carrier is thus unlocked, the frictionally coupled gearing at 78, 80, 81, starts to turn the carrier, but such movement is almost immediately checked by a hook 155, on rock lever 151, coming in engagement with a stationary shoulder 156. This movement however, is sufficient to permit the inclined nose 154, at the opposite end of this rock lever to drop down over the edge 157, of abutment 154, which permits this lever to rock under the force of the spring 152, as soon as the notch in the then rotating winder comes into register with locking slide 144, which thereupon snaps into holding engagement with the winder. The movement thus occurring from engagement of the slide in the locking notch permits the lever 151 to rock far enough to shift the hook from behind the stop shoulder 156, which leaves the carrier then free to turn under the drive of the friction gearing on to the next station.

Strip severing means

The swinging arm 9, after carrying the strip inwardly, opening the movable winder jaw 130, and then permitting that jaw to snap closed on the strip pressed against the fixed jaw, effects the cutting of the strip at a point just above the gripper jaws.

Figs. 9, 11 and 13 show that the swinging arm 9 carries a lever 158, pivoted at 159, and having a slotted and inwardly angled upper end 160, receiving the shank of a screw or stud 161, on the outer end of a shear blade 162, pivoted on the swinging arm at 163, in cooperative relation to the fixed shear blade 164. These blades are angled as illustrated to make a bias cut approximately as indicated at 13, in Fig. 1, and as the arm 9, swings inward in Fig. 9, the movable blade will pass beyond the strip, ready to close against the inner face of the strip as in Fig. 11.

The closing of the shear blade to cut the strip is effected as the arm 9 approaches its inner position by the pin 166, on the lower end of the blade lever 158, coming into engagement with and passing along the stationary inclined cam or shoulder 167 and by the lever 158, contacting an abutment 165, Fig. 11, which serves in the

final inward movement of the arm to positively effect the final cutting movement of the shear blade. In the return or outward swinging movement of the arm 9, the hook 168, by its engagement with the pin 166, serves to rock the lever 158 in the reverse direction to open the shear blade.

Strip guiding and holding devices

In operating at the speed for which the machine is designed, it is important that the strip be kept under control at all points. Suitable guiding and holding means are therefore provided, comprising in the illustration, the following:

The swinging arm 9 carries at its upper end, just below the pusher 142, an edge guide 169, which as indicated in Figs. 9 and 13, may have an inclined or flaring leading edge to pass smoothly over the edge of the strip.

Mounted on the swinging arm 9, at some distance below the bending edge 142, Figs. 9, 11, 12, is a gate made up of the overstanding stationary guide 7, and a cooperating spring pressed lever 8, between which the strip passes. This gate acts also as a one way clutch, permitting the strip to feed freely forwardly therethrough against the light tension of the lever 8, but said lever rocking back to prevent any retractive movement of the strip. This gate, in addition to guiding and holding the strip against retrograde movement, reduces the length of free strip which the arm has to deflect, for as appears in Fig. 9, the arm is thereby holding at a lower point the same strip which it is bending at its upper end.

The gate on the swinging arm, as just described, locates the lower end of a stretch of strip which is bent over into the grip of the winder and the upper end of this stretch of material is determined by arcuate guide channels 172, on the carrier radially outward from the winders and substantially concentric to the carrier axis. These arcuate guides as indicated in Fig. 13, have flaring entrance wings 173, engaging over the edges of the strips in the rotative movements of the carrier wheel to center the strip in the channeled portions of these guides.

At the position where the arcuate guides 172, are in actual service, holding the strip definitely located with respect to the strip deflecting arm 9, and the associated winder, that is, in the winding position at the upper left, Fig. 9, a stationary presser member 174, Fig. 10 comes into cooperative action to hold the strip in the channel. This overstanding arcuate holding member or shoe 174, is shown as supported by a bracket 175, secured by a nut 176, Fig. 13, on the outer end of the stationary pivot shaft 71, of the carrier head. Also there is shown carried by this bracket, a bowed spring 177, to press lightly on the strip in the guide channel and a lightly spring tensioned lever member 178, bending the strip downward over the forward edge of the channel toward the winder, Fig. 9.

As a matter of saving time, the strip may be bent inwardly to engage it with one winder, while the preceding winder is still functioning and the gripping and severance of the strip are timed as closely as possible, so that as quickly as possible, after the strip is severed, the carrier head will be ready to move on to its next position. The winder may be rotated at fairly high speed, so that it will have finished its winding movement and be ready for the indexing movement of the carrier the instant the latter is freed from the

holding hook 88, effected in the outward swinging movement of the arm 9. The winder will therefore have completed its winding action and be ready to be locked by the slide 144, substantially as soon as the carrier is released by hook lever 88. In this initial releasing movement of the carrier, to the extent permitted by engagement of hook 155, with stop 156, Fig. 14, the cam roll 119, will drop off the cam 120, enough to permit the spring 108, Fig. 13, to unclutch the driving spindle 106, from the winder spindle 102. Then in the final rotary movement of the winder and with the hooknose 153, dropping off the shoulder 154, the slide 144, will be free to drop into the locking notch 146, for locking the winder as the carrier then turns on to bring the next winder to the winding station and to carry the filled winder on to the transfer station.

In this travel between the winding and transfer stations, the loose, cut end of the material may hang down from the lower side of the hank and to control this cut end, there are provided in the present machine, wiping devices designated 179, Figs. 9 and 11, carried by levers 180, pivoted on the carrier at 181, and tensioned by springs 182, toward the center of the carrier. Arms 183 of these wipers engage stop pins 184, to limit the inward throw. In the rotation of the carrier toward the right in Fig. 9, these arms will ride over the stationary inclined cam surface 185, to swing the wipers right-handedly in that view, in the course of which movement, the wiper blades 179, will lift and hold the cut edge firmly against the lower side of the bank. These wiper blades may be of rubber or in the nature of flexible bristle brushes which will lay the cut end smoothly up against the lower side of the hank, which at the time, is supported in the substantially flat horizontal relation shown.

Transfer from carrier to packaging mechanism

The three positions of the carrier wheel are all represented in Fig. 9. The strip 1 is carried by the timing arm 9, over into the bite of the gripper on the lower left hand winder, while the winder at the top is completing its winding on operation and while these actions are taking place, the carrier is at rest with the winder at the right locked in position, with the hank in the horizontal relation there indicated, releasably held by the spring tensioned finger 125, pressing toward the winder post 123, and with the cut end of the strip supported and held in place by the wiper 179.

While the hank is thus definitely located, a transfer arm comes up and after collapsing the winder posts and firmly gripping the hank, slips it off the posts, reverses it and lays it in reversed relation on a previously prepared and positioned wrapper on the wrapping mechanism.

The transfer arm is illustrated in its lowered position over the wrapper applying mechanism at 186, in Fig. 5. This view in conjunction with Fig. 9, shows how this arm is journaled at its base in bearings 187, and provided with a crank arm 188, engaged by a link 189, connected with a rocker arm 190, on shaft 191, provided with a rocker arm 192, engaged by link 193, connected with crank pin 194, on shaft 195. By means of such mechanism, the transfer arm is swung upward to the carrier wheel and sufficient time allowed while crank 194, is passing over one dead center for gripper fingers on the arm to close over the hank and then after the arm is lowered,

the slight dwell while the crank is passing over the other dead center is utilized for the opening of the gripper fingers to leave the hank deposited on the wrapper.

5 The transfer gripper as shown in detail in Figs. 19, 20, 21, consists of the flat relatively fixed jaws 196, 197, which are uppermost in the raised position of the transfer mechanism shown in these views and cooperating movable jaws 199, 10 200, and an intermediate lone jaw 201, having the hooked ends shown in Fig. 19, to reach in behind the back edge of the hank. To afford a yielding grip on the hank, the movable, lower jaws, as they will be called, may have light bowed 15 springs 202, on their upper faces as indicated in Fig. 21a. The fixed jaws are carried by a cross head 203, attached to the forward or inner ends of rods 204, sliding in the bearings 205, pivoted to rock at 206, on the free end of the 20 transfer arm.

The relatively movable jaws 199, 200, 201, are carried by rock shaft 207, journaled in the cross head 203, and this shaft is rocked to hold these jaws either in the open or the closed relation by 25 a spring 208, attached at one end to a bracket 209, on one of the slide bearings 205, and connected at its opposite end with a small crank arm 210, on one end of the gripper shaft. It will be apparent in Fig. 19, that as crank 210 30 swings past a dead center position, the spring 208, will be effective to snap the jaws open or closed in accordance with the direction of initial movement.

The spring 208 is also effective to slide the entire gripper carriage, in the bearings 205, to effect 35 retractive movement of the gripper jaws. Control of such action is effected in the illustration, by an abutment arm 211, which when positioned against its stop 212, overstands the end of one 40 of the slide rods 204. This catch or holding member is shown carried by a rock shaft 213, spring tensioned as in Fig. 21a in the holding direction. Release of this latch to permit the retractive movement of the grippers is effected 45 by engagement with a trip lever 214, on the shaft 213.

The retracted position of the gripper carriage is indicated in Fig. 19a and in such position, with the transfer arm swinging upwardly toward 50 the carrier wheel, the jaws are open, that is, the lower hooked jaws are dropped so as to pass beneath and behind the hank on the carrier. At approximately the position shown, the lower end of a lever 215, pivoted at 216, on the transfer 55 arm engages a relatively stationary abutment 217, to cause the upper end of this lever by engagement with the edge of the gripper cross head at 218, to thrust the gripper forwardly in advance of the arm which carries it. This gripper advancement continues as the arm 186 approaches the 60 carrier, enabling the latch 211, to snap over behind the slide rod 204, at a time when the gripper jaws are about in position to grasp the hank.

During the advancing movement of the gripper 65 jaws described, another lever 219, pivoted on the transfer arm at 220, is carried by the movement of the arm into position for its lower end to engage an adjustable stop screw 221, and as this occurs, as the arm is nearing the end of its upward 70 movement, the pin 222, on the upper end of such lever forces an arm 223, on the end of the gripper rock shaft 207, over sufficiently to carry the crank 210 past the dead center and enable the spring 208, to snap the jaws closed 75 as in Fig. 19. Thus the jaws are brought up over

the hank on the winder in open relation and closed at the last instant ready to take the hank off the winder.

Another operation effected in the upward movement of the transfer arm is the collapsing 5 of the winder posts to permit the hank to slide freely off the same.

As shown in Fig. 19, the transfer arm carries a projecting inclined cam 224, positioned to engage one arm 225, on a U-type lever pivoted at 226, 10 Figs. 15, 18, on the winder. The other arm 227 of this double lever engages over an edge or shoulder 228, on the winder jaw opening slide 139. This slide in addition to effecting opening movement of the jaw 130, to release the inner 15 end of the hank, also imparts retracting or collapsing movements to the hank posts 123, 124, through the medium of cam slots 229, therein, receiving pins 230, on the slides 231, 232, carrying the posts 123, 124, respectively. Thus as the 20 gripper jaws on the transfer arm come up and close over the hank on the winder, the movable jaw on the winder is opened to let go the inner end of the hank and the hank supporting posts 123, 124, are collapsed toward each other, so 25 that the hank will slide easily off the posts. It will be noted particularly in Figs. 19 and 21, that the companion jaws 196, 199 and 197, 200, grip and support the hank near the ends, just inside the posts 123, 124, and that the intermediate jaw 30 201, supports the intermediate section of the hank and the outer cut end of the strip supported at the time by the wiper 179, Fig. 9.

To pull the hank straight off the collapsed winding posts, the grippers are held to a substantially 35 horizontal movement in the first part of the retreating and lowering movement of the transfer arm. This is accomplished by means of a link 233, pivotally connected at its upper end at 234, with one of the rocking arms 205, in 40 which the gripper carriage slides, said link having a cam slot 235, at its lower end engaged over a relatively stationary pin 236. A spring 237, is connected to shift the lower end of this link to the right in Fig. 19, toward a stationary stop 45 238, positioned to engage an intermediate portion of the link. As the transfer arm swings back from the Fig. 19 position, the intermediate portion of the link 233 will be held by the spring 237, in a sliding rocking engagement with the 50 stop 238, the latter acting in the capacity of a fulcrum while during this first portion of the arm movement the spring is drawing the lower end of link 233 toward the right to the extent permitted by the length of cam slot 235, over 55 pin 236. After this lost motion is taken up, the link 233 swinging round the stationary pivot 236, at its lower end will cause the gripper carrying head 205, to swing toward the left, Fig. 19, the difference between this and the swinging arm 60 center 239 being sufficient to effect the complete reversal of the gripper head in movement from the upper position, Fig. 19, down to the lowered position over the wrapper.

In the latter position, the hank is completely 65 reversed, with the outer, cut end uppermost as in Fig. 22a. At this time, a holddown 240, rocks down over the hank and the gripper jaws are tripped open and retracted to leave the hank ready for wrapping. 70

The opening of the jaws is effected as indicated in Figs. 22 and 22a, by the end of a lever 241, striking the pin 242, on the rock arm 223, on the end of the gripper shaft 207. This movement is sufficient to carry the crank arm 210, 75

past the dead center enough to cause the spring 208, to snap the hook jaws upwardly to the open position. In the course of this jaw opening movement, after the hooks 244, of the movable jaws have opened sufficiently to clear the hank, the lever 245, which is fixed with or forms a part of rock arm 223, rides up over the inclined face of the trip arm 214, Fig. 20, to shift the latch 211, over from behind the end of the carriage slide 204, which thereupon is snapped back by the spring 208, to withdraw the jaws entirely clear of the deposited hank.

In the construction illustrated, the jaw opening movement is limited by contact of arm 223, Fig. 19a, with the pin 222, on lever 219. The jaw closing movement is limited in the illustration by engagement of the hooked ends of the jaws with the companion fixed jaws. A pin 246, on lever 219, spaced from the pin 222, and connected with the latter by a link or bridging portion 247, forms in effect a lost motion connection between lever 219, and the jaw controlling rock arm 223, the latter having an angularly projecting lug 248, at the end of the same preventing separation of these parts in the swinging movements of the transfer arm about its center 239, and the lever about its center 220.

As the transfer arm 186, swings back to the upper position indicated in Fig. 19, the link 233, as it fulcrums against the stop 238 and has the cam slot 235, forced up against the end of stationary pin 236, becomes a rigidly held member for firmly and securely maintaining the rocking gripper head 205, in the horizontal position definitely related to the winder mechanism on the carrier wheel.

Wrapper mechanism

The wrappers or box blanks 14, stacked on edge in an inclined holder at 249, Figs. 5, 22 and 23, slide down under the push of a follower 250, to a rotatably mounted suction arm 251, on a shaft 252, having a pinion 253, engaged by a rack 254, reciprocated by a rock arm 255 (Fig. 23), deriving its up and down motion from a connected rock arm 256, connected by link 257, with a crank pin 258, on the cross shaft 259. The latter is driven by bevel gears 260, from the longitudinally extending shaft 195, Figs. 5 and 9, which carries the crank 194, for operating the transfer arm 186. Shaft 195 is shown as driven by sprocket chain gearing 261, from a gear speed reduction box 262, Fig. 5, connected by shafting 263, with the electric motor 264.

From the shafting 263, the chain drive 265, operates a suction pump 266, connected by hose 267, with the suction arm 251. A spring tensioned valve at 268, on this arm controls the suction, being positioned to engage a cam 269, Fig. 22, to cut off the suction and leave the blank on the table or runway 270, with the end edges of the same in line with the overstanding edge guides 271, as in Fig. 22. In this lowering movement, the suction gripper slips the blanks in beneath the spring pressed holddown fingers 289, a cam 290, acting on the yoked intermediate portion 291, of these fingers to raise them sufficiently as the blank is slipped beneath the same. These spring pressed fingers hold the blank down in place as the suction is broken and the gripper returns to the upper position. As shown in Fig. 22, the overstanding edge guides 271, may have convergent entrance angles 292, to center the blanks as they start along the runway in the first feeding movement.

Step-by-step feeding of the blanks along the table or runway 270, is effected in the illustration by the pairs of feed dogs 272, 273, 274, 275, Figs. 26 and 27 working up through slots 276, in the feed table and pivoted at 277, between the pairs of spaced rails 278, which slide on the bearing shoulders 279, at opposite sides of the slots beneath the table. The pairs of slide rails 278, are connected together at the ends by yoke 280, and the two sets of feed fingers are reciprocated back and forth by arms 281, on rock shaft 282 (Fig. 23), connected by links 283, Fig. 26, with the pivots 284, at the lower ends of the feed fingers 273, these fingers being connected to rock the other fingers by links 285, similarly pivoted to the lower ends of the other feed fingers by pivots 286. The rocking movements of the feed fingers may be limited as by suitable cooperating stops 287, 288, Fig. 26, so that in the first part of the movement of the rock lever 281, toward the right, the tips of the feed fingers will be projected above the table surface in back of the blanks thereon and the feed fingers then be shifted bodily to advance the blanks toward the transfer arm and so that at the end of such movement, on the swinging of the rock lever in the reverse direction the fingers will first be rocked in a retracting direction and then be bodily shifted to the left back to the starting position.

The "Cellophane" or equivalent window material is shown in Figs. 1 and 22, as taken from a supply reel 293, at one side of the machine and as passing transversely to the direction of cover feed first over an adhesive pot 294, having the adhesive applying fingers 295, dipping therinto and spaced on the supporting shaft 296, to apply adhesive to the underside of the strip at 17, in line with the solid portions of the wrappers at opposite ends of the windows therein. A transparent cover 297, is shown over the adhesive container serving as a back plate against which the fingers may press the strip when applying the dabs of adhesive to the underside of the same. Springs 298, yieldingly couple the gluing fingers to the shaft 296, enabling these fingers to yieldingly and firmly apply the adhesive. This shaft is shown as rocked by means of a forked arm 299, on one end of the same engaged by a crank pin 300, on the end of rock shaft 301, which as shown in Figs. 23a, is oscillated by means of a rock arm 302, connected by link 303, with one end of a lever 304, whose opposite end is oscillated by cam 305, on the shaft 195.

The feeding out of the window strip is accomplished by companion gripper jaws 306, 307, Fig. 27, on the block 308, sliding on the transverse guide rods 309. The upper jaw 307, is pivoted at 310 and closed by spring 311. In the position indicated, Fig. 27, this movable jaw has been opened to leave the length of window strip material deposited on the wrapper by the engagement of a roll 312, on the extended tail portion of this jaw engaging beneath an overstanding shoulder 313.

In movement of the gripper block 308, toward the right in Fig. 27, an upstanding lug 314, on the tail of the movable jaw will pass beneath a cam lug 315, to effect first opening of the jaw and then as the lug passes over the cam point, closure of the jaw over the next protruding end of the window strip. In the movement in the feeding direction, that is toward the left, from this position of closure on the strip, the jaws

will remain closed, the lug 314, then forcing back the cam 315, about its pivot 316, against the spring 317, which normally holds this cam against a front stop 318. The cam 315, mounted to yield in this one direction, is shown as supported in a special overstanding bracket 319.

The gripper slide 308, Figs. 22 and 23, is reciprocated by a pivoted link 320, connected to an arm 321, on the upper end of upright shaft 322, which has at its lower end a rock arm 323, connected by a link 324, to the upper end of a spring tensioned rock lever 325, having a roll 326, engaging a cam 327, on the shaft 195.

Severance of the window strip material 16 into the proper lengths is accomplished in the illustration by shear blades 328, Figs. 22, 25, 27, pivoted at 329, over the edge of the feed table. Springs 330 tension these blades in the open relation indicated in Fig. 25, against stops 331, and closure of the blades is effected by a pin 332, wedging itself over the inclined cam edges 333, between the extended tail portions of the blades. This blade closing pin is carried by the slide 334, which is tensioned in the blade opening direction by spring 335, attached to one end of the slide, the pin 336, at the opposite end acting as a stop limiting such blade opening movement.

To shift the slide 334, in the blade closing direction, the upright rock shaft 322, is shown as carrying a spring pressed dog 337, which as indicated in Fig. 22, will yield to pass by the lug 338, as the shaft rocks left-handedly and in the reverse movement will positively engage the lug 338, to shift it and the slide to which it is connected by the bracket 339, toward the right in Fig. 22. This blade closing movement would be toward the left as viewed in Fig. 25, in which case, the pin 332, on the slide will wedge the tail portions of the blades apart to cause their cutting edges to come together over the interposed strip material. This severance of the pasted length of strip occurs, when as indicated in Fig. 27, the gripper 306, 307, has advanced the strip transversely across the feed table and the grippers have opened to drop this advanced portion on to the wrapper which has been shifted into position beneath the strip.

In the continued movement of the gripper toward the left in Fig. 27, after dropping the cut strip, the actuating dog 337, Fig. 22, passes on by the lug 338, releasing the shear actuating slide 334, which thereupon is snapped to the left by spring 335, to again open the jaws as in Fig. 25. At such time, the end of the strip remaining attached to the spool is held by the gravity clamp 340, Fig. 27, in position to be taken by the gripper 306, 307, on its return movement to the right in this view.

To assure proper adhesion of the length of window strip material to the wrapper, pads or pressed fingers 341, are indicated in Fig. 22, which press the strip down over the three places where the adhesive has been applied to the underside of the strip. These pads are indicated as pivotally mounted at 342, in the ends of rocker arms 343, on the same rock shaft 301, which actuates the glue or cement applying fingers 295.

After having the window strip secured to it as described, the wrapper is advanced by the second set of feeding fingers 273, Fig. 26, to the station where glue or other adhesive is applied to the wrapper blank. During such movement, the blank with the attached window strip passes beneath the elongated holddown fingers 344, Figs. 22, 23 and 29, overlying the table, supported at

the back by a yoke 345, pivoted to the sides of the table at 346, and tensioned in a holding down direction by spring 347.

The wrapper gluing fingers 19, Figs. 1, 22 and 28, are four in number, positioned to apply spots of adhesive to the four corner portions at the underside of the blank. These operate up and down in the glue pots 348, being carried by the arms 349, on the rock shafts 350, having the rock arms 351, with the lost motion connections 352, to links 353. These links are engaged by extensions 354, Figs. 23, 28, 28a, from the levers 355, pivoted at the opposite sides of the feed table at 356.

Wrapper folding and securing

The wrapper in the flat condition illustrated at the center of Fig. 22, with the window strip secured to the upper and what becomes the inner face of the same and the adhesive applied to the four corners of the under or outer face of the same is passed along by the feed fingers 274, Fig. 26, to the next station to the left in Figs. 22 and 23, in time to have the flat hank 12, of ribbon or other material deposited on top of the same immediately over the window strip. As shown particularly in Figs. 1 to 4, the hank is the width of this window strip and the length of the box blank. The box blank is shown in Fig. 1 as scored on the lines 357, along opposite edges of the window openings 15, and scored along the parallel lines 358, to form the box sides 20, 21, Figs. 2 and 3, and the full width inner back flap 22 and the narrower or half width outer back flap 23.

As described in conjunction with the transfer operation, the holddown finger 240, Figs. 22, 30 and 31, turns down over the hank as the latter is placed on the wrapper, so as to hold this hank and the wrapper firmly in position as the gripper jaws of the transfer arm open and retreat to leave the hank on the wrapper. In this action, the flat bladed (heretofore termed "the upper") jaws 196, 197, of the gripper simply slide back over the face of the wrapper from beneath the hank deposited thereon.

The hank holder 240, as probably best shown in Fig. 30, is carried by a spindle 359, and is rocked downwardly from an upright to a lowered position engaged with the hank through the medium of a pinion 360, on the spindle engaged by a gear segment 361, pivoted at 362, and connected with a slide 363, which has a tooth 364, engaged by a push lug 365, on the feed finger connecting bar 285, Fig. 29. The slide 363, is then temporarily locked in this hank holding relation by the spring pressed holding dog 366, engaging a shoulder 367, on the slide. On the return movement of the feed finger 285, a cam 368 engages the extended lower end 369 of the holding dog to release the slide 363, and permit a torsional spring 370, to return the parts to position with the hank holder uplifted and clear of the hank as indicated in the broken lines, Fig. 30.

To hold the hank while the wrapper is being folded up about the same, after the holddown member 240, has let go, the holding blades 371, Figs. 22, 31 and 32, are provided to advance inwardly over opposite ends of the hank. These are shown pivoted at 372, on the opposed transverse slides 373, which as indicated in Fig. 28a, are connected by pivoted links 374, with the upper ends of the upright rocking levers 355. One of these levers has an angularly projecting arm 375, carrying a roll engaged with a cam 376, on the cam shaft 195, and this lever is shown as having

a lower extension 377, below the pivotal support 356, connected by cross link 378, with a pivot point 379, on the other rock lever 355, a corresponding distance above its pivotal support 356, the result of such construction being that the opposing slides 373, will be caused to approach and recede in unison.

In the outward or separating movement of these slides, Fig. 32, the extended tail portions 380, of the pivoted holding blades 371, strike the stationary abutment pins 381, to rock these blades so that the shoulders 382, thereon will rock by and be caught by the pivoted spring pressed latches 383.

In the inward, approaching movement of the slides 373, the upstanding portions 384, of the latches 383, strike the overstanding stationary abutments 385, to release the latches and drop the blades down into holding engagement over the opposite ends of the hank on the wrapper.

Fig. 22 shows how the blades 371 can come in over the hank, ready to take hold as soon as released by the stationary trips 386, while the hank is still held by the holddown 240. This view also shows how this holddown is cut out in its central portion 386, to clear the intermediate finger 201 of the transfer gripper. The parts may be so proportioned and timed that all three holddown devices, that is, the member 240, and the members 371, 371, may hold the hank down while upward folding of the edges of the wrapper blank is started, but the member 240 should be out of the way by the time the sides of the wrapper are bent upward over the side edges of the hank. The end blades 371 however may, and in this illustration, do remain down over the hank while the sides of the wrapper are being formed.

Fig. 29 illustrates this last mentioned feature of the blades 371, remaining in holding position over the hank while the wrapper is folded up about the sides of the same. In this view, the folding blades are indicated at 387, 388, carried by the fingers 389, 390, and working up through openings 391, 392, in the table at opposite sides of the temporarily held hank. The folder fingers 389, 390, are pivoted at 393, 394, on the upper ends of links 395, 396, guided in their vertical movements by the pivoted links 397, 398, connected with the pivotal centers 399, 394. Springs 399 draw the folder fingers outward as in Fig. 29, with the upper ends of the fingers abutting the outer edges of the guide openings 391, 392, in their retracted positions shown or the cam surfaces 400, 401, on the fingers riding over positioning rolls 402, 403, as the fingers are projected.

The link 395 supporting the first folder finger, Fig. 29, is pivoted at its lower end to a rock lever 404, carrying a cam roll 405, riding a cam 406, on the cross shaft 259. The link 396 supporting the second folder finger similarly is pivotally connected at its lower end to a rock lever 407, carrying a cam roll 408, riding a sequentially acting cam 409, on rock shaft 259.

By reason of this construction, the first folder blade 387, Fig. 29, comes up and bends the scored portions of the blank to form the side 20, Fig. 3, and full width back flap 22. As this folder is operating, the second folder blade 388, starts bending the other scored portion to form the other side 21, and the shorter width back flap 23, laying the latter down over the previously folded full width back flap 22. In so doing, the adhesive placed by fingers 19 across the ends of the wide back flap at 410, Fig. 22, is brought uppermost so as to secure the narrower flap

when the latter is laid down over the same and the adhesive 411, across the ends of the narrower flap is left exposed, along with that portion of the adhesive 410, which remains uncovered by the narrow flap 23.

After the wrapper blank is thus formed up about the hank and the back flaps secured one over the other, the projecting ends of the window strip are turned up and sealed over the ends of the lapped back flaps as shown in Figs. 3 and 4. This action is accomplished by the mechanism illustrated in Figs. 29, 31, 32, and comprising the folder rolls 412, carried by levers 413, pivoted on the upper ends of links 414, and yieldingly tensioned in the inwardly projecting relation shown by springs 415, connected with links 416, pivoted at their outer ends at 417, and pivoted at their inner ends at 418, on the centers which pivotally mount the links 414, on the upper ends of the vertically operating links 419. The latter as indicated in Fig. 29, are connected by universal joints 420, to rock levers 421, carrying cam rolls 422, riding on cams 423, on the transverse cam shaft 259, only one set of these parts appearing in this view.

The end folder fingers 413, have a compound vertical and transverse movement imparted to them by cams 423, and by stationary cams 424, Fig. 32, engaged by cam rolls 425, on the finger carrying links 414.

The effect of the end folder fingers 413, is to first bend the projecting end portions 426, of the window strip up over the ends of the hank and then inward over the back of the box shaped wrapper, as in broken lines at the right in Fig. 32. In the latter part of this motion, the projecting end flaps 426, are forced down over the exposed portions of adhesive 410, 411, on the back flaps of the wrapper. The rolls 412, on the ends of these folder fingers thus have the effect of smoothing the transparent strip material up over the ends of the hank and then ironing it down in smooth secured relation over the back flaps of the wrapper, thus providing in effect end seals for the package.

The lever 241, Figs. 22, 31 and 32, previously described for tripping the transfer gripper open to leave the hank deposited on the flat wrapper blank, is operated in the present disclosure by a cam shoulder 427, on the left hand slide 373, which as best shown in Fig. 31, engages a shoulder 428, on the trip lever 241, to swing it around its center 429, outward in the inward movement of the slide. As the cam shoulder 427 goes past the shoulder 428, Fig. 22, an abutment face 430, on the slide holds the trip lever in the outwardly swung position until in the return movement of the slide a shoulder 431, thereon engages the lever at 432, and rocks it back to the position shown in Fig. 31.

The sealing flaps 426, may be temporarily held while the glue is setting by fingers 433, Fig. 31, carried by a rock shaft 434, actuated through a rock arm 435, from a cam 442, on the other feed link 285, before passing under the stationary holddown bars 443, Fig. 29.

The completed packages are advanced from the wrapper folding and sealing station by the last set of feed fingers 275, between the carrying off belts 436, 437, Figs. 5, 22, 23, 29, which may be suitably driven as by the belt or chain drive from the cross shaft 259, as indicated at 438, in Fig. 23. These belts may deliver into boxes or other containers or simply into a hopper or chute as indicated at 439, Fig. 5.

The many related operations performed by the machine requires a high degree of accuracy in timing. This is accomplished largely by actuating the several related mechanisms all from the one cam shaft 105. The cam 100, Fig. 9, which operates the swinging cut off arm 9, is shown on a separate shaft 440, but this is directly driven by gearing 441, from the shaft 105.

While it is practical and convenient to have two motors as shown at 70 and 264, Fig. 5, it will be realized that all mechanisms may be driven from a single motor.

In the machine shown, the first motor, 70, simply furnishes power for driving the measuring device at 2, and for indexing the carrier head 73, and turning the winders on that head as they reach the winding station. The other motor 264, is larger and heavier as it furnishes the power for driving all the other parts of the machine.

The guide roll 6, Figs. 1, 5 and 9, for forming a downward loop in the stretch of tape or ribbon feeding into the machine is shown as carried by a swinging link 442, pivoted at 443, to the knife arm 9, to keep the stretch of material under better control. The ring 4, by riding in a loose bight of the material as in Fig. 1, operates to hold the necessary slack between the strip feed mechanism and the swinging arm 9 in proper order.

While particularly adapted to winding and packaging ribbon and tape, it will be apparent that the invention may be adapted to the handling of many different kinds of strip material, including materials in the nature of cord, etc. The various mechanisms illustrated hold the material under proper control at all times and operate rapidly and practically continuously. Thus, while material is being wound on at the winding station, the pendant portion of that same length of material is being carried into the grip of the next winder and is severed at the moment it is gripped in this second winder, which then immediately goes forward to the winding station, while the hank on the preceding winder is transferred to the wrapper applying mechanism. At this last mentioned station, the hank is held while the wrapper is being folded about the same. A feature of this is that the flat blades 371, Figs. 31, 32, which hold down the ends of the hank while the edges of the wrapper are being folded up about the same can be kept in place, while the final wrapper folds are being made and need not actually be withdrawn until after the back folds are secured and just prior to the folding of the projecting window strip material up over the back of the box.

By folding the back flaps of the box wrappers over the backs of the end holddown blades 371, these blades are utilized as internal formers for the side corners of the boxes and as supports preventing the side folders from crushing the back of the box down over the enclosed hank of material. The blades after serving these functions or while these operations are going on, may be quickly withdrawn endwise from within the formed box structure.

The hanks are wound without cores and hence the expense and weight of cores are saved and the package is kept that much smaller and lighter. The wrapper is folded closely about the hank, so that the hank will be firmly held and can not slip about. It will thus be kept in smooth shape regardless of shipping and han-

dling. This close fitting form of wrapper saves packing space and enables the use of light weight cardboard or paper, since the wrapper and the hank mutually reinforce each other. The windows may be made substantially the full length of the package as indicated, to provide with the transparent end closures practically a full view of the hank. The strip of window material being substantially the full width of the package and of the enclosed hank also acts as a reinforcement. In bending across the ends of the hank, this window strip practically fills the space between the sides of the box, thus acting both as closures and as transverse braces for the box ends.

The side folders 387, 388, Figs. 29, 31 and 32 which carry first the wider back flap and then the narrower back flap across the back of the hank may, one or both remain in holding engagement over the back of the package while the end blades 371, are withdrawn and may in fact, hold the package down while the end folders 412, are working the end flaps up over about the ends of the package, this being possible in a construction like that shown, where the side folders need not extend the full length of the wrapper, thus leaving space at the ends for the folders 412, to work the end flaps inward over the ends of the package.

As the invention has many uses and is of broad scope, it will be understood that terms employed herein have been used in a descriptive rather than in a limiting sense and that the claims are to be construed accordingly.

What is claimed is:

1. In a machine of the character disclosed for operating on wrapper blanks having window openings, means for securing window material over the window openings of said wrapper blanks, means for placing material to be wrapped on the secured window material on said blanks, means for folding the blanks about said placed material and means for securing the window material over said folded blanks.

2. In combination, wrapper applying mechanism and transfer mechanism including cooperating gripper jaws, one consisting of a substantially flat blade and the companion jaw having a hooked end to reach in back of a hank of wound strip material, means for traversing said gripper between a receiving station and said wrapper applying mechanism arranged to position the flat blade jaw uppermost at said receiving station and lowermost at the wrapper applying mechanism and means for automatically effecting opening and closing movements respectively of the hooked jaw at said wrapper applying mechanism and at said receiving station.

3. In combination, wrapper applying mechanism and transfer mechanism including cooperating gripper jaws, one consisting of a substantially flat blade and the companion jaw having a hooked end to reach in back of a hank of wound strip material, means for traversing said gripper between a receiving station and said wrapper applying mechanism arranged to position the flat blade jaw uppermost at said receiving station and lowermost at the wrapper applying mechanism, means for automatically effecting opening and closing movements respectively of the hooked jaw at said wrapper applying mechanism and at said receiving station and said latter means including mechanism for effecting bodily retracting and pro-

jecting movements of said jaws at said wrapper applying mechanism and said receiving station respectively.

4. In a machine for operating on wrapper blanks foldable on lines to form a box front, sides and full width and part width back flaps, means for folding said blanks to lay the substantially full width back flaps inside the part width back flaps, means for previously applying adhesive across the outer end faces of said back flaps, whereby in folding as described exposed adhesive will be left on the outer end face of the part width flap and on the exposed portion of the substantially full width flap which is left uncovered by the outside flap and means for securing end closures for the boxed wrapper over said adhesive portions on the ends of the back flaps.

5. In combination, means for associating material and wrappers for the same with the material resting on a wrapper, a holddown engageable over the intermediate portion of the material, end holddowns engageable over the end portions of the material, side folders for bending up the sides of the wrapper about the material while held by said end holddowns, means for effecting removal of the intermediate holddown before said side folders bend the wrapper about the material, end folders for folding flaps up about the ends of the wrapper and means for effecting removal of the end holddowns after operation of the side folders and prior to operation of said end folders.

6. In combination, means for transferring hanks of strip material to a wrapping station and in so doing turning the hanks over, means for feeding in wrapper blanks beneath the hanks at the wrapping station and folding mechanism at said wrapping station for bending the wrapper blanks about the upper sides of the hanks.

7. In combination, mechanism for intermittently advancing wrapper blanks in one direction, a gripper operating transversely across the line of wrapper feed, a holder for retaining the leading edge of a strip of window material in position to be taken by said gripper, cut off mechanism adjoining said holder, means for closing said cut off mechanism to cut the strip after the gripper has advanced across the line of wrapper feed and for opening said cut off mechanism while the gripper is making its next advancing stroke and means for closing said gripper on the cut edge of the strip retained by the holder to enable the gripper to advance the strip through the opened cut off mechanism and means for opening the gripper at the end of its strip advancing movement.

8. In combination, a feed table, means for depositing wrapper blanks on one end portion of said feed table, sliding rails below said feed table, feed fingers pivoted in spaced relation on said rails and adapted to project up above the table

and be lowered below the table surface, links connecting said feed fingers to rotate and reciprocate them in unison, means connected with said links for effecting reciprocation of the rails and oscillation of the feed fingers, stop means limiting oscillation of the feed fingers, holddown means for blanks on the feed table and connections from said link operating means for raising and lowering said holddown means in timed relation with the operation of said feed fingers.

9. In combination, a wrapper support, means for depositing flat hanks of strip material on wrappers on said wrapper support, side folders operable up through the support at opposite edges of the hanks to fold the sides of the wrappers up over the edges and across the backs of the hanks thereon, means for holding said hanks down on the wrappers while said side folders are so operating, and end folders operating up about the ends of the wrappers acted on by said side folders.

10. In combination with a wrapper support, a gripper operating across the same, means for positioning window material in position to be taken by said gripper, including a holder for retaining the leading edge of a strip of window material in position to be taken by said gripper cut-off mechanism adjacent said positioning means, means for closing said cut-off mechanism to cut the window material after the gripper has advanced across the wrapper support and for opening said cut-off mechanism, while the gripper is making its next advancing stroke, means for closing the gripper over the cut edge of the window material strip retained by said holder to enable the gripper to advance the material through the opened cut-off mechanism and means for opening the gripper at the end of its advancing movement across the wrapper support.

11. In combination with a wrapper support, a gripper operating across the same, means for positioning window material in position to be taken by said gripper, including a holder for retaining the leading edge of a strip of window material in position to be taken by said gripper cut-off mechanism adjacent said positioning means, means for closing said cut-off mechanism to cut the window material after the gripper has advanced across the wrapper support and for opening said cut-off mechanism, while the gripper is making next advancing stroke, means for closing the gripper over the cut edge of the window material strip retained by said holder to enable the gripper to advance the material through the opened cut-off mechanism, means for opening the gripper at the end of its advancing movement across the wrapper support and means for applying adhesive to the window material prior to its reaching the cut-off mechanism.

RAYMOND G. BUSER.