United States Patent

[11] 3,577,702

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[21] Appl. No. **790,587**
[22] Filed **Jan. 13, 1969**
[45] Patented **May 4, 1971**

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[54] **BANDING MACHINE**
10 Claims, 12 Drawing Figs.

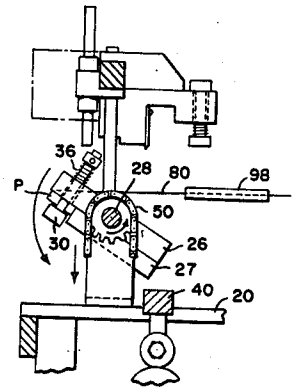
[52] **U.S. Cl.** **53/198,** 100/15
[51] **Int. Cl.** **B65b 13/02**
[50] **Field of Search** 53/198, 211; 100/15

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ABSTRACT: A banding machine wherein a strip of banding material is fed onto an article supported at a banding station. The article and the strip of banding material are gripped together and then given a revolving motion to cause the banding material to be wrapped completely around the articles. The wrapped portion of the banding material is then secured together in a wrapped condition by a heat sealing operation and served from the supply strip.



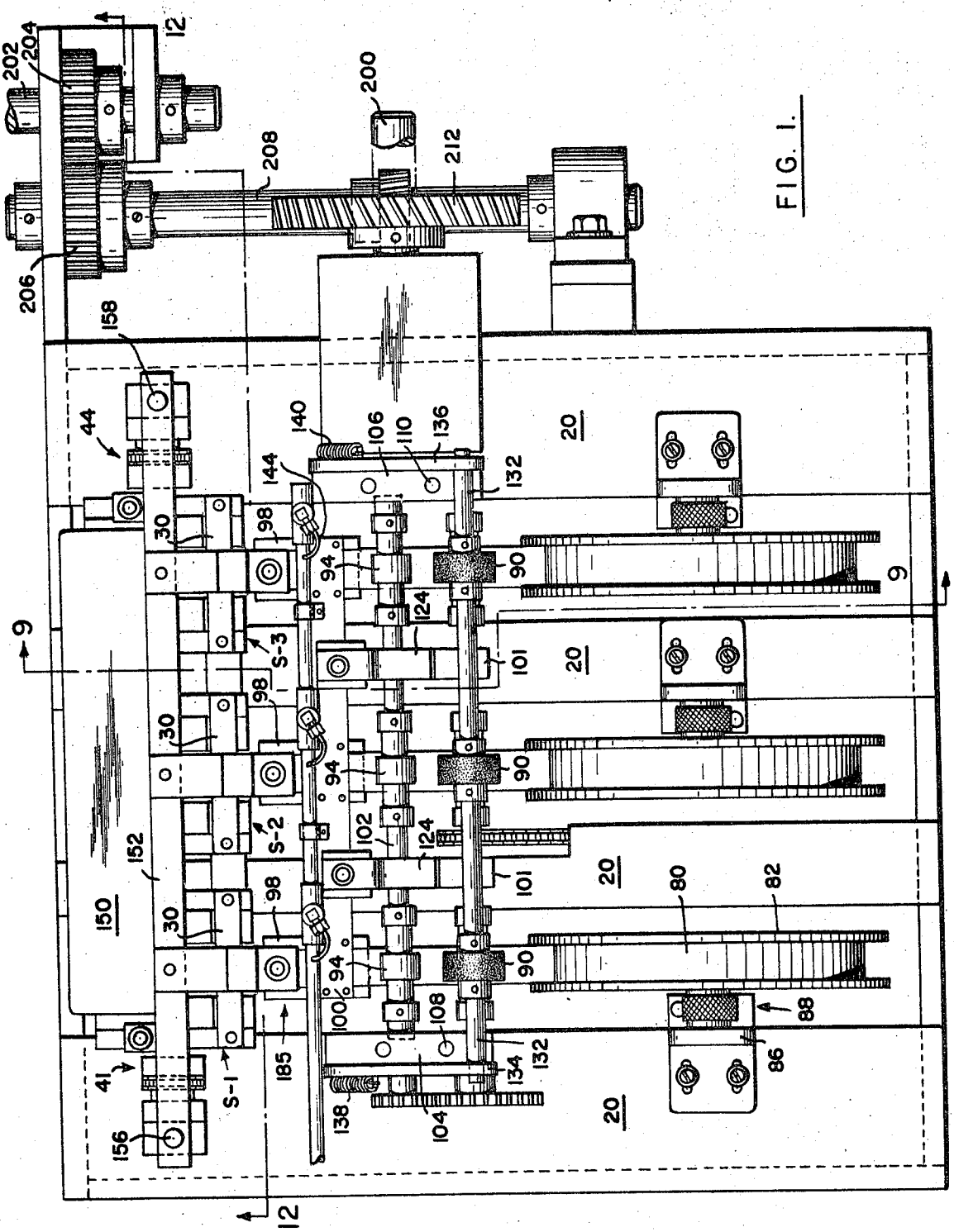


FIG. 1.

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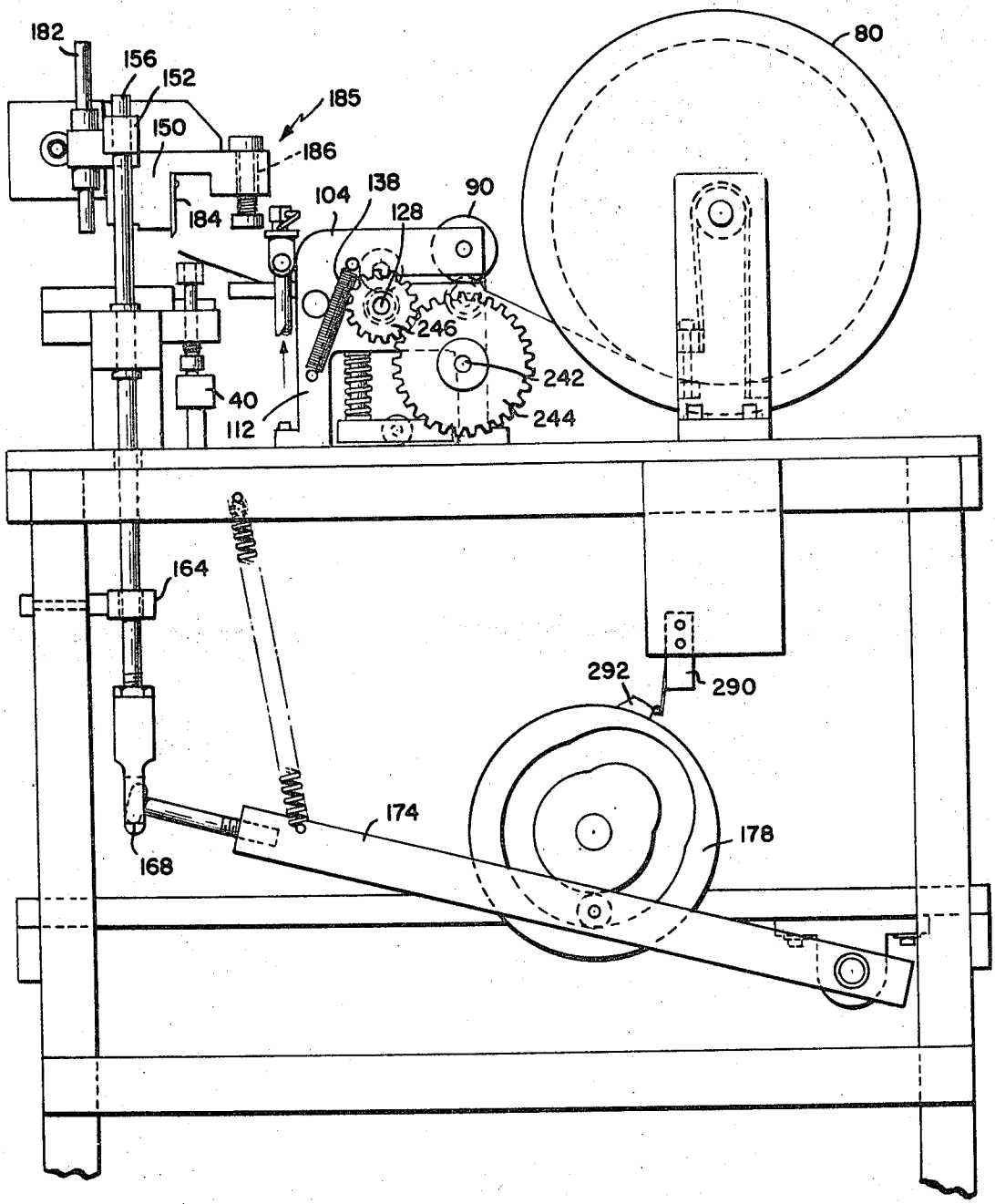


FIG. 2.

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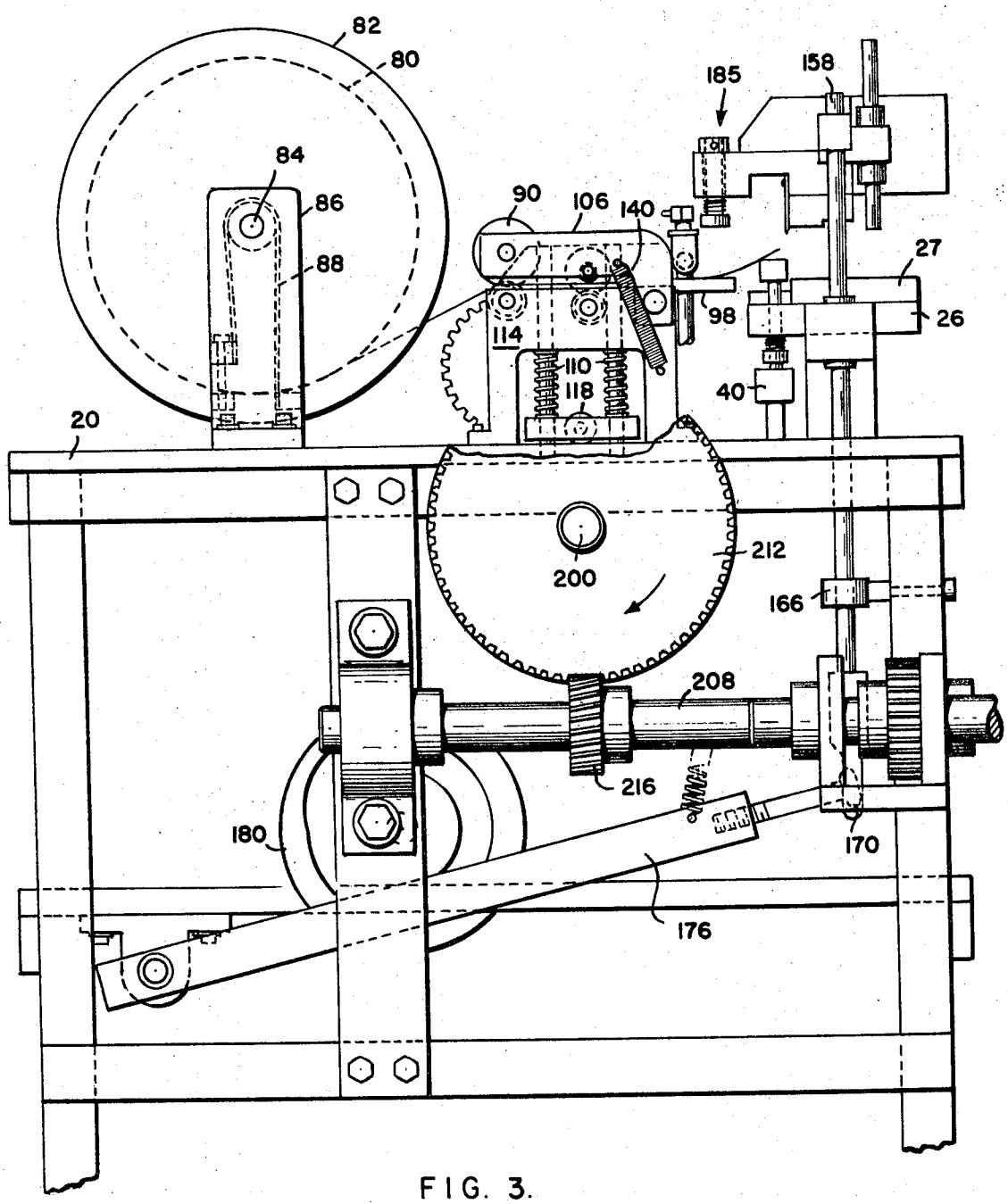


FIG. 3.

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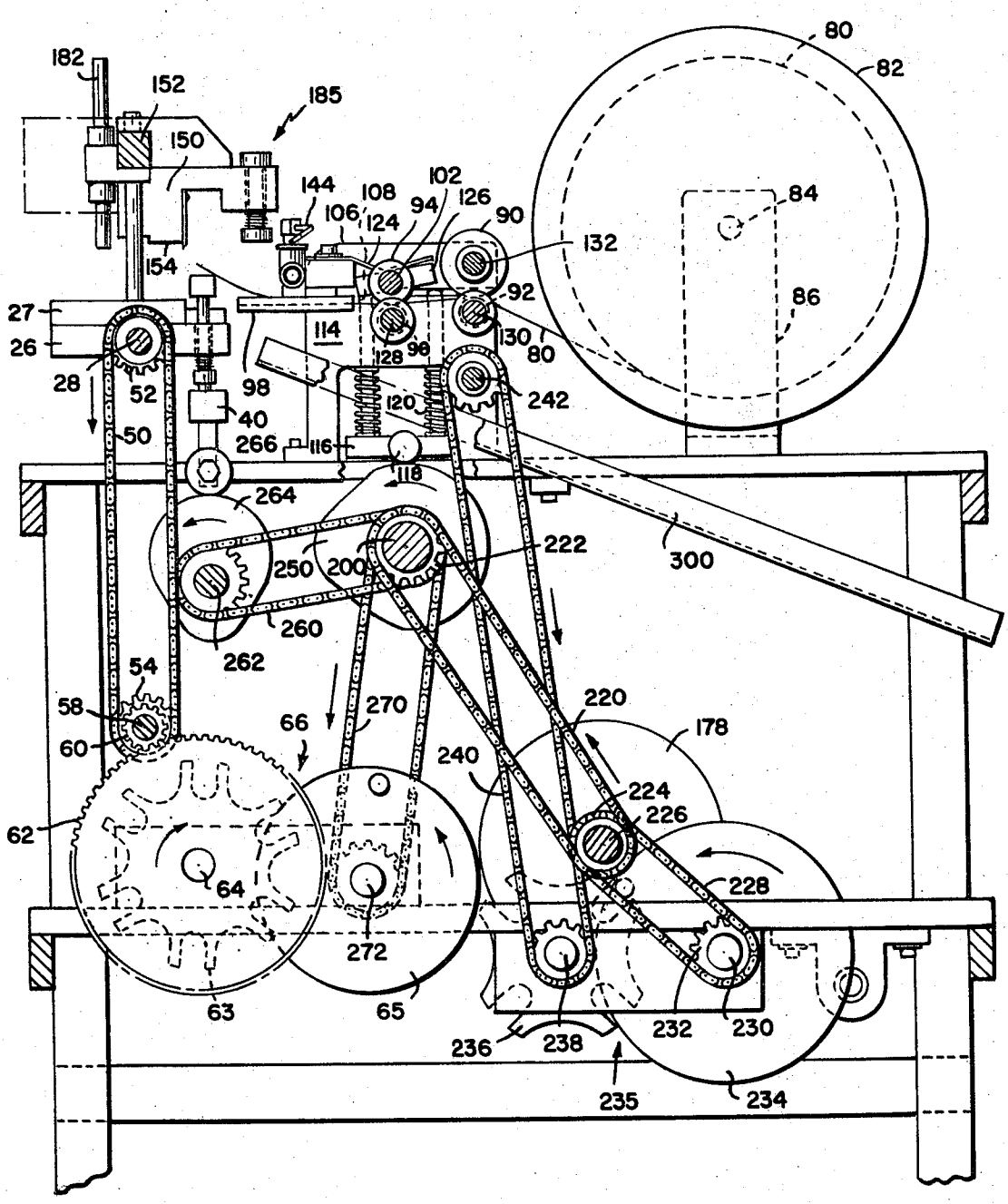


FIG. 4

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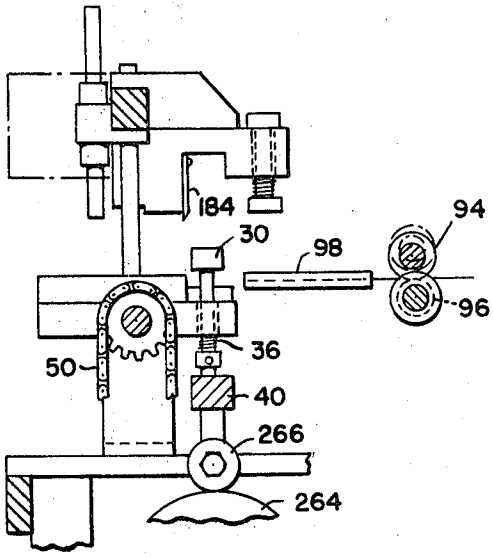


FIG. 5.

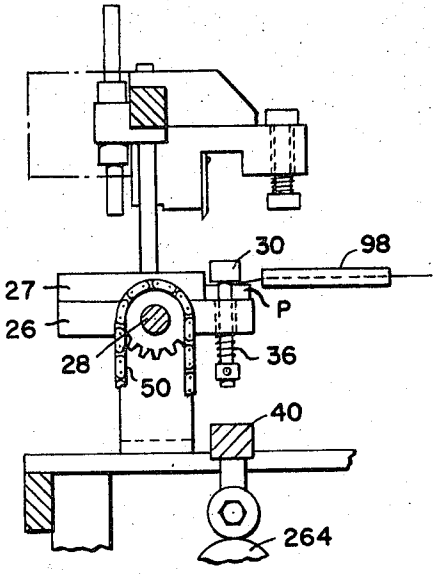


FIG. 6.

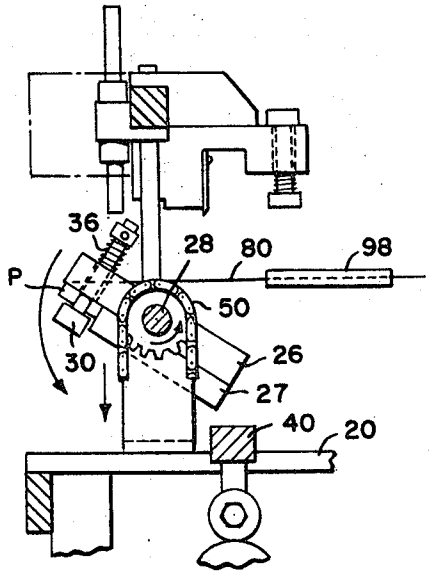


FIG. 7.

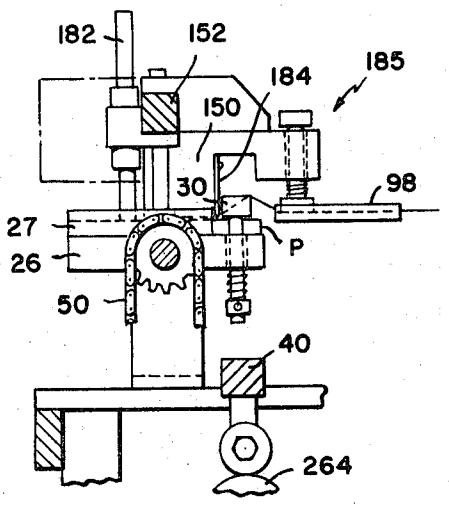


FIG. 8.

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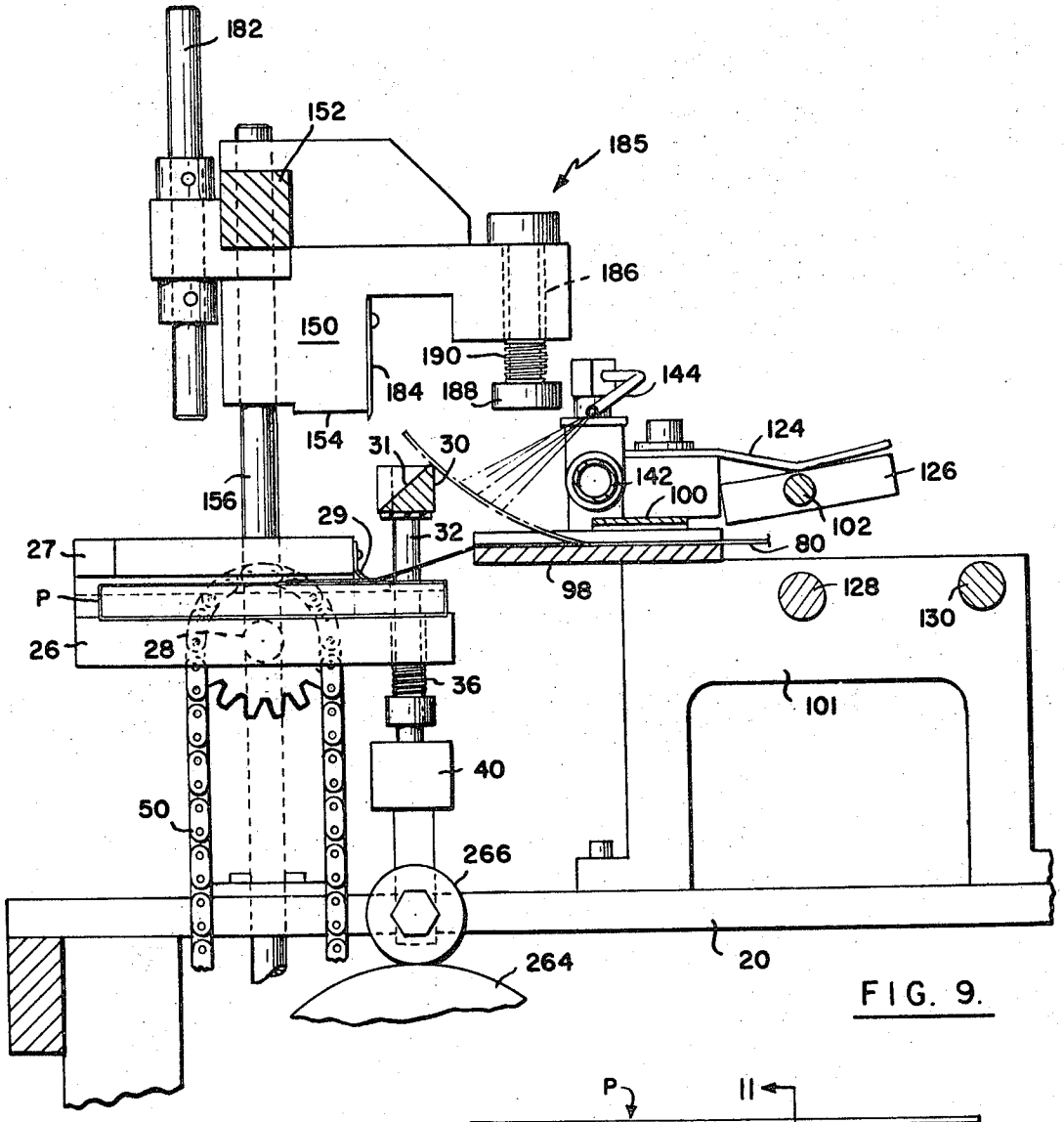


FIG. 9.

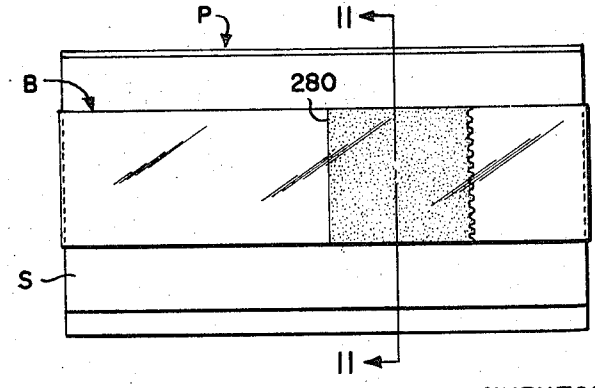


FIG. 10.

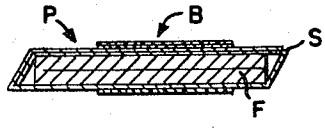
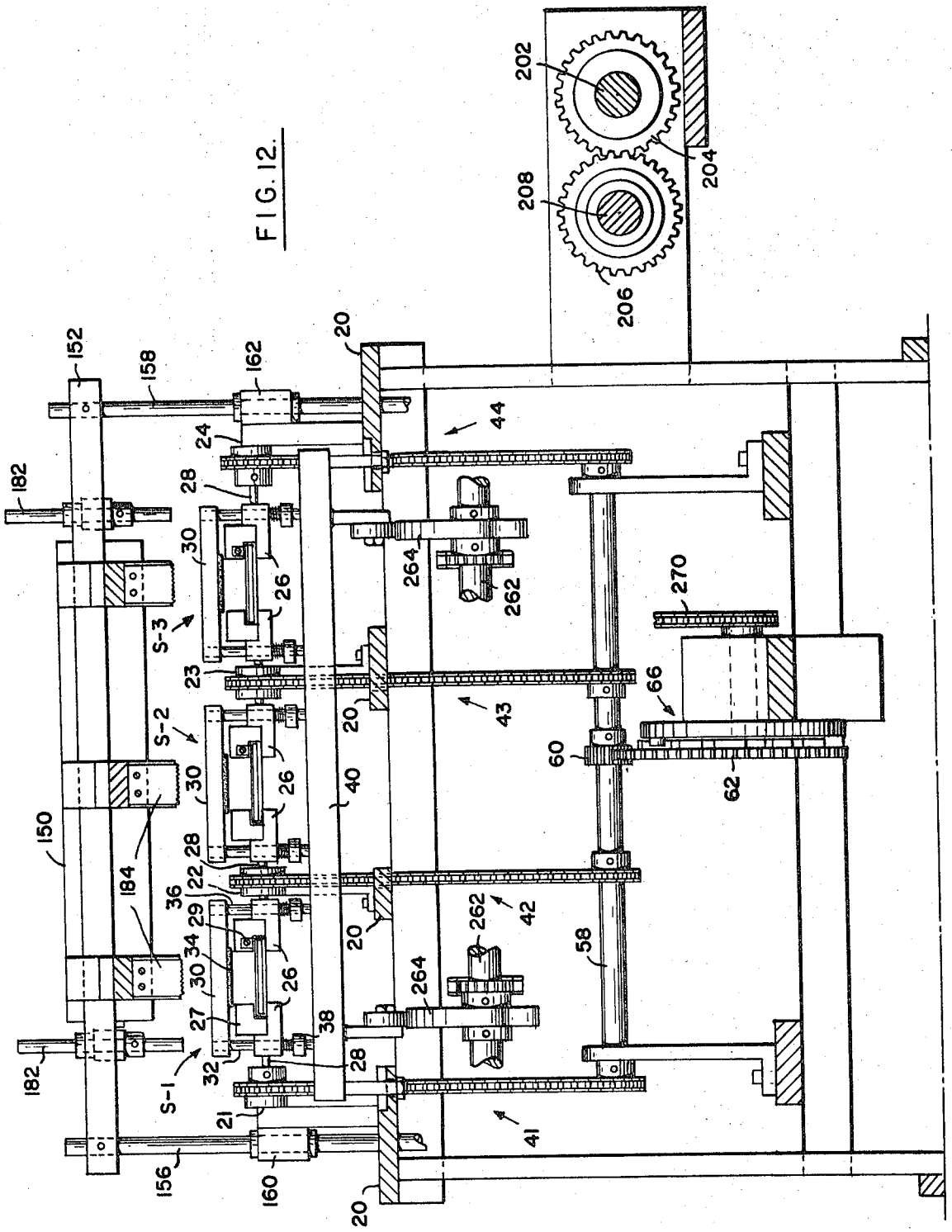


FIG. 11.

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FIG. 12.



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BANDING MACHINE

BACKGROUND OF THE INVENTION

The invention relates to the field of banding machines which are used primarily in the packaging art to band together various types of articles. For example, in the packaging art, physicians' samples are often made of articles which comprise a "sleeve" and a "frame member" as they are called in the art, the frame member being enclosed within the sleeve. The banding machines of the prior art have been slow in operation and have required substantial manpower and labor. Also, prior banding machines have not been able to achieve a high degree of uniformity in banding particularly with respect to the tightness of the wrapping.

One improvement over the prior art machines is disclosed in my copending application Ser. No. 697,371.

SUMMARY OF THE INVENTION

In accordance with the present invention there is provided a banding machine which is fast in operation, which achieves a tight band to prevent the packaged article from slipping free of the band and which achieves a uniform banding of the articles. Briefly stated, these features of the invention are provided by a banding machine construction involving means for supporting an article to be banded at a banding station and means for supplying a strip of banding material from a supply into contact with a portion of the article supported at the banding station. The machine also comprises means for gripping the article and the band together and means for revolving the article and the band secured thereto through a complete revolution to wrap the band about the article. The band is then secured together in the wrapped condition by suitable means such as a heat sealing operation.

Advantageously, the strip of banding material is a tape wound on a reel and there is provided means to sever the wrapped band from the tape supply.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view of a banding machine in accordance with the invention;

FIG. **2** is an elevation of the left side of the machine of FIG. **1**;

FIG. **3** is an elevation of the right side of the machine of FIG. **1**;

FIG. **4** is an elevation taken from the left side of FIG. **1** and illustrating the drive mechanism for the machine;

FIGS. **5**, **6**, **7** and **8** are simplified views of the banding station illustrating sequential steps in the cycle of operation of the machine;

FIG. **9** is a fragmentary sectional view of the parts at the banding station at a step in the cycle of operation of the machine;

FIG. **10** is a top plan view of an article which is banded by the banding machine in accordance with the invention;

FIG. **11** is a sectional view taken on line **11–11** of FIG. **10**; and

FIG. **12** is a section taken on line **12–12** of FIG. **1**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring preliminarily to FIGS. **10** and **11**, the article to be banded by the machine in accordance with the invention may take the form of a generally flat rectangular package, indicated generally at P, and comprising a sleeve S containing a frame member F therein. The sleeve is open at each end and extends completely around the frame member as is shown in these FIGS. The band as it is applied to the package by the banding machine of the invention is indicated generally at B.

As is shown in FIG. **1**, the machine comprises three essentially identical banding stations **S–1**, **S–2**, and **S–3**, each of which is provided with means for supporting a package P to be banded. Such package supporting means comprises four upstanding supports **21**, **22**, **23** and **24** which are mounted on the machine baseplate **20** which consists of four plates mounted on a rectangular frame supported on vertical legs. Each station comprises a pair of package support plates **26** carried on the ends of shafts **28** journaled in adjacent upstanding supports as is best shown in FIG. **12**. The package support plates **26** provide a horizontal surface adapted to receive and horizontally support a package and are spaced apart to provide clearance for the banding material as will be apparent hereafter. As is best shown in FIGS. **9** and **12**, at each station there is provided with the downwardly extending flexible rubber leaf **29** which serves to retard the package as it is inserted into the banding station from the left as viewed in FIG. **9** and to hold the same in a desired position at the banding station. The packages P may be fed into the machine in the direction of the arrows of FIG. **1** by any suitable means, such as for example, the machine of the type described in U.S. Pat. No. 2,902,806.

Mounted on each of the plates **26** is a generally rectangular member **27** having a notched corner in the lower inside portion thereof. The notched corners of members **27** cooperate with the associated plates **26** to provide opposed recessed grooves which support the packages in the manner shown in FIG. **12**. The leafs **29** are mounted on members **27**. The position the package assumes after it has been fed to the banding station is illustrated by reference to FIGS. **9** and **12**.

Means are provided for gripping the packages and holding the same in a fixed position on the supporting plates **26**. Such means at each station comprises a crossbar **30** mounted on a pair of upstanding rods **32** which are slideably mounted in bores in the plates **26** as is best shown in FIG. **12**. The crossbar **30** extends horizontally across the forward edge of the package as is best shown in FIG. **9** and carries in its lower side a strip of friction material **34** such as rubber. It is this strip **34** which will engage the package of the banding tape which is fed between the top side of the package and the crossbar **30** as will be described hereafter. The crossbar **30** is biased downwardly toward gripping contact with the package by means of springs **36** positioned in compression between the lower side of the plates **26** and an enlarged head **38** secured near the lower end of each of the rods **32**.

The crossbars **30** for each station are moved into and out of gripping engagement with the package at appropriate times in the cycle of operation of the machine by means of a horizontally extending bar **40** which is cam-actuated upwardly and downwardly by mechanism to be described more fully hereafter.

Means are provided for revolving the package supporting and gripping mechanism through a complete revolution, which movement, as will be described more fully hereafter, actually causes the banding material to be wrapped around the package. Such means comprises four chain drives **41**, **42**, **43** and **44** best shown in FIG. **12**. Referring to FIG. **4**, each of these chain drives comprises an endless chain **50** mounted for rotation about upper and lower sprockets **52** and **54**, respectively. Upper sprocket **52** is secured to the associated horizontally extending shaft **28** which carries the associated package support plate **26**. The lower sprocket **54** is secured for rotation with a drive shaft **58** which carries a small gear **60** driven by a large gear **62** mounted on a shaft **64**. The shaft **64** is driven by a Geneva mechanism **66** as will be described hereafter.

As is shown in FIG. **12**, the chains **50** for each of the four chain drives are secured on sprocket which are driven by the shaft **58**. The chains **50** for chain drives **42** and **43** extend upwardly for cooperation with shafts **28** journaled on upright support **24**.

By this arrangement, the rotation of the shaft **58** causes a corresponding rotation of the small shafts **28** carrying the package support **26** by way of the driving engagement provided by the chain drives.

The drive for the Geneva mechanism **66** is connected in the drive means for the banding machine to effect the revolving action of the package support plates **26** at a desired point in the cycle of operation of the machine as will become apparent more fully hereafter.

The supply of banding material for each station comprises a roll of tape **80** wound on a reel **82**. The tape may be of any suitable material such as cellophane or other material which is capable of providing the tight band and is also adapted to be fused together by the application of heat which is important for reasons which will appear hereafter. The reels **82** for each station are rotatably mounted on a shaft **84** secured in a suitable frame **86**. A tension strap **88** is wrapped around the shaft **84** and is adapted to be adjusted to vary the frictional load applied to the shaft. In this manner the braking force applied to the reel **82** may be adjusted to a desired amount. These adjustable braking mechanisms are well known in the art and need not be described in any more detail.

As is shown in FIG. **4**, the tape **80** passes from the bottom of the roll and between a pair of idling mounted guide rollers **90** and **92** and then passes between a pair of tape feed rollers **94** and **96**. From the feed rollers **94** and **96** the tape passes through a horizontally extending guide **98** which serves to position the tape laterally before it passes to the banding station. The guides **98** are mounted on a transversely extending frame member **100** which is supported on a pair of members **101** standing on the middle bore plates **20**.

Means are provided for actuating the tape feed rollers into and out of driving engagement with the tape. To this end, the upper feed rollers **94** are mounted on a shaft **102** which is journaled at its ends in movable blocks **104** and **106**. The blocks **104** and **106** (FIG. **1**) are secured to a cam-actuated mechanism comprising pairs of vertically extending pins **108** and **110** which extend through frame members **112** and **114** mounted on the outer baseplates **20** beneath the members **104** and **106**, respectively. The pins **108** and **110** are secured at their upper ends to blocks **104** and **106**, respectively. At their lower ends pins **108** and **110** are secured to plates **116** each of which carries a cam follower roller **118**. Springs **120** are mounted in compression between the plates **116** and a portion of the frame members **112** and **114** to bias the cam follower plates **116** and the blocks **104** and **106** downwardly. The cam follower rollers **118** ride on cams **122** each of which has a high portion which actuates the plates **116** and the blocks **104** and **106** upwardly during a desired portion in the cycle of operation.

It will be apparent that the springs **120** acting through the blocks **104** and **106** which carry the shaft **102** serve to bias downwardly the shaft **102** and the upper tape feed rollers **94** carried thereby. In order to assist this bias, there is also provided a pair of leaf springs **124** mounted on the plate **100** and arranged to engage a pair of blocks **126** carried by the shaft **102** to urge the same downwardly.

The lower tape feed rollers **96** are mounted on a shaft **128** journaled in frame members **112** and **114**. Also, the lower guide rollers **92** are mounted on a shaft **130** journaled in members **112** and **114**. The upper guide rollers **90** are supported on a shaft **132** secured at its ends on a pair of pivoted arms **134** and **136** (FIG. **1**). Each of the pivoted arms **134** and **136** are biased downwardly by springs **138** and **140** as is best shown in FIG. **1** and FIG. **3**. Accordingly, the upper guide rollers **90** are normally biased into contact with the tape which passes between rollers **90** and **92**.

Means are provided for blowing a severed end of the tape onto the top of a package positioned in the banding station. This means is best illustrated in FIG. **9** wherein the severed end of the tape is shown in dotted lines in the position it assumes at the completion of a banding operation after it has been severed from the banded package. The solid line showing of the tape end illustrates the position of the tape after the application of an air blowing operation in which the tape is positioned on top of a package in preparation for a subsequent banding operation. The means to achieve this function comprise an elongated tube **142** forming an air supply manifold and an air nozzle **144** for each of the banding stations positioned to direct air in the direction best illustrated in FIG. **9**. Thus, air is supplied through the air manifold tube **142** which is connected to each of the nozzles **144** whereby the air is discharged in the direction of the spray shown in FIG. **9** to blow the end of the tape from the dotted line position to the solid line position shown in this FIG. The purpose of this air blowing operation in the overall operation of the mechanism will appear more fully during a description of the cycle of operation. It is noted that the air blowing operation is controlled by a cam (FIG. **2**) and it is coordinated with the cycle of operation so that the air blowing operation occurs at the desired period of time in the cycle.

The machine comprises means for securing a band in its wrapped condition about the article after the machine has performed the wrapping operation. This means comprises a heat-sealing mechanism which applies heat to the cellophane tape to fuse the tape together in the wrapped condition thereof. To this end, there is provided at each station a heat-sealing head **150** which is mounted on a transversely extending crossbar **152** and is provided with a tape engaging heat applying bottom surface **154**. The size of the portion **154** in relation to the tape is illustrated in FIG. **10** wherein the heated area is shown by the shaded lines. The heat-sealing mechanism is electrically operated in accordance with procedures well known in the art.

Means are provided for actuating the heat-sealing means and the crossbar **152** upwardly and downwardly into and out of contact with the package for effecting the heat-sealing operation at a desired point in the cycle of operation of the machine. To this end, the crossbar **152** is secured at its ends onto a pair of vertically extending rods **156** and **158** (FIG. **12**). The rods **156** and **158** are guided for vertical movement in guides provided in support members **160** and **162**, respectively, which are supported on the outer baseplates **20** of the machine. The rods **160** and **162** are also guided by guide means **164** and **166** positioned below the baseplates **20** and carry at their lower ends ball and socket connections **168** and **170**. Each of the ball and socket connections **168** and **170** is connected to a pivoted arm **174** and **176**, respectively. These pivoted arms **174** and **176** carry cam follower rollers which ride in cam tracks in a pair of cams **178** and **180**, respectively.

The cam tracks in the cams **178** and **180** are arranged to move the arms **174** and **176** upwardly and downwardly as desired in the cycle of operation of the machine. It will be apparent that this movement of the arms **174** and **176** also causes a corresponding upward and downward movement of the rods **156** and **158** and a corresponding upward and downward movement of the heat-sealing heads **150**.

At each end, the crossbar **152** carries a stop member **182** which will limit the downward movement of the bar **122** to prevent possible damage of the package.

Also carried by each of the heat-sealing heads **150** is a transversely extending knife **184** which will serve to sever the wrapped band from the tape supply after the completion of a sealing operation.

Each of the heads **150** also carries a mechanism **185** for holding down the tape during a cutting operation. This means comprises a pin **186** mounted on an extended portion of the heat-sealing head **150** as is best shown in FIG. **9**. The pin **186** carries an enlarged cylindrical portion **188** at its lower end and is biased downwardly to the position shown in FIG. **9** by a spring **190**. By this arrangement, when the head **150** moves downwardly the lower portion of the holddown mechanism clamps the tape between its portion **188** and the guide member **98** to thereby hold the tape against longitudinal movement.

As will appear more fully hereafter, the cutting action of the knife **184** is achieved by the upward movement of the crossbars **30** while the knife is held in a downward position. For this reason, the upper surface of each of the crossbars **30** in the region of the tape is provided with a cutout **31** as is best shown in FIG. **9**.

The drive mechanism for the various elements of the banding machine are best illustrated in FIGS. **1** to **4**. The main drive shaft is indicated at **200**, extends transversely across the machine, and is mounted at its ends in suitable bearing means. The drive for the main drive shaft **200** is by way of a motor-driven shaft **202**, a pair of spur gears **204** and **206**, a shaft **208**

and a pair of helical gears **210** and **212**, the last-mentioned gear being secured to the main drive shaft **200**. The parts are arranged so that the main drive shaft **200** is given a rotation in the direction indicated by the arrows in the various FIGS. In other words referring to FIG. **3**, the main drive shaft **200** is driven in a clockwise direction, and referring to FIG. **4**, the main drive shaft **200** is driven in a counterclockwise direction.

The drive for the tape feed rollers **94** and **96** is by way of a chain **220** which is mounted on a sprocket **222** secured to the shaft **200** and a sprocket **224** mounted on a shaft **226**. The shaft **226** also drives a chain **228** by way of a suitable sprocket drive and this chain **222** drives a shaft **230** by way of sprocket **232**. Secured to shaft **230** is the driving cam **234** of a Geneva mechanism **235**. The star wheel **236** of the Geneva mechanism **235** is connected to a shaft **238** which drives a chain **240** by way of a suitable sprocket connection. The chain **240** drives a shaft **242** by way of a sprocket and this shaft **242** carries a spur gear **244** shown in FIG. **2**. The spur gear **242** meshes with smaller spur gear **246** which is secured to the shaft **128** carrying the lower tape feed rollers **96**. It is apparent that the tape feed rollers **96** are rotated in a counterclockwise direction as viewed in FIGS. **2** and **4** to thereby feed the tape toward the banding station. Moreover, by reason of the Geneva drive **235** in the feed roller drive mechanism, it will be apparent that only a predetermined length of tape will be fed to the banding station in each cycle of operation. This length of tape will be exactly sufficient to achieve the banding operation in accordance with the invention.

The means for controlling the actuation of the upper tape feed rollers **94** to the feeding position includes the pair of the cams **250** which are mounted directly on the drive shaft **200** and rotate therewith. Thus, for each rotation of the drive shaft **200** these cams **250** will actuate the feed rollers **94** into and out of the feeding position during desired portions of the cycle of operation. This is achieved by means of the movable supports for the blocks **104** and **106** described above, the cam follower rollers **118** being actuated by cams **250** as shown in FIG. **4**.

The means for driving the cams which control the position of the bar **40** of the package gripping mechanism comprises a chain **260** driven by a sprocket on the shaft **200** and arranged to drive shaft **262**. Mounted for rotation with the shaft **262** are the cams **264** which actuate the cam follower rollers **266** which are connected to the transversely extending bar **40**. As discussed above, the bar **40** is arranged to actuate the crossbar carrying pins **32**, and the crossbar **30**, upwardly and downwardly.

The drive means for the shaft **58** for the package revolving means comprises a chain **270** driven by the main drive shaft **200** and connected by a sprocket to drive a shaft **272**. Connected to the shaft **272** is the driving cam member **65** of the Geneva mechanism **66** which, through star wheel **63**, drives the shaft **64**, which in turn drives the shaft **58** through gears **62** and **60**. The shaft **58** drives the chains **50** for each of the chain drives **41**, **42**, **43** and **44**.

The drive means for achieving the upward and downward movement of the heat-sealing heads **150** is provided by connecting the cams **178** and **180** directly onto the shaft **226** which is driven by chain **220** in the manner described above.

It will be noted that each cycle of operation of the machine is achieved by a single revolution of the main drive shaft **220** in a manner which will appear more fully in connection with the description of the operation of the machine.

OPERATION

In describing the operation of the embodiment of the invention shown in the drawings, let it be assumed that the cycle of operation begins with the parts in the position wherein a package is positioned on the support plates **26** at the banding station and the air nozzle **144** has operated to position the forward edge of the tape below the gripping bar **30** as is shown in FIG. **9**. Accordingly, the parts are in the position shown in FIG. **5**. The description of the cycle of operation will be with respect to one of the banding stations, it being obvious that the operation is the same for each of the banding stations.

In the first step in the cycle of operation, the tape feed control cam **250** is moved to the position to actuate the upper feed roller **94** downwardly (by means of the actuating means for blocks **104** and **106**) into feeding position for a short interval of time after which the cam **250** permits disengagement of the tape feed. During this short feeding period, the banding tape is fed across the top of the package to overlie a substantial portion thereof. The feed will position the forward edge of the tape to a location indicated at **280** in FIG. **10** so that the tape is located beneath portion **154** of the heat-sealing means **150**. The drive of the predetermined feed of the tape is achieved by the Geneva mechanism **235** as was described above.

At the end of this first step, the tape feed roller **94** is moved upwardly to place the tape feed in a nonfeeding condition.

The next step in the cycle of operation involves the gripping of the tape onto the package. This is achieved by the movement of the package gripping means cams **264** to a position permitting the cam followers **266** and bar **40** to drop downwardly to the position illustrated in FIG. **6**. This permits the springs **36** to urge the crossbar **30** to the package gripping position with the crossbar **30** being urged downwardly into gripping contact with the tape to hold the same securely onto the top of the package and to urge the package against the support plates **26**. This condition of the parts is shown in FIG. **6**, and it will be apparent that the gripping means secures the package and the forward edge of the tape to the plates **26**.

The next step in the cycle of operation involves the wrapping of the tape around the package and is illustrated in FIG. **7**. This step is achieved by causing movement of the package, along with the tape secured thereto, through a complete revolution in the manner illustrated by the curved arrow in FIG. **7**. This movement is achieved by the movement of the chain drives **41**, **42**, **43** and **44** by means of the Geneva mechanism **66** and involves a very rapid 360° movement of the shafts **28** which carry the package support plates **26**. During this movement the end of the package having the tape secured thereto moves in a counterclockwise direction as viewed in FIG. **7** and away from the tape supply roll to thereby pull the tape from the supply and wrap the same around the package. It will be apparent that by the time the mechanism completes its revolution, it will pull a length of tape from the supply which approximates the peripheral dimension of the package. Moreover, this banding operation serves to make a very tight wrapping of the band because the pulling action applied to the tape is resisted by the tension force applied to the tape supply.

At the completion of this operation the parts are in the position similar to that shown in FIG. **8** with the tape extending above the bar **30** to the tape supply reel.

The next step in the cycle of operation involves the sealing of the band in the wrapped around condition thereof and is illustrated in FIG. **8**. This is achieved by the action of the cams **178** and **180** which act through pivoted arms **174** and **176** and vertical rods **156** and **158** to move the heat-sealing head **150** downwardly whereby the heat-sealing portion **154** comes into heat-sealing contact with the overlapping portions of the band to thereby fuse the same together. The heat-sealing area is illustrated in FIG. **10**.

The next step in the cycle of operation is the upward movement of the crossbar **30** to release the package, and cause the knife **184** to cut the wrapped band from the roll of tape. This movement is achieved by the cams **264** actuating the bar **40** upwardly to cause a corresponding movement of the crossbar **30**. As the crossbar **30** moves upwardly it pulls the tape upwardly past the cutting edge of the knife **184** to thereby sever the tape from the banded portion thereof. This movement also serves to release the banded package. Also, it is noted the holddown mechanism **185** holds the tape on one side of the knife **184** and the portion **154** holds the tape on the other side of the knife **184** as the crossbar **30** moves the tape upwardly. This serves to provide an effective cutting action.

Accordingly, there is now a banded package positioned at the banding station.

The next step in the cycle of operation involves the feeding of a new unbanded package into the banding station in the direction of the arrows of FIG. 1. As the package is pushed off the support plates **26** it passes into the discharge chute **300** and slides down this chute to a desired location. It will be noted that before this can occur the sealing head **150** is returned to the upward position by means of the cam actuated rods **156** and **158**. The parts are thus in the position shown in FIG. 9 with the forward edge of the tape extending above the crossbar **30** as shown by dotted lines in this FIG.

The final step in the cycle of operation involves the application of air through the nozzle **144** to push the forward edge of the tape below the crossbar **30** and into contact with the top surface of the unbanded package now in position in the banding station. The application of air is controlled by a control means **290** (FIG. 2) actuated by a cam member **292** carried by the cam **178**.

The cycle of operation is now completed and is repeated for each revolution of the drive shaft **200**.

It will be understood that the above described embodiment is illustrative and is not intended to be limiting.

I claim:

1. A banding machine comprising means for supporting an article to be banded at the banding station, means supplying a strip of banding material to said banding station, means for feeding said banding material strip from said supply to a position wherein a portion of said strip overlies said article supported at the banding station, means for gripping said article overlying portion of said strip to said article, said gripping means being mounted on said article support means, means for revolving said article support means along with said gripping means mounted thereon, the article supported thereby and the strip portion gripped thereto through a complete revolution to wrap said strip about said article to form a band, and means securing said strip in said wrapped condition about said article.

2. A banding machine according to claim **1** wherein said banding material supply is a roll of tape, and including means for severing the portion of said banding material which is wrapped around the article from said supply thereof.

3. A banding machine according to claim **1** wherein said banding material is heat sealable, and said means securing said strip in said wrapped condition comprises a heat-sealing means moveable into contact with overlapped portions of said strip to secure said overlapped portions together and to hold the band in the wrapped condition.

4. A banding machine according to claim **1** wherein said supply of banding material comprises a reel having a tape of banding material wound thereon, and including means for holding said reel against rotation during the operation of the revolving means to thereby tension the strip of banding material as it is being wrapped.

5. A banding machine according to claim **2** wherein said banding material is heat sealable, and said means securing said strip in said wrapped condition comprises a heat-sealing means moveable into contact with overlapped portions of said strip to secure said overlapped portions together and to hold the band in the wrapped condition.

6. A banding machine according to claim **4** wherein said banding material is heat sealable, and said means securing said strip in said wrapped condition comprises a heat-sealing means moveable into contact with overlapped portions of said strip to secure said overlapped portions together and to hold the band in the wrapped condition.

7. A banding machine according to claim **1** wherein said gripping means includes a bar arranged to clamp the strip and the article onto said supporting means, said supporting means being mounted on a rotatable shaft means extending transversely to the direction of feed of said strip.

8. A banding machine according to claim **7** wherein said revolving means includes drive means engaging said shaft means to cause rotation thereof about its axis, whereby said supporting means and an article gripped thereon by said gripping means is revolved in a path about the shaft means axis.

9. A banding machine according to claims **2** wherein said gripping means includes a bar arranged to clamp the strip and the article onto said supporting means, said supporting means being mounted on a rotatable shaft means extending transversely to the direction of feed of said strip.

10. A banding machine according to claim **9** wherein said revolving means includes drive means engaging said shaft means to cause rotation thereof about its axis, whereby said supporting means and an article gripped thereon by said gripping means is revolved in a path about the shaft means axis.