Oct. 18, 1955 W. E. NAUGLER 2,720,667

CEMENTING AND FOLDING MACHINES

Filed Oct. 21, 1952 8 Sheets-Sheet 1

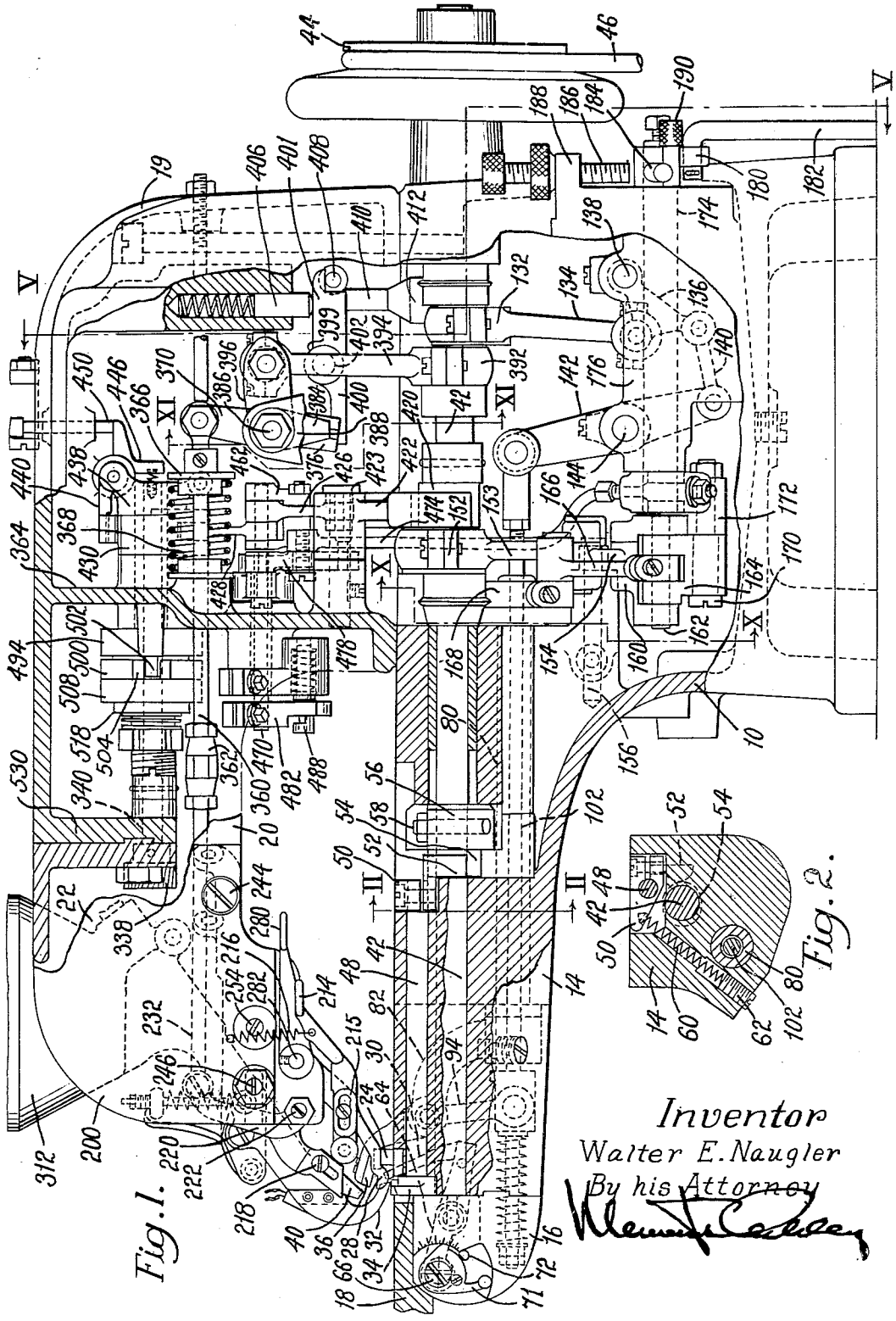


Fig. 1.

Fig. 2.

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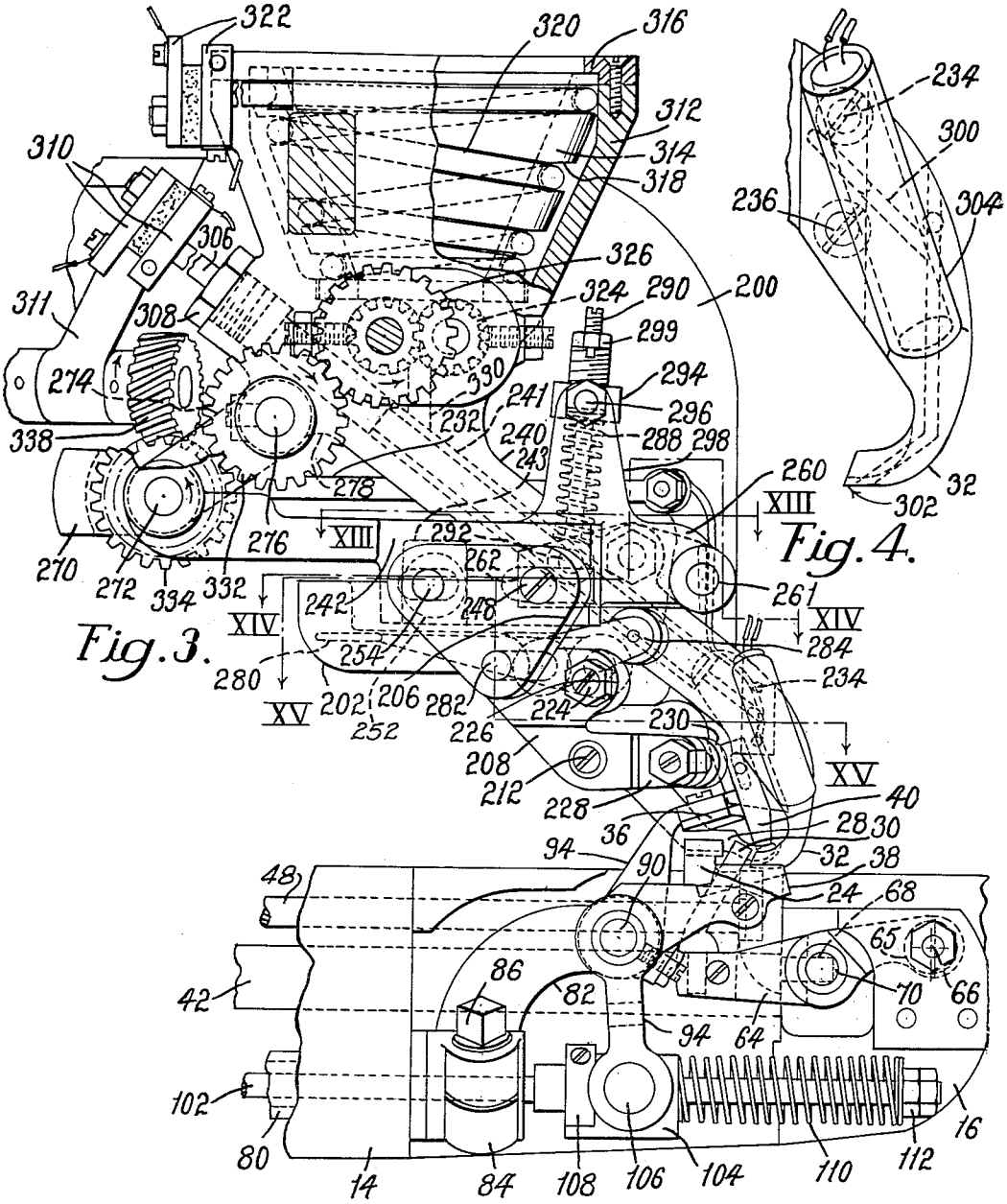


Fig. 3.

Fig. 4.

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Fig. 5.

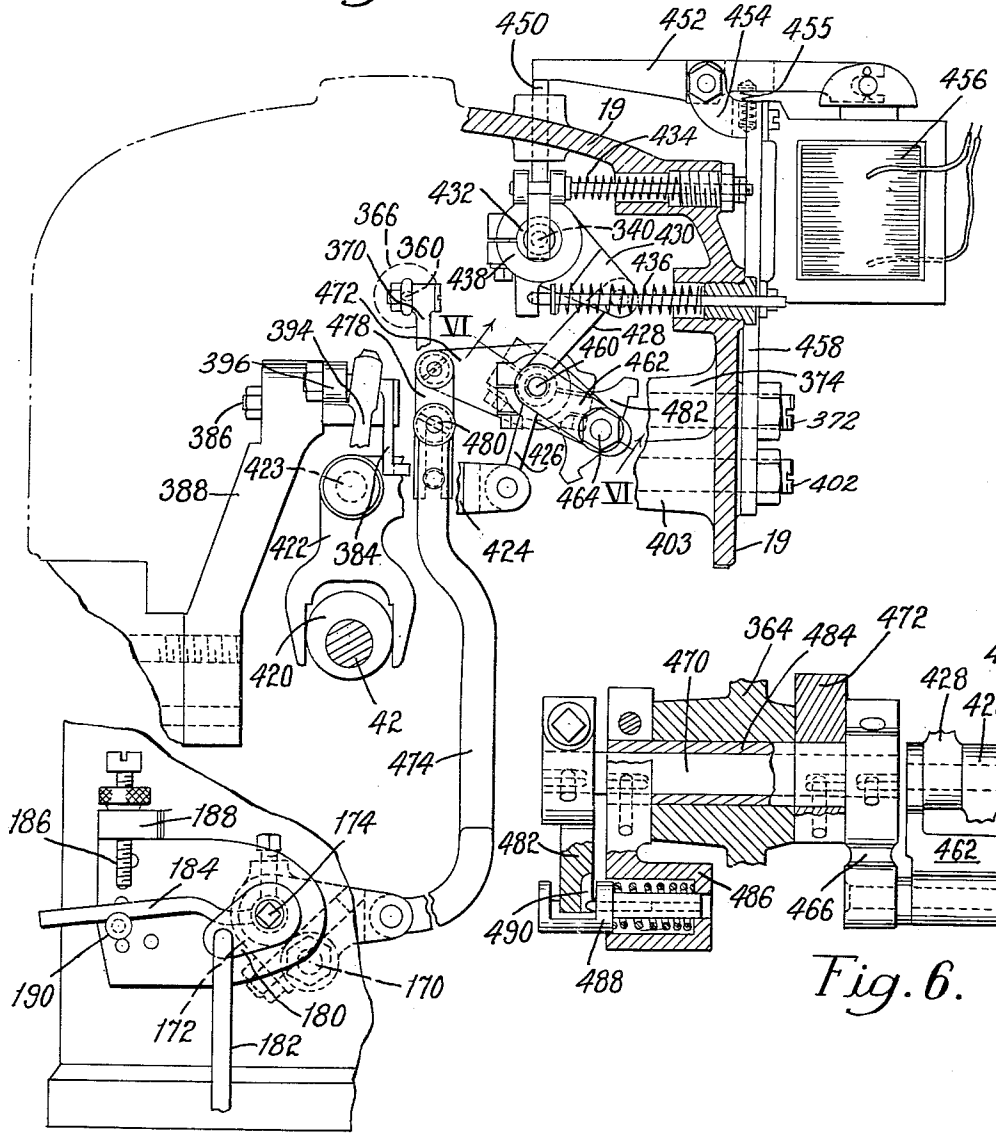


Fig. 6.

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Fig. 7.

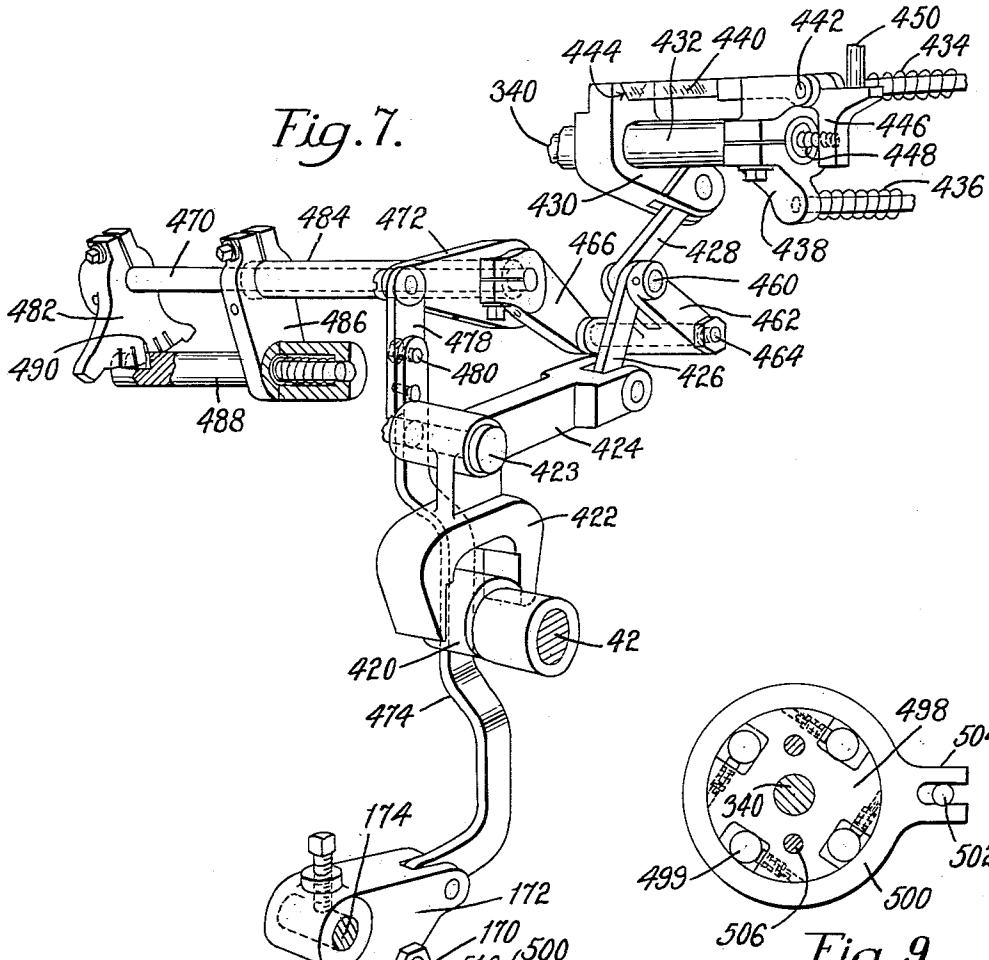


Fig. 8.

Fig. 9.

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CEMENTING AND FOLDING MACHINES

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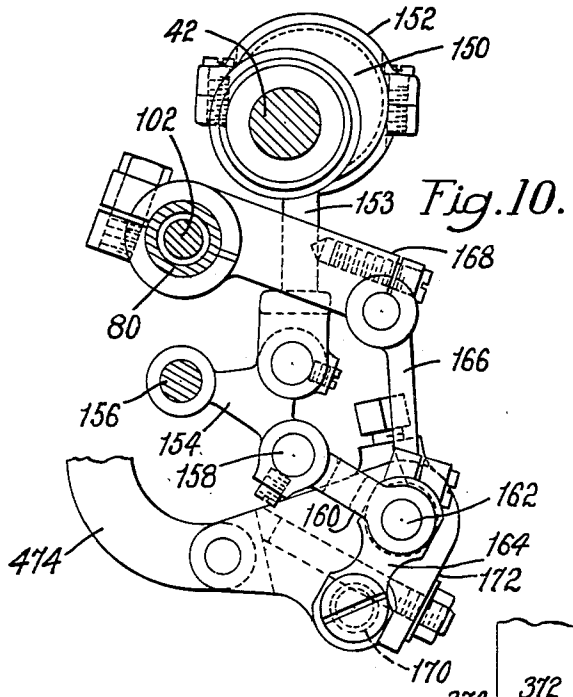


Fig. 10.

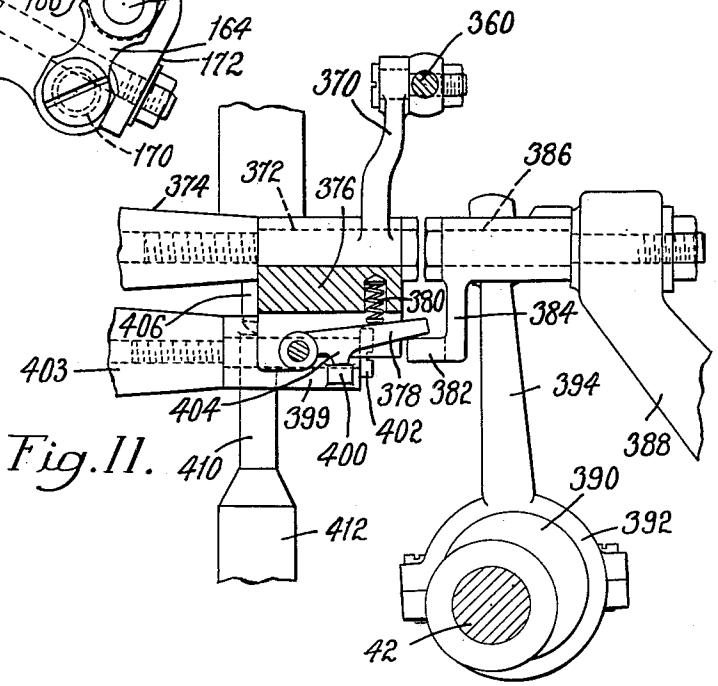


Fig. 11.

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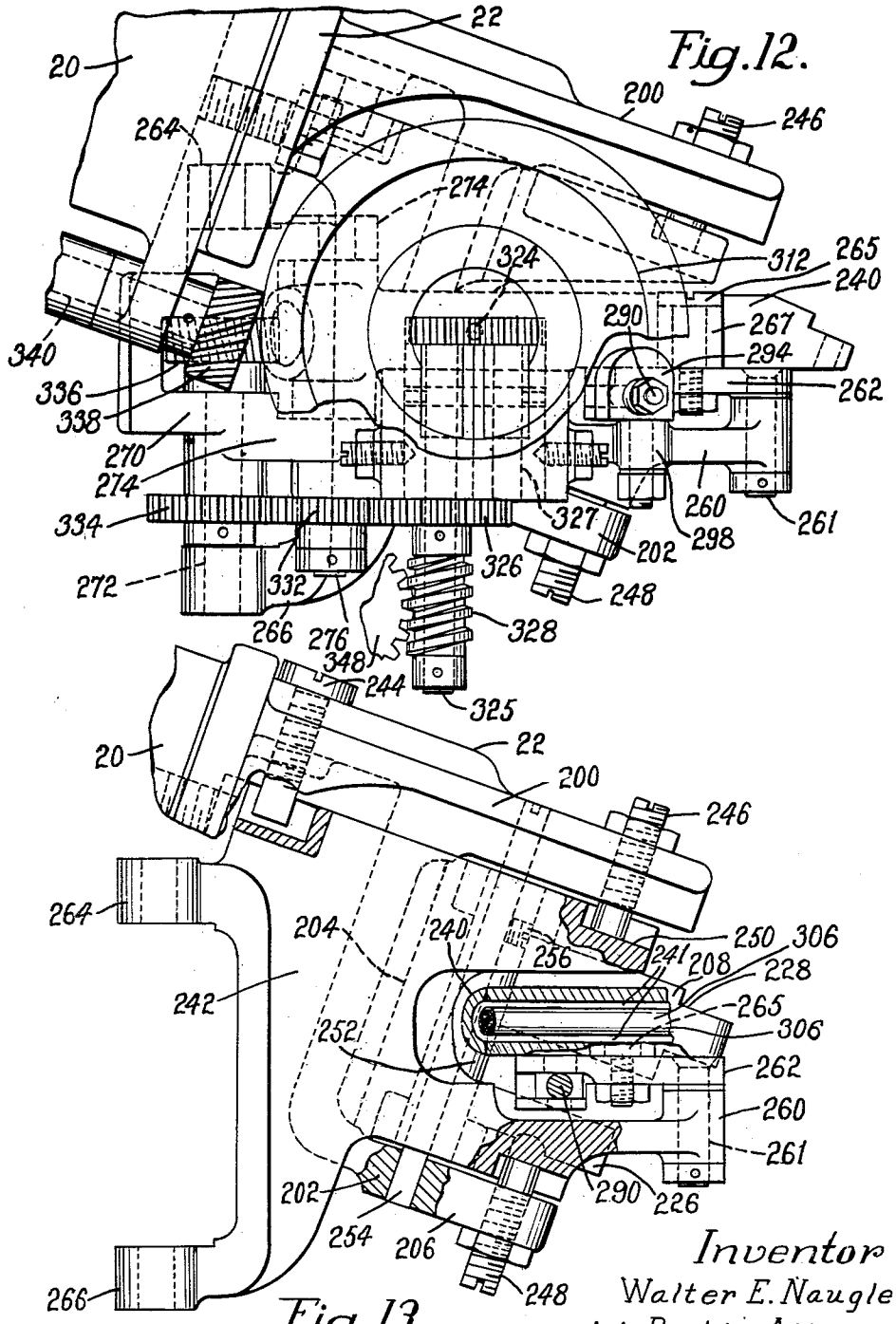


Fig. 12.

Fig. 13.

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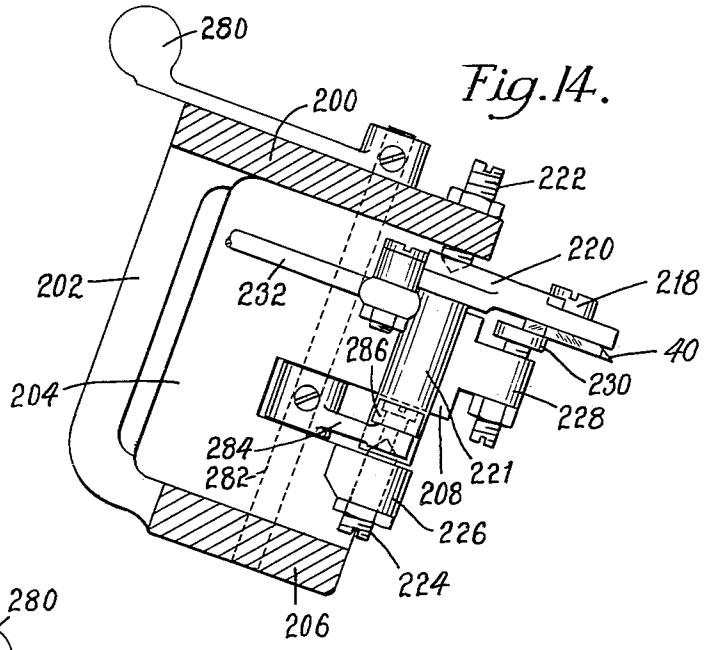


Fig. 14.

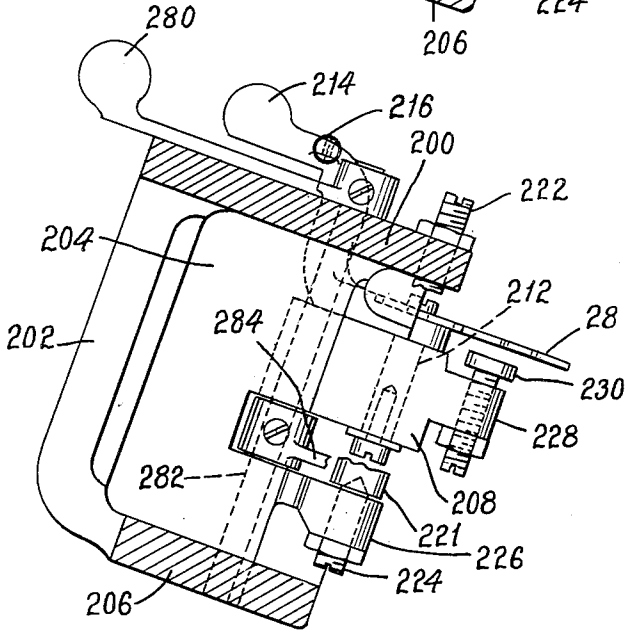


Fig. 15.

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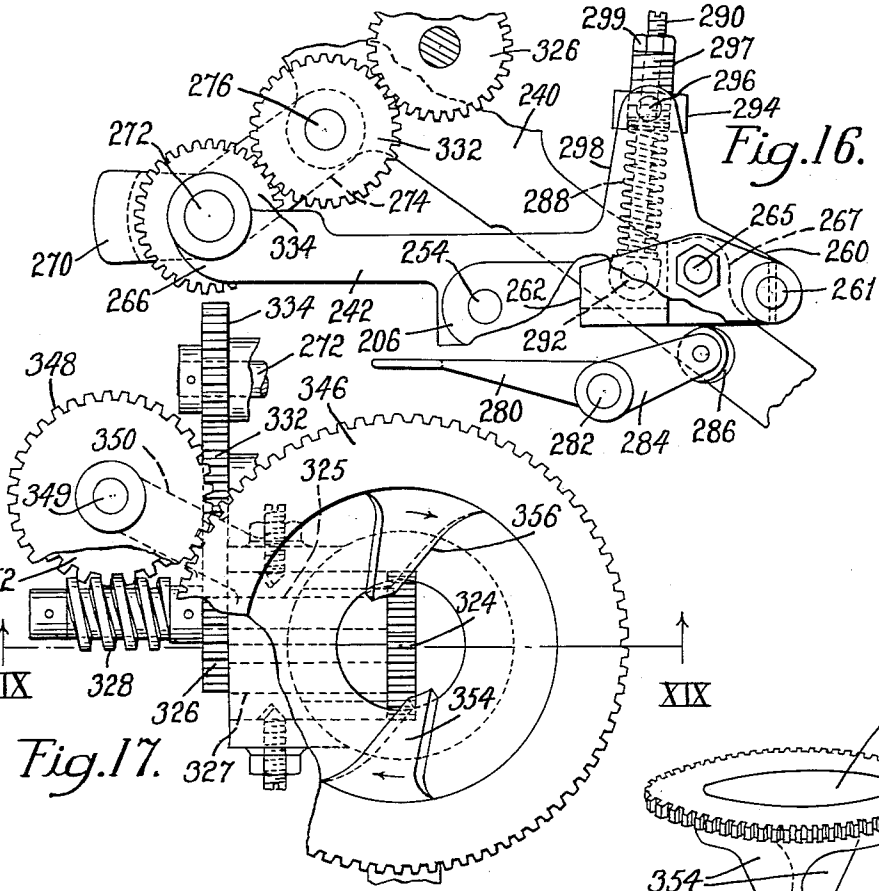


Fig.16.

Fig.17.

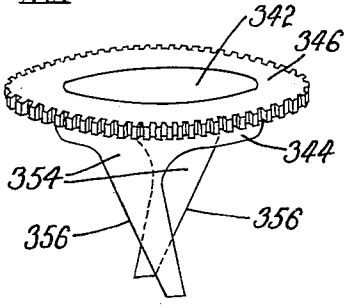


Fig.18.

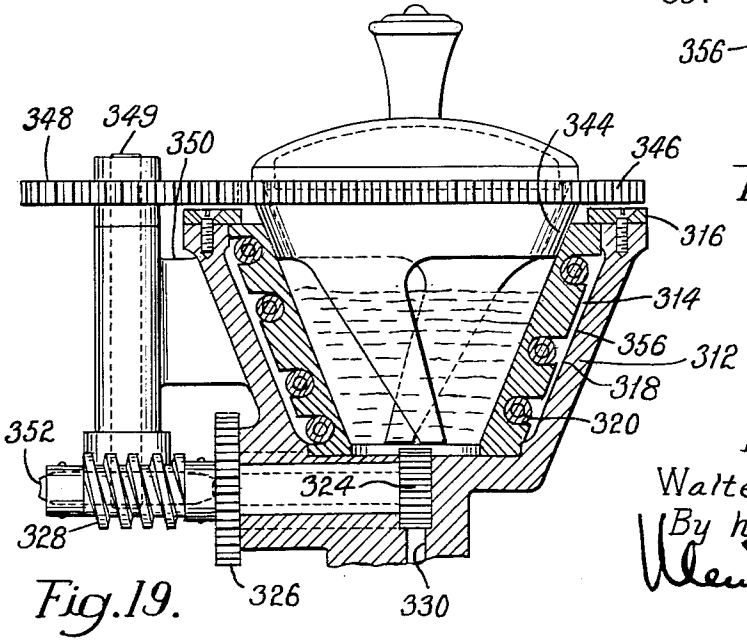


Fig.19.

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United States Patent Office

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CEMENTING AND FOLDING MACHINES

Walter E. Naugler, Beverly, Mass., assignor to United Shoe Machinery Corporation, Flemington, N. J., a corporation of New Jersey

Application October 21, 1952, Serial No. 315,895

9 Claims. (Cl. 12—55.1)

This invention relates to machines for cementing and folding edges of work such as shoe uppers and of the type in which cement is applied to the work immediately prior to the operation of the folding instrumentalities.

Although it was realized for many years that the cementing operation as a separate step could be eliminated if folding machines were provided with means for applying the cement just prior to the folding operation, it has also been understood that the usual cements such as those of the rubber or pyroxylin type would not set quickly enough to hold the fold afetr the work had left the machine. Later it was found that cements of the thermoactive type provided one possible solution and there was developed a machine for handling such cements which is illustrated in Letters Patent of the United States No. 2,301,202, granted November 10, 1942, upon the application of Paul H. Dixon. While such machines have been in successful use for a number of years, the desire has persisted for a machine which would handle an even more viscous type of thermoplastic resinous adhesive. Such cements, however, have proven difficult to handle because of their viscosity and the consequent requirement of higher temperatures and greater pressures. The need for such cements is found particularly in the folding of skived leather edges and the need is greatest where the leather of the upper material is stiff and has a marked tendency to return to its unfolded condition unless the cement sets very quickly and has a good bonding power. These leathers are typified by those known to the trade as Cordovan and as Scotch Grain. An additional difficulty has arisen in machines designed to handle the more viscous thermoplastic resinous materials because of the high temperatures required to heat the supply of material in a receptacle and the consequent tendency for such cements to "cook" or "burn on" the receptacle in cases where the cement has been kept at a high temperature hour after hour and perhaps day after day.

Accordingly, an object of the invention is to provide an improved machine for applying a cement and forthwith folding the work, capable of utilizing materials requiring high temperatures and considerable pressures.

In step-by-step folding machines of a type which has been in common use for many years, provision is usually made for quickly changing the rate of feed of the work so that the operator may obtain full production on the straightaway portions and yet be able to slow down the feed when working on corners or other areas which require more careful attention. There is provided, therefore, in accordance with a feature of the invention, an intermittent drive for the cement feeding mechanism and a connection between the work feeding mechanism and this drive so that the control by the operator of the usual mechanism for changing the feed of the work is also effective to change similarly the speed of the intermittent drive for the cement feeding mechanism.

This and other features of the invention will best be understood from a consideration of the following specification taken in connection with the accompanying drawings, in which

Fig. 1 is a side elevation of a machine embodying the invention with portions of the frame cut away and in section to show the internal mechanism;

Fig. 2 is a transverse section on the line II—II of Fig. 1;

Fig. 3 is a view of the work-engaging parts of the machine, taken from the side opposite to that shown in Fig. 1 and drawn on a larger scale, the cement pot scraper having been omitted;

Fig. 4 is a detail view of the creaser foot with its internal passages;

Fig. 5 is a section on the line V—V of Fig. 1 showing a part of the snipper mechanism and also the change-speed mechanism included in the drive for the gear pump;

Fig. 6 is a fragmentary section taken on the line VI—VI of Fig. 5 to show a portion of the manual adjustment for the change-speed mechanism;

Fig. 7 is a diagrammatic angular view of the change-speed mechanism for the pump drive;

Fig. 8 is a fragmentary view, partly in section, on a large scale taken along the axis of the drive shaft for the intermittent cement-feed pump;

Fig. 9 is a detail in transverse section on the line IX—IX of Fig. 8;

Fig. 10 is a view, partially in elevation and partially in section, of the change-speed work-feed mechanism and is taken on the line X—X of Fig. 1;

Fig. 11 is a view on the line XI—XI of Fig. 1 showing the mechanism by which the snipper knife is thrown into operation;

Fig. 12 is a plan view of the cement-feed mechanism shown in Fig. 3 but omitting the scraper for the sake of clarity;

Fig. 13 is a section on the line XIII—XIII of Fig. 3;

Fig. 14 is a horizontal section on the line XIV—XIV of Fig. 3;

Fig. 15 is a similar section on the line XV—XV of Fig. 3 but with the snipper knife and the creaser-foot omitted;

Fig. 16 is a fragmentary portion of the support for the creaser-foot carrier shown in connection with a finger lever for lifting the same;

Fig. 17 is a fragmentary view looking down on the cement pot and showing the drive for the associated scraper;

Fig. 18 is an angular view of the scraper removed from the pot; and

Fig. 19 is a vertical section through the cement pot on the line XIX—XIX of Fig. 17, but leaving the whole of the scraper therein.

The frame of the machine comprises a hollow base **10** (Fig. 1) forming an oil reservoir, this base having a laterally extending arm **14**. The arm **14** includes a removable end portion **16** on which is secured a work-supporting plate **18**. Removably secured to the upper portion of the base **10** is a cap **19** having a neck **20** which overhangs the arm **14** and terminates in a removable head **22**. The basic structure of the machine is similar to that shown in Letters Patent of the United States No. 2,270,891, granted January 27, 1942, upon the application of C. A. Newhall.

Supported on the outer end of the arm **14** is a gage block **24** (Fig. 1) having an upturned surface for deflecting upwardly the margin of the work to be folded. The extent to which the margin of the work is deflected upwardly is determined by a gage finger **28** which is mounted on the lower portion of the head **22** in a manner to be described. Since this gage finger determines the extent to which the margin of the work is deflected up-

wardly, it also determines the width of the fold which is to be formed therein. A folding finger **30** (Fig. 1) is mounted for oscillation in the arm **14** in a path forming an acute angle with the upper surface of the arm **14** and folds the margin of the work, which has been deflected upwardly by the gage block **24**, against the adjacent surface of a creaser-foot **32**. During the upward movement of the folding finger **30**, the work is held against movement on the work support **18** by means of a gripper member **34** (Fig. 1) which moves from a position within the upper surface of the arm **14** to a position above this surface in which it grips the work against the under surface of the creaser-foot **32**.

Located beyond the folding finger in the direction of feed of the work is a hammer **36** (Fig. 3) which cooperates with an anvil **38** to press the fold formed by the folding finger **30**. After the fold has been pressed between the hammer and anvil, the gripper member **34** moves downwardly to release its hold on the work and the hammer and anvil then move as a unit toward the observer in Fig. 3 to feed the work past the gage block **24**. The work is accordingly folded and fed in a step-by-step manner generally as described in the aforementioned Newhall patent.

A snipper knife **40** (Figs. 1 and 14) is mounted on the head **22** and is arranged to be moved downwardly under the control of the operator for snipping the margin of the work when a sharp incurved portion thereof is being folded. This snipper knife moves between the gage block **24** and the folding finger **30** and the adjacent surface of the gage block is formed as a shearing surface with which the knife cooperates when moved downwardly to snip the margin of the work. The mountings and operating mechanisms for the various folding instrumentalities will now be described in detail.

A main drive shaft **42** (Fig. 1) is journaled in the base **10** and the arm **14** of the machine and is provided at its right end with a pulley **44** by which it may be connected by a belt **46** to any suitable driving means. The work gripper member **34** is mounted on the outer end of a rockshaft **48** journaled in the arm **14** and extending parallel to the main drive shaft **42**. A release arm **50** (Figs. 1 and 2) is secured to the inner end of the shaft **48** and forms means by which the shaft **48** may be manually rocked by the operator to move the gripper member **34** downwardly when desired. The release arm **50** includes a downwardly extending portion **52** the lower end of which is rounded and acts as a cam follower, this portion of the arm engaging the periphery of a cam **54** mounted on the drive shaft **42**. The cam **54** is integral with a collar **56** (Fig. 1) adjustably secured to the shaft **42** by means of a pinch screw **58**.

A spring **60** engages a recess in the under side of the release arm **50**, the lower end of the spring engaging a screw **62** threaded in the arm **14**. This spring maintains the arm **52** in engagement with the cam **54** so that rotation of the cam with the shaft **42** will impart a rocking movement to the rockshaft **48** to move the gripper member **34** intermittently into and out of the upper surface of the arm **14**. On the other hand, the shaft **48** may be manually moved by the operator by applying pressure to the release finger **50** when it is desired to hold the gripper member **34** in its lower position. The timing of the movements of the gripper member by the shaft **48** may be varied by adjusting the collar **56** with respect to the shaft **42**.

The folding finger **30** is mounted on the inner end of an arm **64**, the outer end of the arm being mounted for oscillation on a stud **66** (Fig. 3). Oscillatory movement is imparted to the arm **64** to move the folding finger by a crank pin **68** on the end of the drive shaft **42** which is received by a slotted pin **70** carried by an intermediate portion of the arm **64** so that upon rotation of the drive shaft **42** the pin **68** imparts oscillatory movement to the arm **64** carrying the folding finger.

Provision is made for adjusting the path of movement of the folding finger in order to vary the space between it and the adjacent surface of the creaser-foot by adjusting the position of the stud **66** on which the arm **64** is mounted. The stud is mounted in a bore eccentrically located in a bushing **65** journaled in the end portion **16**. An arm **71** (Fig. 1) is secured to one end of this same bushing to adjust the position of the stud **66** in the end portion **16**. In order to hold the bushing in the desired position of adjustment, the inner surface of the arm **71** around the margin thereof is provided with a plurality of notches with which cooperates a detent having a depressible, outwardly extending portion **72**. The gripper-operating cam **54** is so adjusted on the shaft **42** that the gripper **34** holds the work against the under surface of the creaser foot **32** during the movement of the folding finger **30** to fold the margin of the work against the adjacent surface of the creaser-foot.

The anvil **38** is supported by means of a hollow shaft **80** (Figs. 2 and 3) journaled in the arm **14** and arranged to be oscillated about its axis by mechanism to be described. The anvil **38** is mounted on the outer end of an arm **82** which extends rearwardly and downwardly, as indicated in Fig. 3, the lower end thereof terminating in a split clamp **84** secured to the shaft **80** by means of a screw **86**.

The hammer **36** which cooperates with the anvil **38** to press the folded margin of the work and to feed the work is formed at the upper end of an arm **94** which is pivoted between its ends on a pin **90** mounted in the arm **82**, the outer end of which carries the anvil **38**. Oscillatory movement is imparted to the hammer **36** to move the hammer toward and away from the anvil by a reciprocating rod **102**. As the shaft **80** is oscillated, it will cause oscillation of the anvil **38** and, by reason of the mounting of the hammer, a similar motion will be imparted thereto so that the hammer and anvil are moved together along the line of feed. During this movement of the hammer and anvil, the hammer is adjacent to the anvil with a portion of the fold in the margin of the work pressed and held therebetween.

The mechanism by which the hammer is moved toward and away from the anvil will now be described. The hammer-carrying arm **94** (Fig. 3) is bifurcated at its lower end to embrace opposite sides of a block **104** mounted on the rod **102**. Pins **106** pass through alined apertures in the arm **94** and pivotally connect the arm to the block **104** for movement therewith. The block **104** is maintained against a stop **108** carried by the rod **102** by a spring **110**, the outer end of which bears against a nut **112** threaded on the outer end of the rod **102**. The inner end of the spring **110** bears against the block **104**, so that the hammer will be oscillated about the pin **90** as the rod **102** is reciprocated. The spring **110** forms a yielding connection between the arm **94** and the reciprocating rod to permit relative movement between these members to soften the blow of the hammer against the work.

In order to cause reciprocation of the rod **102** within the hollow shaft **80** to move the hammer **36** toward the anvil, the shaft **42** is provided with an eccentric surrounded by a strap **132** (Fig. 1) from which depends a pitman **134** pivotally secured at its lower end to a lever **136**. This lever is journaled on a stud **138** supported in the base **10** of the machine and the opposite end of the lever is connected by a link **140** to the lower end of a lever **142**. This lever is journaled on a stud **144** mounted in the base of the machine and the upper end of this lever is connected to the inner end of the reciprocable rod **102**. As the shaft **42** rotates, the rod **102** will be reciprocated in time relationship with the folding finger **30** and the gripper member **34** which are also driven from the shaft **42**.

The hollow shaft **80** which is oscillated to impart feeding movements to the hammer and anvil is also connected to the shaft **42**. For this purpose an eccentric **150** (Fig. 10) is mounted on the shaft **42** and is surrounded

by a strap **152** having a depending arm **153** the lower end of which is pivotally connected to a lever **154**. This lever is journaled on a stud **156** mounted in the base of the machine. The opposite end of the lever **154** is connected to a link **160** by means of a pin **158** traversing the forked upper end of said link. The opposite end of the link **160** is also forked, as indicated in Fig. 1, and is connected by means of a pin **162** to the upper end of an arm **164**. The pin **162** also carries the lower end of a link **166** pivotally connected at its upper end to an arm **168** secured to the hollow shaft **80** which supports the anvil for oscillation.

The arm **164** forms with the link **166** a toggle through which oscillation is imparted to the shaft **80** as the pin **162** connecting the arm **164** and the link **166** is moved more or less out of alinement with the opposite ends of the arm and link respectively upon rotation of the shaft **42**. The lower end of the arm **164** is supported by a pin **170** which is in turn supported by an arm **172** fixed to a feed-control shaft **174** (Figs. 1 and 5) journaled in a hollow bearing sleeve **176** in the base of the machine. Upon turning the shaft **174**, the arm **172** is swung about the axis of the shaft, thus moving the pin **170** on which the arm **164** is supported so as to cause the pin **162** connecting the arms of the toggle to lie more or less in alinement with the ends of the toggle arms whereby the amount of oscillation of the shaft **80** for a given movement of the link **160** may be varied. Thus the amount of feeding movement of the hammer and anvil will also be varied.

The feed-control shaft **174** extends outwardly from the base of the machine and is connected by an arm **180** (Fig. 5) to a rod **182** suitably connected to a treadle. This arm is urged upwardly by any suitable means, such as a spring (not shown), and the extent of upward movement is limited by the engagement of an arm **184**, rigid with the shaft **174**, with an adjustable stop **186** threaded through a bracket **188** fixed to the base of the machine. When the arm **180** is in this upper position, the pin **170** is in the position illustrated in Fig. 10, which is the normal operating position thereof. If a longer feeding movement of the hammer and anvil is desired, the shaft **174** is moved in a counterclockwise direction, as viewed in Fig. 5, to the position shown there, by downward movement of the treadle rod **182** so as to carry the pin **170** more out of alinement with the pin **162** and the upper end of the link **166** of the toggle. Movement of the shaft **174** in this direction is limited by the engagement of the arm **184** with a stop peg **190** received by one of several holes in the lower portion of the bracket **188**. The position of this stop peg may be varied adjustably to limit the maximum work-feeding movements of the hammer and anvil.

It will be noted that the mechanism for operating the reciprocable rod **102** for causing movement of the hammer toward and away from the anvil and that for oscillating the shaft **80** for imparting feeding movements to the hammer and anvil are entirely enclosed by the base **10** and the cap **19** with its neck **20** forming a cover therefor. The base may therefore be filled with oil to maintain the various operating parts and connections properly lubricated whereas the various adjustments heretofore described are all located so as to be accessible exteriorly of the casing, thus simplifying the various adjustments that may be desired during the operation of the machine.

Having described the work-contacting tools which are supported in the lower arm **14** of the frame, it is in order to describe those coacting tools which are supported in the removable head **22** attached to the neck **20** of the frame. This removable head **22**, the attaching portion of which is shown in section in Fig. 1, comprises a casting which has a side plate **200** erected on the side toward the observer in Fig. 1 and from the lower edge of this side plate the casting is extended away from the observer to provide an underlying portion **202** which includes a transverse web **204** (Figs. 14 and 15) and which extends upwardly again (as seen in Fig. 3) terminating in a triangular plate **206**.

Integral with the web **204** is a depending member **208** (Figs. 3 and 15) passing through which is a pivot rod **212**. On this pivot rod **212** are mounted the gage finger **28** and a finger piece **214**. The latter is normally held upward by a spring **216** (Fig. 1) but the arrangement is such that the finger piece may be depressed by the operator to lift the gage finger when inserting a piece of work to allow the skived margin of the work to be slipped into the space between the gage finger and the gage block **24**. The finger piece **214** has a recess which receives a slotted end **215** of the gage finger, thus providing for the front to back adjustment of the gage finger with respect to the gage block so as to accommodate different thicknesses of work.

Also mounted on this underlying portion **202** is the snipper knife **40** (Fig. 14) which is adjustably secured by a screw **218** to a bell-crank supporting lever **220** having a hub **221** which is carried between pivot screws **222** and **224**. The first of these screws is threaded in the lower portion of the side plate **200** while the other screw is threaded in a lug **226** forming an integral extension of the web **204**. To prevent the moving work from springing the supporting lever **220** for the snipper knife **40**, the depending member **208** has a further extension **228** in which there is threaded a screw having a head **230**, which is shown in Fig. 14, and against which the face of the snipper knife **40** rests. It will be clear that by means of the screws **222** and **224** the plane of movement of the snipper knife may be adjusted to bring it close to the far face of the gage block **24**, as seen in Fig. 1, it being remembered that the knife cooperates with this block to provide a shearing action as cuts are made in the skived margin which is turned up from the body of the work between the gage finger **28** and the gage block **24**. Attached to the upper arm of the bell-crank lever **220** is a rod **232** to which a reciprocating movement may be imparted at the will of the operator by a mechanism to be later described.

It may be desired to adjust the position of the creaser-foot **32** to vary the work-margin receiving space between it and the adjacent surface of the folding finger **30**, said foot being attached by screws **234**, **236** (Fig. 4) to the lower end of a cement tube **240** having a passage **241** (Fig. 3) connecting a receptacle **312** (to be described) to a passage **300** in the creaser-foot **32** which enables the latter to act also as a nozzle. This cement tube **240** is movably supported, as later described, so that it may be raised to insert the work, on a carrier plate **242** (Figs. 3 and 13) overlying the web **204** of the head casting **22**. The carrier plate is supported in the head **22** by means of screws **244**, **246**, **248** (Fig. 13) which are received in grooves as at **250** in the side edges of this carrier plate. This allows adjustment horizontally of the supported creaser-foot **32** with respect to the folding finger **30** and by turning in and out the screws **246**, **248** permits the lateral position of the carrier plate **242** to be determined so that said foot will clear the anvil **38**. An adjustment of the plate, endwise of the head, is accurately effected by providing a groove **243** (Fig. 3) in the bottom of the carrier plate to receive a cylindrical piece **252** eccentrically mounted on a pin **254** and secured thereto by means of a set-screw **256**. The pin **254** is frictionally held against rotation by a tight fit in the lower part of the triangular portion **206**, shown in Fig. 3, and at its other end in the side plate **200**.

At its front end the carrier plate **242** has an extension **260** (Fig. 13) to furnish a mounting for a pivot **261** (Fig. 16) at one end of a supporting link **262** (Fig. 13) which has a pivot screw **265** joining it to a hump **267** on the tube **240**. At its other end the carrier plate has spaced lugs **264**, **266** (Fig. 13) to provide a tiltable mounting for the upper portion of the cement tube **240**.

Specifically, this mounting comprises a U-shaped yoke **270** (Fig. 12) pivoted upon a shaft **272** passing through the lugs **264**, **266**. This yoke has forwardly extending

arms 274 serving as links to receive a pivot pin 276 passing through a hump 278 (Fig. 3) on the lower side of the cement tube. Upward movement of the creaser-foot and the cement tube about the shaft 272 and the link pivot 261 may be effected by the depression of a finger piece 280 (Figs. 1 and 16) attached to the outer end of a cross rod 282 on which an arm 284 (Fig. 16) is secured. This arm has at its outer end a roller 286 positioned to underlie the link 262. The lifting action is effected against the action of a spring 288 (Fig. 16) surrounding a rod 290, a lower end of which is pivotally attached to the link 262 at 292. The rod passes through a plate 294 having a pivot extension 296 which rocks in an upstanding arm 298 forming part of the carrier plate 242. Threaded in the plate 294 is a bushing 297 to adjust the tension of the spring 288 and on the rod is a lock nut 299.

It will be noted that the connecting passages 300 in the creaser-foot 32 (shown in Fig. 4) join the passage 241 in the cement tube 240 to the bottom surface 302 of the creaser-foot. The latter is provided with a lateral hollow extension 304 for the reception of a heating unit designed to maintain the temperature of the creaser-foot at a desired value.

Furthermore, within the passage 241 in the tube 240 there is a heating unit 306 (Fig. 3) supported at its upper end in a bushing 308 threaded in the tube 240. The upper end of this unit is provided with terminals 310 supported on a bracket 311 and to which electric conductors may be attached and led to any suitable control device whereby the temperature of the passage surrounding this heating unit 306 may be maintained at its desired value.

Coating material is supplied to the passage 241 in the tube 240 from a frusto-conical receptacle 312 which is made integral with the tube. Received within the receptacle (Figs. 3 and 19) is a cup 314 held in place therein by an overhanging rim 316 and provided on its outer surface with a substantially helical groove 318 designed to receive a heating unit 320. The latter unit is also provided with terminals 322 adapted to be connected by electric conductors to a controlled source of electrical heating energy.

At the bottom of this reecptacle 312 is a chamber containing a gear pump comprising gears 324 (Figs. 3, 17 and 19) mounted on laterally extending shafts 325, 327. The shaft 325 is provided with a driving pinion 326 and a worm 328. It will be seen from Fig. 3 that the gear pump feeds into an outlet passage 330 which opens directly into the passage 241 of the tube. The pinion 326 which is attached to the pump gear 324 meshes with an idler 332 to which power is transmitted by a gear 334 carried by the shaft 272 about which the yoke 270 swings and on this shaft between the arms of the yoke is a skew gear 336 (Fig. 12) meshing in turn with another gear 338 on a shaft 340 extending lengthwise of the frame arm 20 and to which power may be delivered intermittently by a mechanism to be later described.

Difficulties which have been previously encountered when employing thermoplastic cements, because of overheating or "cooking" of the cements if they are kept for a long time at an elevated temperature, have been overcome by the utilization within the cup 314 of a rotatable scraper 342 (Fig. 18). This comprises an upper rim 344 on which there is mounted an annular gear 346 meshing with a gear 348 (Figs. 17 and 19) which is carried at the upper end of a shaft 349 journaled in a bracket 350 attached to the receptacle 312. At the lower end of this shaft 349 is a worm gear 352 meshing with the previously mentioned worm 328 attached to the drive shaft 325 of the gear pump. Whenever the gear pump is driven, therefore, the scraper is rotated and it will be noted that it is provided with a pair of depending blades 354 each of which extends downwardly from the upper rim 344 of the scraper to slide on the inner wall of the cup 314. The active edges 356 of these scraper blades extend rearwardly and downwardly, considering the direction of rotation of the scraper, as indicated by the arrows in Fig. 17.

Consequently, these active edges serve also to push the melted cement, which lies immediately adjacent to the inner face of the cup 314, downwardly toward the gear pump chamber and at the same time allow the cooler cement in the inner portion of the cup to flow out into contact with the heated wall of the cup to take the place of the material which has been pushed downwardly. Another important advantage of this arrangement is that, in starting the machine into operation after it has been allowed to cool, it is only necessary to melt a thin layer of cement immediately adjacent to the inner surface of the cup 314 after which the succeeding portions of the lump of material contained in said cup will soften, the lump will drop down, and melted portions will move out into contact with the heated walls of the cup.

After the whole of the material in the cup has become melted, it will be seen that the scraper 342 serves also as an agitator continuously to bring cooler portions to the inner cap surface. For the above reasons there is no danger of harming the cement by a repeated overheating or "cooking" and the fully melted cement will be immediately and continually furnished to the gear pump for removal thereby and extrusion through the passage 241 of the cement tube.

Mechanism for the oscillation of the snipper knife 40 comprises a rod 360 (Fig. 1) connected to the rod 232 by means of a turnbuckle 362. The rod 360 passes through a partition 364, between the cap 19 and the neck 20, which completes the oil chamber. The rear end of the rod 360 is pivotally connected to an arm 370 rockable on the shank of a screw 372 (Fig. 11) supported by a boss 374 (Fig. 5) carried by the cap 19 of the frame of the machine. The arm 370 includes a downward extension block 376 below the screw 372, the lower portion of the block 376 having spaced arms between which is pivotally mounted a latch 378.

This latch is spring-biased downwardly by a spring 380 to a position in which it is located between a pair of spaced arms, one of which is indicated by the reference character 382, which extend laterally from an arm 384 journaled on a pin 386 secured to the upper end of a bracket 388 (Fig. 5) extending from the base of the machine up into the cap 19. The arm 384 is arranged to be oscillated about the pin 386 by the drive shaft 42.

To this end, the drive shaft carries an eccentric 390 surrounded by a strap 392 which has a pitman 394 pivotally connected by ball and socket to an arm 396 (Fig. 1) integral with the arm 384. Thus, a rocking motion is imparted to the arm 384 upon rotation of the shaft 42 and, when the latch 378 is in its down position between the extensions 382 of the arm 384, a similar motion will be imparted to the arm 370 to which the rear end of the rod 360 is connected, causing oscillation of the snipper knife to snip the margin of the work.

The snipper-operating latch 378 is normally maintained in the up position shown in Fig. 11 by a lever 399 pivoted on a screw 402 threaded in a boss 403 attached to the cap 19 of the machine, in which position the latch is out of engagement with the extensions 382 of the arm 384. The forward end 400 of the lever engages an extension 404 of the latch 378 and moves the latch upwardly under the influence of a spring-pressed plunger 406 (Fig. 1) engaging the rear and 401 of the lever 399. A stop pin 408 (Fig. 1) located below the rear end 401 of the lever limits the extent of movement thereof by the plunger 406.

In order to move the lever 399 against the force of the plunger 406 to permit downward movement of the latch 378, a rod 410 vertically movable in a frame bearing 412 engages the under side of the lever arm 401 op-

posite the plunger 406. This rod 410 may be connected to a treadle mechanism (not shown) by means of which an upward movement may be imparted thereto by the operator whenever operation of the snipper knife is desired. The connection between the knife and the shaft 42 formed by the latch 378 is such that the upper part of the casing comprising the neck 20 and the cap 19 may be readily removed from the base of the machine whenever desired.

An intermittent drive for the cement pump is actuated by means of an eccentric 420 (Figs. 1 and 7) on the drive shaft 42. This eccentric imparts an oscillatory movement to a forked lever 422 pivoted at 423 and having an arm 424 (Fig. 7) joined by means of links 426 and 428 to a lever 430 which is loose on a sleeve 432 surrounding the shaft 340 and is adapted to be connected to said sleeve to give an intermittent movement thereto in a clockwise direction, as viewed in Fig. 7.

To that end, a latch 440, pivoted at 442 in a lever 438 gripping the sleeve 432, is shaped to fit in the notch 444 at the top of the lever 430 and when it snaps into that notch, under the action of a spring 448, connects the lever to the sleeve 432 to oscillate the sleeve and drive the pump. The shock resulting from thus connecting a still part to a moving part is softened by a buffer spring 434 and a follower spring 436 acting on opposite ends of the lever 438. These springs, as may be seen in Fig. 5, surround rods slidable in bushings secured to the cap 19. The latch 440 has a depending tail piece 446 which is normally urged away from the end of the shaft 340 by means of the interposed spring 448. The latch 440 and its tail piece 446 may, however, be rotated against the spring 448 by the depression of a rod 450 so as to lift the latch out of the notch 444 and stop the pump.

This depression of the rod 450 is effected by a lever 452 (Fig. 5) pivoted on a bracket 454, whenever a solenoid 456 is deenergized by an operator-controlled switch (not shown) so that its core is released from the solenoid and is raised by a spring 455. The bracket 454 is a part of a plate 458 which is clamped on the outside of the cap 19.

It is desirable to vary the amount of cement extruded during each oscillation of the sleeve 432, and eventually of the shaft 340, in accordance with the lengths of the work-feeding steps so that, irrespective of the rate of feed of the work, the quantity of cement delivered thereto will be uniform. For this purpose the arm 172, which is adjusted by the operator to vary the rate of feed, is utilized also for adjusting the extent of oscillation of the sleeve 432.

The links 426 and 428 are connected by a pin 460 to which is also connected the arms of a twin lever 462 (Fig. 6) carried by a fulcrum pin 464 extending outwardly from an end of an arm 466. A swinging of this arm varies the center about which the links-connecting pin 460 moves when the arm 424 is oscillated by the drive shaft 42. Consequently the extent of swinging movement imparted to the sleeve 432 by the eccentric 420 depends upon the position of the fulcrum pin 464.

The arm 466 (Fig. 7) is secured to one end of a rod 470 which is in turn adjustably secured, as will be described, to a sleeve 484 carrying an arm 472 which is in turn connected by an adjustable link 474, 478 to the arm 172. The two parts of the link 474, 478 are clamped together in adjusted relation by a screw 480. From the above it will be seen that upon swinging the arm 172 to adjust the lengths of the feeding steps of the work, arms 472, 466 will swing, thus varying the position of the fulcrum pin 464 and consequently varying the extent of the oscillatory movement imparted by the drive shaft 42 to the sleeve 432 and the shaft 340.

It may also be desirable to effect an independent adjustment of the rate of feed of cement to accommodate work pieces of different characteristics requiring a greater or lesser amount of cement to hold the margin in folded condition. For this purpose provision is made for relatively moving the rod 470 and the sleeve 484 to vary the angular relationship between the arms 466 and 472, the effect of which is to adjust the position in the space of the fulcrum pin 464. The rod 470 carries a segment 482 provided with a series of spaced notches 490 arranged to be engaged by a spring-pressed latch 488 carried by an arm 486 secured to the sleeve 484. By retracting the latch 488 the sleeve 484 may be moved relatively to the rod 470 and the parts locked in the desired relative positions by engagement of the latch 488 with the appropriate notch 490. Since these parts are outside of the partition 364 (Fig. 1) it is possible to make this adjustment during operation of the machine.

The mechanism for imparting the oscillations of the sleeve 432 to the gear 338 is illustrated in Fig. 8 where it will be seen that the sleeve 432 has a bearing 492 in the partition 364 between the cap 19 and the neck 20. The left end of the sleeve, as shown in Fig. 8, terminates in a Horton clutch comprising an annular cup 494, a rotor 496 and the usual spring-pressed rolls (not shown) whereby the rotor, and ultimately the gear 338 which drives the cement pump gears 324 and the scraper 342, is driven intermittently in one direction as the sleeve 432 is oscillated.

This rotor 496 is connected to a similar rotor 498 constituting part of a one-way brake of the Horton type which prevents retrograde movement of the gear during back strokes of the sleeve. The rotor 498 cooperates through rolls 499 (Fig. 9) with a cage 500 held against rotation by a pin 502, which, as may be seen in Fig. 1, is mounted on the partition 364 and is received between two lips 504 extending outwardly from the cage 500. These rotors, separated by a washer 501, are joined by pins 506 to one another and to a cup 508 within which there is a protective friction clutch joining it to the shaft 340. If the operator should start the pump drive, by energizing the solenoid 456, before the cement has melted sufficiently, the breakage of parts will be avoided by this protective clutch.

The friction clutch just described includes a sleeve 510 which surrounds the shaft 340 and at the right end of which there is a flange 512 resting against a friction plate 514 which is keyed to the cup at 516. At the left of plate 514 is a ring 518 keyed to the sleeve 510 at 520. This ring is continually urged against the side of the plate 514 by means of a spring 522, the outer end of which is held in adjusted compression by nuts 524 threaded on said sleeve. The end of the latter is notched to receive prongs 526 on a spacer 528 between the sleeve and an end web 530 (Fig. 1) of the neck 20. The spacer 528 is pinned to the shaft 340. Thus, while retrograde movement of the shaft is prevented by the one-way brake 498, 500, the oscillations imparted to the sleeve 432 are carried through the clutch 494, 496 and the protective friction clutch to give the driving gear 338 an intermittent turning movement in one direction. The shaft 340 adjacent to the gear 338 is journaled in the web 530.

When the machine is to be operated, assuming that cement has been supplied to the frusto-conical receptacle, the operator will turn on the electrical heat for the unit 320 (Fig. 3) in the receptacle and for the unit 306 in the tube leading to the nozzle and for the unit 304 on the side of the creaser-foot. As soon as this heat melts any residue in the nozzle and a layer of cement adjacent to the wall of the receptacle, a switch, such as a knee-operated switch, may be closed to energize the solenoid 456, thereby to complete the drive for the pump by allowing the latch 440 to be closed by its spring 448 (Fig. 7).

A piece of work, having a skived edge, may be inserted in the machine in the usual fashion by depressing the finger pieces 214 and 280 so as to lift the gage finger and the creaser-foot, whereupon the work may be moved against the gage block 24 and the finger pieces released. Having then started the drive leading to the main shaft 42 of the machine to fold and feed the work, cement will be

supplied continuously through the creaser-foot just prior to the folding of the margin of the work. The cement cools so quickly that, as soon as the folded margin is pressed against the margin of the work by the hammer **36**, enough heat will be removed by the leather to allow the cement to cool and to hold the fold in the work.

If, during the operation of the machine, the portions of the work to be treated are practically straight, then the treadle connected to the rod **182** will be depressed thereby increasing the rate of feed of the work by the hammer and anvil mechanism. This will be effective at the same time, by reason of the mechanism, including the vertical link **474** in Fig. 7, to increase the arc of oscillation of the drive gear **338** and thus will increase the amount of cement which is delivered to the work, to the end that the same amount of cement may be applied to each unit of the margin. If the character of the work requires it, more or less cement may be delivered by adjusting the latch **488** with respect to the segment **482** and this may be done without stopping the operation of the machine. It will be understood also that the snipping mechanism may be operated during curved portions of the work by raising the rod **410** so as to drop the latch **378** in Fig. 11 to complete the drive for the snipper knife. The novel features of the receptacle and its scraper disclosed but not claimed herein are claimed in a divisional application Serial No. 507,670, filed May 11, 1955, in my name, for improvements in Cement Handling Mechanisms.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a folding machine, a folding mechanism including a creaser-foot provided with a passage terminating in an outlet opening, means for intermittently feeding the work past said folding mechanism, means for intermittently extruding adhesive through said creaser-foot in time relation to the action of said feeding mechanism, and operator-controlled means for regulating the amount of adhesive extruded by the intermittent cement-extruding mechanism adjustable during the operation of the machine.

2. In a folding machine, a folding mechanism, a work-feeding mechanism acting intermittently to feed the work in steps, means for controlling the length of the feed steps, an extruding mechanism for delivering an adhesive to the work at a point closely adjacent to said mechanisms and prior to the completion of the fold, and means for driving said extruding mechanism intermittently.

3. A machine as in claim 2 having connections between the mechanism controlling the length of the feed steps and the drive parts for the cement-extruding mechanism, operative to effect the delivery of equal quantities of cement for successive increments of the work irrespective of changes in the lengths of the work-feeding steps.

4. In a folding machine, a folding mechanism, an intermittent work-feeding mechanism, a nozzle for delivering cement to the work in a position to lie beneath the fold, a force-feeding mechanism for said cement, and means for operating said force-feeding mechanism intermittently, said operating means having a manually adjustable control determining the amount of cement extruded at each interval, said control means being operable while the machine is running.

5. A machine as in claim 4 in which intermittently operable mechanism is provided to drive the work-feeding mechanism, said drive mechanism having a manual control to determine the length of the feed steps, and a connection between said manual control and the control for determining the length of interval of the cement feed whereupon uniform quantities are extruded upon successive increments of the work.

6. In a folding machine, means for folding the margin of a work piece, means for feeding the work in a step-by-step manner past the folding means, means for intermittently feeding cement to the margin of the work just prior to the folding operation, means for adjusting the rate of operation of the feeding means to vary the rate of feed of the work, and means for synchronizing said work-feeding means and said cement-feeding means to provide for the deposit of a uniform amount of cement on the work irrespective of the rate of feed.

7. In a folding machine, means for folding the margin of a work piece, means for feeding the work in a step-by-step manner past the folding means, means for intermittently feeding cement to the margin of the work just prior to the folding operation, means for adjusting the rate of operation of the feeding means to vary the rate of feed of the work, means for synchronizing said work-feeding means and said cement-feeding means to provide for the deposit of a uniform amount of cement on the work, and means for adjusting said cement-feeding means independently of said work-feeding means.

8. In a folding machine, a creaser-foot having an outlet opening, a gear pump for delivering cement to the outlet of the creaser-foot, tiltable links for supporting said creaser-foot and gear pump for lifting movement away from the work, and driving means for the gear pump including a gear which is coaxial with the end of one of the supporting links.

9. In a folding machine, a lower arm supporting a folding finger, an upper arm supporting a creaser-foot, said upper arm including an underlying web, means including a yoke slidably mounted on said web, said yoke having spaced arms pivoted on said means and serving as links for supporting said creaser-foot, an eccentric member interposed between said means and said web to provide for the adjustment of the creaser-foot with respect to the folding finger, a driven member on said creaser-foot, and a chain of driving elements for said driven member including a member rotatable about the axis of the pivot for said arms.

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