Sept. 1, 1964 F. C. WORTH 3,146,698

MARKING APPARATUS

Filed Oct. 3, 1961 3 Sheets-Sheet 1

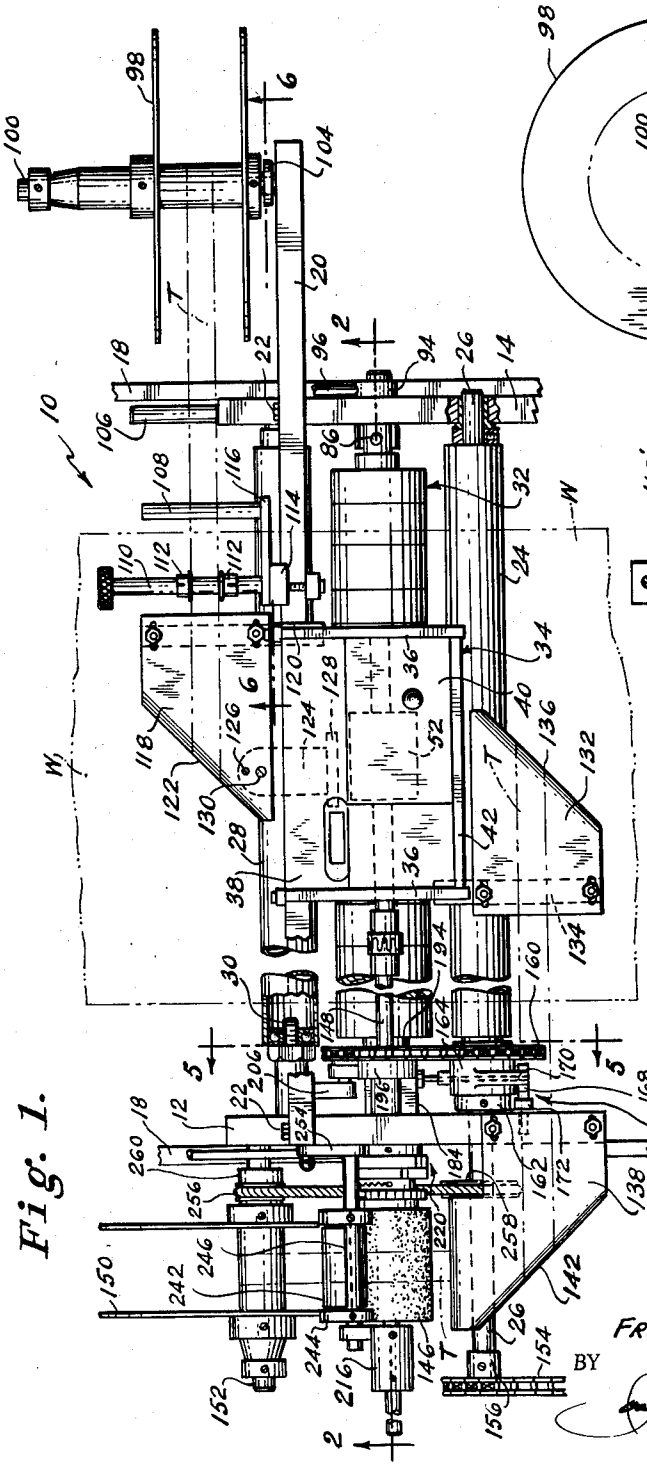


Fig. 1.

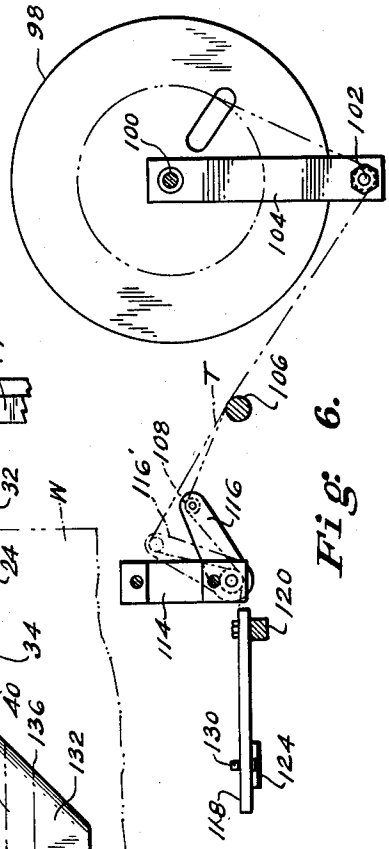


Fig. 6.

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MARKING APPARATUS

Filed Oct. 3, 1961 3 Sheets-Sheet 2

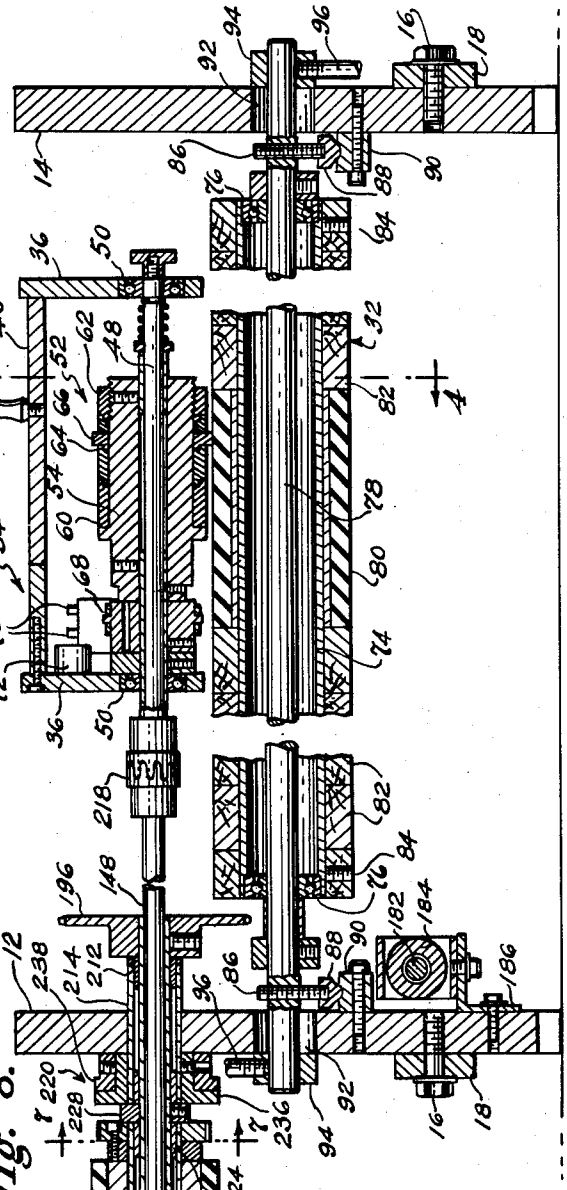


Fig. 2.

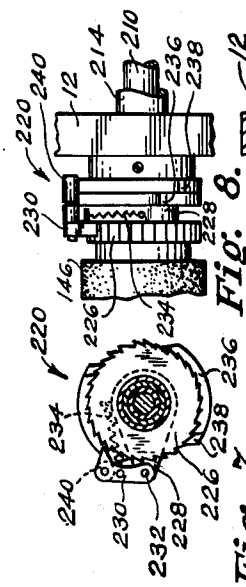


Fig. 8.

Fig. 7.

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MARKING APPARATUS

Filed Oct. 3, 1961 3 Sheets-Sheet 3

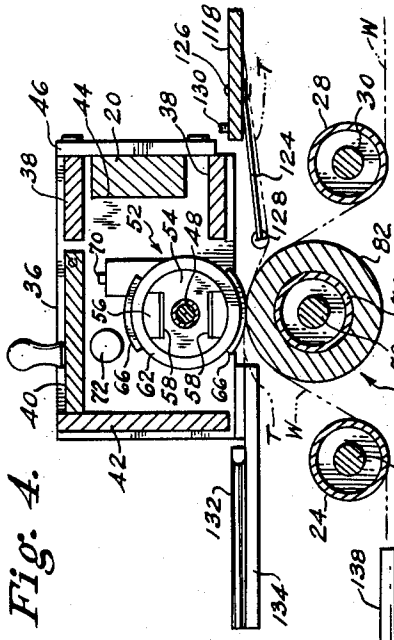


Fig. 4.

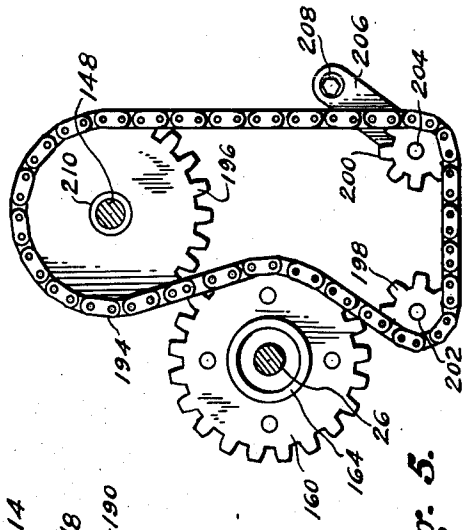


Fig. 5.

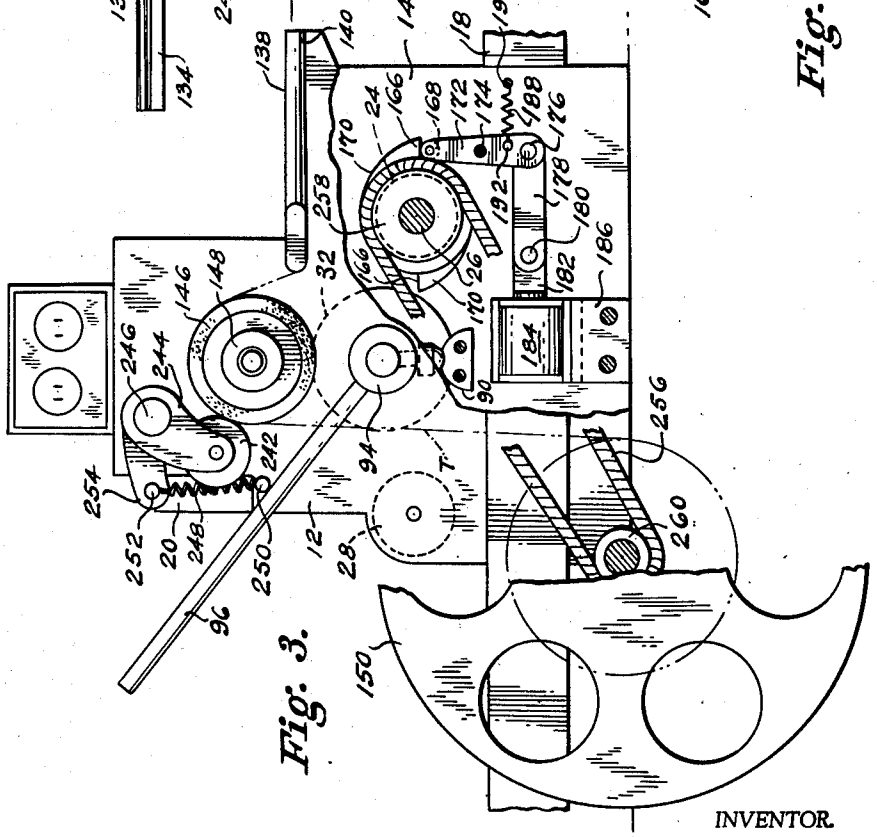


Fig. 3.

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United States Patent Office 3,146,698 Patented Sept. 1, 1964

3,146,698

MARKING APPARATUS

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Filed Oct. 3, 1961, Ser. No. 142,672
3 Claims. (Cl. 101—25)

This invention relates generally to a marking apparatus, and more particularly is directed to an apparatus for applying markings to successive sections of a continuous web or flattened tube of plastic or other sheet material which is continuously or intermittently fed to an associated wrapping or other machine, and wherein the markings are applied by pressing heated type elements upon a hot roll leaf stamping tape disposed against the surface of the web or flattened tube to be marked so as to transfer pigment to the latter from the tape.

Apparatus has been previously proposed for marking plastic or other glossy sheet materials by pressing heated type elements upon a hot roll leaf stamping tape disposed against the surface to be marked, and wherein the stamping tape is fed or advanced after each marking operation so as to expose a new or unused portion of the tape to the action of the heated type elements during the next marking operation. In such previously proposed apparatus, the type elements are reciprocated toward and away from the path of the web or flattened tube to be marked, while the stamping tape is fed laterally with respect to the direction of movement of the web or flattened tube. Further, in the previously proposed apparatus, marking occurs when the web or flattened tube is at rest, at which time the heated type elements are moved toward the path of travel of the web or flattened tube, while feeding of the tape is effected when the type elements are moved away from the path of the web or flattened tube and the latter is advanced toward the associated wrapping or other machine. Thus, the previously proposed marking apparatus of the described character can be used only when the web or flattened tube to be marked is intermittently advanced to the associated wrapping or other machine utilizing the successive sections of the continuous web or flattened tube.

Accordingly, it is an object of this invention to provide a marking apparatus which is capable of applying markings to successive sections of a continuous web or flattened tube of plastic or other sheet material by pressing heated type elements upon a hot roll leaf stamping tape disposed against the surface to be marked, and which performs each marking operation during movement of the web or flattened tube to the wrapping or other associated machine intended to utilize the successive marked sections of the continuous web or flattened tube.

Another object is to provide a marking apparatus of the described character in which the heated type elements are carried by a die wheel which is rotated during each marking operation so as to roll the type elements upon the stamping tape disposed against the web or flattened tube and being advanced with the latter during each marking operation, and wherein the feeding or advancing of the stamping tape is effected in a manner to expose an unused portion of the tape to the action of the type elements during each marking operation while avoiding any unnecessary waste of the stamping tape.

Another object is to provide a marking apparatus of the described character in which the web or flattened tube is marked while the latter travels over a back-up or pressure roller, and wherein the back-up or pressure roller is mounted for quick release of the marking pressure between the die wheel and back-up roller so as to avoid burning of the web or flattened tube in the event that movement of the latter is interrupted for an extended

period with the die wheel positioned so as to effect contact of the heated type elements with the web or flattened tube.

In accordance with an aspect of this invention, the die wheel carries heated type elements only on one or more spaced apart peripheral portions thereof and the die wheel is held at rest in the intervals between marking operations in a rotational position where a gap between the type elements faces toward the pressure or back-up roller to permit the web or flattened tube to pass freely between the die wheel and back-up roller. During each marking operation, the die wheel is turned through a single revolution, or a fraction thereof, so as to effect rolling pressure of the heated type elements upon the stamping tape while the latter is advanced with the web or flattened tube between the die wheel and back-up roller. Further, the marking apparatus includes feeding means for the stamping tape which advances the latter during each marking operation through an adjustably predetermined distance corresponding only to the circumferential distance on the die wheel occupied by a type element, thereby to expose an unused portion of the tape for each successive marking operation while avoiding unnecessary waste of the tape.

The above, and other objects, features and advantages of the invention, will be apparent in the following detailed description of an illustrative embodiment thereof which is to be read in connection with the accompanying drawings, forming a part hereof and wherein:

FIG. 1 is a top plan view of a marking apparatus embodying the present invention;

FIG. 2 is a transverse sectional view taken along the line 2—2 on FIG. 1;

FIG. 3 is a side elevational view of the marking apparatus of FIGS. 1 and 2;

FIG. 4 is a sectional view taken along the line 4—4 on FIG. 2;

FIG. 5 is a sectional view taken along the line 5—5 on FIG. 1;

FIG. 6 is a sectional view taken along the line 6—6 on FIG. 1;

FIG. 7 is a sectional view taken along the line 7—7 on FIG. 2; and

FIG. 8 is a fragmentary top plan view of the structure shown in FIG. 7.

Referring initially to FIGS. 1 and 2 of the drawings, it will be seen that a marking apparatus embodying the present invention and generally identified by the reference numeral **10** includes upstanding, spaced apart side frame members or plates **12** and **14** secured at their lower portions, as by bolts **16** (FIG. 2), to a pair of spaced apart, parallel structural members **18** between which the web or flattened tube W (FIG. 1) is intermittently or continuously advanced during its travel to the inlet of a wrapping or other associated machine (not shown) which utilizes successive sections of the web. A laterally extending cross bar **20** disposed above the path of web W is secured to side frame plates **12** and **14**, as at **22** (FIG. 1), and has an end portion projecting beyond side frame plate **14**.

A front guide roller **24** extends laterally between side frame plates **12** and **14** and is freely rotatable on a shaft **26** which is journalled in the side frame plates. A rear guide roller **28** also extends laterally between the side frame plates at a location spaced rearwardly from roller **24** and is rotatably mounted, at its opposite ends, on stub axles **30** (FIG. 1) projecting inwardly from side frame plates **12** and **14**. A back-up or pressure roller **32** is rotatably mounted between guide rollers **24** and **28**, as hereinafter described in detail, and is intended to movably support the web or flattened tube W during the marking thereof by a marking unit **34** which is disposed

above the back-up roller and adjustably supported on cross bar 20.

As shown in FIGS. 1, 2 and 4, the marking unit 34 includes a housing made up of side walls 36 held in spaced apart parallel relationship by top and bottom cross members 38 extending between the rear portions of the side walls, and a pivoted top cover 40 from which a front wall 42 depends. The back end edges of side walls 36 are cut out, as at 44 (FIG. 4) to slidably receive the cross bar 20, and a clamping member 46 is removably secured across each cutout 44 to lock the housing of marking unit 34 in adjusted position along cross bar 20. A laterally extending shaft 48 is journalled in bearings 50 carried by side walls 36 (FIG. 2) and rotatably supports a die wheel 52. Die wheel 52 includes a generally cylindrical body 54 having removable segments 56 covering heater elements 58 (FIG. 4) and rings 60 clamped axially on body 54 by a ring nut 62 screwed onto one end of the body. Each ring 60 is undercut, at one side, for locking engagement with a foot 64 formed along the inner edge of a metal type element 66 disposed between selected adjacent rings 60. The marking wheel 52 can carry one or more type elements 66 at circumferentially spaced locations, for example, two diametrically opposed type elements, as shown in FIGS. 2 and 4. Die wheel 52 further includes a slip ring assembly 68 rotatable therewith and engaged by brushes 70 and suitably connected to the electrical heater elements 58. The heater elements are energized by connection to a source of electric current through an electrical receptacle 72 connected to brushes 70.

As shown in FIG. 4, the web or flattened tube W to be marked is passed under rear guide roller 28, over back-up roller 32 and then under front guide roller 24, and the back-up roller 32 is normally vertically positioned so that, during operation of apparatus 10, rotation of die wheel 52 causes type elements 66 projecting from the periphery thereof to bear against the surface of back-up roller 32 with the web W and a hot roll leaf stamping tape T interposed therebetween. As shown in FIG. 2, the back-up roller 32 preferably includes a tubular shell 74 rotatably mounted by bearings 76 on an axle 78 and having its surface defined by a sleeve 80 of heat resistant elastomeric material and by a series of wooden rings 82. The end rings 82 are secured on shell 74, as by set screws 84, and the elastomeric sleeve 80 is located among the wooden rings 82 so as to be disposed under die wheel 52. Thus, the position of the elastomeric sleeve can be changed when the marking unit 34 is laterally adjusted along cross bar 20 for varying the lateral locations of the markings applied to the web or flattened tube W.

The axle 78 of back-up roller 32 is preferably mounted on side frame plates 12 and 14 so as to permit the quick dropping of the back-up roller from its illustrated operative position for substantially spacing apart the die wheel and back-up roller in the event that advancement of the web or flattened tube is discontinued for an extended period, thereby to avoid burning or other damage of the web or flattened tube.

As shown in FIGS. 2 and 3, the mounting for the axle 78 may conveniently include screws 86 extending diametrically through tapped bores in the opposite end portions of axle 78 and having rounded heads 88 at their lower ends which normally seat in rounded sockets provided in the top surfaces of mounting blocks 90 secured against the inner sides of side frame plates 12 and 14. The end portions of axle 78 extend through enlarged holes 92 in side frame plates 12 and 14 and, at the outsides of the latter, have collars 94 secured thereon. Handles 96 project radially from collars 94 to provide means by which axle 78 can be manually turned through approximately 90 degrees from the position shown in FIG. 2 so that screws 86 then extend substantially horizontally and permit axle 78 to drop until the ends of the axle rest against the bottom portions of openings 92, in which position back-up roller 32 is substantially spaced from die wheel 52. It is apparent that the degree of marking pressure obtained between type elements 66 on die wheel 52 and back-up roller 32 when axle 78 is in its raised operative position can be varied by adjusting screws 86 within the related tapped bores of the axle.

The stamping tape T, prior to use in the marking of the web or flattened tube W, is stored on a supply reel 98 (FIGS. 1 and 6) which is rotatable on a spindle or axle 100 extending rearwardly from the end of cross bar 20 which projects beyond side frame plate 14 and having its axis arranged horizontally in a plane parallel to that of plate 14. The stamping tape T is drawn downwardly from reel 98 and passes under a guide pin 102 which projects rearwardly from an arm 104 depending from spindle 100 between reel 98 and cross bar 20. The tape T passes generally laterally with respect to the direction of movement of web W from guide pin 102 over a guide pin 106 extending rearwardly from the back edge of side frame plate 14, and then over a guide pin 108 prior to passing under a frictional drag member 110 having a cylindrical surface with side guides 112 slidable therealong to position the tape along the frictional drag member. Frictional drag member 110 extends from a clamp 114 (FIG. 1) which is adjustable along cross bar 20, and the guide pin 108 projects rearwardly from an arm 116 which is mounted on clamp 114 for angular adjustment about the axis of drag member 110. Thus, pin 108 can be adjusted from the position shown in full lines on FIG. 6, where the tape T is wrapped around only a relatively small circumferential extent of drag member 110, to the position shown in broken lines, where the wrap of the tape on drag member 110 is substantially increased so that the frictional resistance or drag to movement of the tape T is correspondingly increased.

After passing under drag member 110, the tape travels across the top surface of a horizontal guide blade or plate 118 extending rearwardly from marking unit 34 and being adjustably mounted on a bar 120 which is secured to the lower edge of the side wall 36 closest to side frame plate 14. Guide blade 118 has a diagonally extending rounded edge 122 (FIG. 1) at the side thereof facing away from drag member 110, and the stamping tape T travels around the diagonal edge 122 and then forwardly along the underside of guide blade 118 so as to pass between die wheel 52 and the web or flattened tube W movably supported on back-up roller 32.

Since the web or flattened tube is supported by the elastomeric or resilient sleeve portion 80 of the back-up roller during the marking thereof and since the back-up roller is adjusted through screws 86 to provide a substantial marking pressure between the type elements 66 on die wheel 52 and the back-up roller, the type elements tend to indent the stamping tape and the web during each marking operation and thereby cause a feeding movement of the tape which is slightly greater than the length of tape that needs to be advanced for the particular type elements being used. In order to avoid such excessive feeding of the tape, the apparatus 10 has a tape pull-back device which includes a leaf spring 124 (FIGS. 1 and 4) secured at one end to the underside of guide blade 118, as by a screw 126, and projecting forwardly from the guide blade to position a round rod 128 secured along the free end edge of spring 124 at a location between guide blade 118 and die wheel 52. An adjusting screw 130 extends downwardly through a tapped hole in guide blade 118 and bears, at its lower end, against leaf spring 124 to vary the downward flexing of the latter. Thus, when tape T is pulled forwardly between die wheel 52 and the web W on back-up roller 32, the tension in the tape causes the latter to urge rod 128 upwardly. However, at the conclusion of a marking operation, the type elements 66 on die wheel 52 face away from back-up roller 32 to release the marking pressure on the tape T and the web W, so that the force of spring 124 then acts

through rod 128 on the tape to pull back the latter to the extent necessary for overcoming the previously encountered excessive feed of the tape resulting from indentation of the tape and web into the resilient surface of the back-up roller.

After passing between die wheel 52 and web W on back-up roller 32, the used tape travels under a forward guide blade 132 which extends forwardly in a horizontal plane from marking unit 34 and which is adjustably mounted on a support bar 134 secured to the lower edge of the side wall 36 closest to side frame plate 12. Guide blade 132 has a diagonally extending rounded edge 136 at the side thereof facing toward side frame plate 14, and the used tape is wrapped over edge 136 and then travels laterally with respect to the direction of movement of web W across the top surface of guide blade 132 and across the top surface of a further guide blade 138 which is mounted horizontally on a shelf 140 (FIG. 3) formed on side frame plate 12. Guide blade 138 extends laterally outward from side frame plate 12 and is formed with a diagonally extending rounded edge 142 at the side thereof facing away from frame plate 12 and also with a rounded rear edge 144. The used tape T passes around diagonal edge 142 and then rearwardly along the underside of guide blade 138 prior to passing upwardly from rear edge 144 around a tape feeding roller 146 which is rotatably mounted, as hereinafter described in detail, on a drive shaft 148 for the marking unit 34. Finally, the used tape travels downwardly from feeding roller 146 and is taken up or rewound on a take-up reel 150 which is rotatably mounted on a spindle 152 extending laterally outward from the lower rear corner of side frame plate 12.

The drive shaft for the entire marking apparatus 10 is constituted by the shaft 26 on which the front guide roller 24 is freely rotatable, and the drive shaft 26 is itself driven, for example, by way of a chain 154 and sprocket 156 fixed on shaft 26 (FIG. 1), from an electric motor or a rotated shaft of the associated wrapping or other machine (not shown) to which the web W is fed. A drive clutch 158 is mounted on shaft 26 between guide roller 24 and side frame plate 12 and is intended to intermittently transmit the rotation of shaft 26 to a drive sprocket 160 (FIGS. 1 and 5) so as to turn the latter through a single complete revolution, in the event that die wheel 52 carries only a single type element, or as in the illustrated example, where the die wheel carries two diametrically opposed type elements 66, to turn drive sprocket 160 through one-half revolution, whenever the clutch is engaged.

The drive clutch 158 may be of the type available commercially from the Curtis Wright Corporation as item B–111–97226–1, and generally includes a drive member 162 fixed on drive shaft 26 and a driven member 164 connected to sprocket 160 and frictionally urged to rotate with drive member 162. Driven member 164 is held against rotation with drive member 162, except during each marking operation of apparatus 10, by engagement of an abutment surface 166 extending radially therefrom (FIG. 3) with a stop pin 168 which is movable into and out of the path of travel of shoulder 166. In the illustrated embodiment of the invention, the clutch 158 which is intended to effect a half revolution of sprocket 160 is provided with two diametrically opposed shoulders 166 on its driven member 164 so that, upon the momentary removal of stop pin 168 from the circular path of travel of shoulders 166, the driven member 164 can rotate through 180° and is then again halted by engagement of a shoulder 166 with the stop pin. The shoulders 166 are preferably formed at the ends of cam-like ramps 170 along which guide pin 168 can ride for smooth return from its release position to its operative position projecting into the path of travel of shoulders 166.

Stop pin 168 projects from the upper end of a lever 172 (FIG. 3) which is pivoted, intermediate its ends, on a pivot pin 174 extending from the adjacent side frame plate 12. The lower end of lever 172 is pivotally connected, as at 176, to links 178 which are, in turn, pivotally connected at 180 to the movable armature 182 of a solenoid 184 mounted on a bracket 186 secured to side frame plate 12. A spring 188 is connected between an anchor pin 190 extending from side frame plate 12 and a pin 192 on lever 172 to urge the latter to rock in the counterclockwise direction, as viewed on FIG. 3, that is, to move stop pin 168 into the path of travel of radial shoulders 166 of drive clutch 158, while energization of solenoid 184 retracts its armature 182 and thereby rocks lever 172 in the clockwise direction for moving stop pin 168 momentarily out of the path of travel of shoulders 166, thereby freeing the driven member 164 of the clutch for rotation of sprocket 160 with shaft 26 until a shoulder 166 again engages stop pin 168.

As shown particularly in FIG. 5, sprocket 160 drives an endless chain 194 which runs around a sprocket 196 on shaft 148 and around idler sprockets 198 and 200. Idler sprocket 198 is rotatable on a stub shaft or axle 202 extending from the adjacent side frame plate 12, while idler sprocket 200 is rotatable on an axle 204 carried by an arm 206 which is adjustably pivoted, as at 208, on side frame plate 12 so that sprocket 200 can be displaced to maintain the desired tension in chain 194.

Sprocket 196 is fixed on one end of a tube or sleeve 210 (FIG. 2) through which shaft 148 extends axially, and sleeve 210 is rotatably mounted in bearings 212 within a tubular bearing holder 214 which is fixedly mounted in side frame plate 12. The outer end of sleeve 210 is adjustably secured by a coupling 216 to the outer end of shaft 148 so that the latter is normally rotatable with sprocket 196, but can be angularly adjusted relative to the latter.

The inner end of shaft 148 is removably connected by a scribe coupling 218 to the shaft 48 on which die wheel 52 is secured, and sprockets 160 and 196 preferably have the same pitch diameter so that each half revolution of sprocket 160 causes turning of the die wheel 52 through a half revolution.

Shafts 48 and 148 are angularly positioned relative to each other through coupling 218 so that, when a radial shoulder 166 of clutch 158 engages stop pin 168 to halt rotation of die wheel 52, the latter is rotatably positioned with its diametrically opposed type elements 66 at the front and back, respectively, of the die wheel, that is, spaced from the underlying back-up roller 32, thereby to permit movement of the web or flattened tube W over the back-up roller without interference from the type elements of the stationary die wheel. Thus, the distance between successive markings applied to web W is not dependent upon the circumference of die wheel 52, as marking of the web or flattened tube occurs only when the die wheel is rotated from its described rest position for bringing a type element 66 thereof into rolling contact with the tape T superposed on the web W supported by a back-up roller 32.

Each marking operation of apparatus 10 is initiated by momentary energizing of the solenoid 184, for example, upon closing of a microswitch (not shown) actuated by an operative element of the associated wrapping or other machine to which the web or flattened tube is fed. Upon such energization of the solenoid, stop pin 168 is temporarily moved to its released position to permit a half revolution of die wheel 52, whereupon the die wheel has returned to its rest position, and is there held by engagement of a shoulder 166 of clutch 158 with stop pin 168. Thus, the distance between successive markings applied to web W is determined by the periods between successive energizations of solenoid 184 and by the speed of advancement of web W.

Shaft 26 which drives clutch 158 is driven at a rotational speed which is effective to provide a linear speed at the periphery of the type elements 66 equal to the linear speed at which the web or flattened tube W is

advanced over back-up roller 32, thereby to avoid blurring and ensure the attainment of a clear impression during each marking operation.

In order to feed the tape T between die wheel 52 and web W on back-up roller 32 during each marking operation, tape feeding roller 146 is intermittently coupled through a drive mechanism 220 (FIGS. 2, 7 and 8) with sleeve 210 driven by sprocket 196. The feeding roller 146 is fixed on a sleeve 222 (FIG. 2) which is freely rotatable on bearings 224 carried by sleeve 210 so that feeding roller 146 can remain at rest during an adjustably predetermined part of each rotational movement of sleeve 210.

The drive mechanism 220 for feeding roller 146 includes a ratchet wheel 226 disposed at the end of roller 146 closest to side frame plate 12 and being connected to feeding roller 146 for rotation with the latter. A radially extending arm 228 is fixed to sleeve 210 for rotation with the latter adjacent ratchet wheel 226, and a pawl 230 (FIGS. 7 and 8) is pivotally connected, as at 232, to the outer end of arm 228 for rotation with the latter. A spring 234 is connected between arm 228 and pawl 230 to urge the latter to rock inwardly relative to the arm 228 for engaging the nose of the pawl with the peripheral teeth of ratchet wheel 226. During such engagement of pawl 230 with ratchet wheel 226, feeding roller 146 is made to rotate with sleeve 210, and the feeding roller is diametrically dimensioned so that the linear speed at its periphery, that is, the speed of advancement of the tape by reason of its frictional engagement with roller 146, is equal to the linear speed at the periphery of type elements 66 on die wheel 52, thus ensuring that the tape T will move with the web W and that the type element 66 will effect pure rolling contact with the tape during each marking operation.

The drive mechanism 220 further includes two adjacent radial cams 236 and 238 fixed on the outer end of the tubular bearing holder 214 and being angularly adjustable relative to the fixed bearing holder as well as relative to each other. The cams 236 and 238 each have diametrically opposed radially enlarged portions which are more or less angularly registered with each other depending upon the relative adjustment of the cams. The peripheries of both cams 236 and 238 are simultaneously engaged by a cam follower roller 240 rotatably mounted on pawl 230, and the cams are dimensioned so that, when roller 240 rides on the radially enlarged portions thereof, the nose of pawl 230 is moved radially outward against the force of spring 234 and is disengaged from the peripheral teeth of ratchet wheel 226. On the other hand, when roller 240 rides on the radially depressed portions of cams 236 and 238, spring 234 urges pawl 230 inwardly for engagement of its nose with the teeth of ratchet wheel 226.

The cams 236 and 238 are angularly located and shaped so that the described engagement of pawl 230 with ratchet 226, and hence turning of feeding roller 146, occurs only during actual rolling contact of a type element 66 of die wheel 52 with the tape T, rather than during the entire half revolution of the die wheel effected for each marking operation. When the circumferential extent of each type element 66 on die wheel 52 is altered, cams 236 and 238 are correspondingly adjusted relative to each other to either increase or decrease the extent of the angular movement of feeding roller 146 during each marking operation. Thus, a length of the tape T is fed during each marking operation which exactly corresponds to the circumferential extent of each type element 66 thereby making unused tape available for each of the successive marking operations without wasting any of the tape.

In order to ensure that the tape T will be positively fed by feeding roller 146 during turning of the latter, apparatus 10 further includes a pressure roller 242 (FIGS. 1 and 3) rotatably mounted between arms 244 which extend downwardly from, and are secured to a shaft 246 journalled, at one end, in side frame plate 12. Pressure roller 242 is urged toward the surface of feeding roller 146 to hold the tape T in frictional contact with the latter by a spring 248 which is connected between an anchor pin 250 extending from frame plate 12 and a pin 252 extending from an arm 254 which projects radially from shaft 246.

In order to take up the tape which is fed by roller 146, the take-up reel 150 is driven from the drive shaft 26 by means of an endless spring belt 256 which runs around a pulley 258 fixed on drive shaft 26 and around a sleeve 260 rotatably coupled to the take-up reel. The frictional engagement of spring belt 256 with sleeve 260 merely urges reel 150 to rotate for taking up the tape advanced or fed by feeding roller 146, but is not sufficiently strong to pull the tape over the feeding roller during the periods when the latter is at rest, as previously described herein.

From the above detailed description of the marking apparatus 10 embodying this invention, it will be apparent that rolling contact of a type element 66 of die wheel 52 with the tape T causes a corresponding marking to be applied to the web W by transfer of pigment from the tape T while the web or flattened tube is moving over back-up roller 32. Further, the apparatus 10 effects feeding of the tape T during each marking operation in a manner to avoid waste of the tape. It is also to be noted that the described arrangement for guiding the tape from the supply reel 98 to the take-up reel 150 includes adjustable components, for example, the guide blades 118, 132 and 138, which permit the use of a relatively wide tape even though the type elements on die wheel 52 are relatively narrow. In that event, the tape may be fed through the marking apparatus more than once by laterally shifting the tape for each pass through the apparatus so that different portions of the width of the tape are presented to the action of the heated type elements, thereby to provide full, economical utilization of the hot roll leaf stamping tape.

Although an illustrative embodiment of the invention has been described in detail herein with reference to the accompanying drawings, it is to be noted that the invention is not limited to that precise embodiment, and that various changes and modifications may be effected therein without departing from the scope or spirit of the invention, except as defined in the appended claims.

What is claimed is:

1. An apparatus for marking sheet material during movement of the latter, comprising a back-up roller having a resilient surface movably supporting the sheet material, rotatably mounted supply and take-up reels for a stamping tape, guide means leading the tape from said supply reel to said take-up reel along a path that includes a portion extending over the sheet material on said back-up roller in the direction of movement of the sheet material, a rotatable die wheel disposed above said back-up roller and having marking means projecting from at least one peripheral portion of the die wheel for exerting rolling pressure upon the stamping tape against the sheet material on said resilient surface of the back-up roller in order to apply a marking to the sheet material, intermittently operable drive means for turning said die wheel from and to inoperative positions where said marking means faces away from the stamping tape and through an angular extent that is larger than the angular extent of said marking means on the die wheel so that the marking means exerts said rolling pressure upon the tape to apply a marking to the sheet material during said turning of the die wheel, whereas the sheet material is free to move on said back-up roller independently of said die wheel and the tape when said die wheel is in said inoperative positions, a tape feeding roller frictionally engaging the stamping tape at a location along said path between said portion of the latter and said take-up reel so that the tape

is fed between the die wheel and the sheet material on said back-up roller in response to turning of said feeding roller, means actuated by said drive means to positively turn said feeding roller for feeding the tape during said rolling pressure of the marking means upon the tape through an adjustably predetermined distance equal to the circumferential extent of said marking means on the die wheel and preventing turning of the feeding roller in the other direction when the die wheel is at its inoperative positions, drag means frictionally resisting the feeding of tape from said supply reel, and resilient tape pull-back means engaging the stamping tape at a location along said path between said supply reel and said die wheel and back-up roller and being urged in one direction by tension in the stamping tape, said tape pull-back means having a resilient resistance to displacement in said one direction which is smaller than the frictional resistance of said drag means so that, during feeding of the tape, said tape pull-back means is displaced in said one direction and, thereafter, when the die wheel is in said inoperative positions, resiliently returns in the other direction to pull back any feed of the tape between the die wheel and back-up roller in excess of said distance resulting from indentation of the tape by the pressure of said marking means against said resilient surface during a preceding marking of the sheet material.

2. An apparatus as in claim 1; wherein said drag-means includes a cylindrical rod engaging the tape at a location along said path between said supply reel and said resilient tape pull-back means, and means for adjusting the wrap of the tape on said rod and thereby varying the resistance to feeding of tape from said supply reel so as to avoid the pulling of tape from the supply reel by the action of said tape pull-back means.

3. An apparatus for marking sheet material during movement of the latter, comprising a back-up roller for movably supporting the sheet material, rotatably mounted

supply and take-up reels for a hot roll leaf stamping tape, guide means leading the tape from the supply reel to the take-up reel along a path that includes a portion extending over the sheet material on the back-up roller in the direction of movement of the sheet material, a rotatable heated die wheel disposed above the back-up roller and having peripheral projecting marking means for rolling contact with the stamping tape against the sheet material on the back-up roller, thereby to apply heat and pressure for applying a marking to the sheet material, means for feeding the tape from said supply reel to said take-up reel during said rolling contact of the marking means therewith, an axle on which said back-up roller is rotatable, screws threaded diametrically through the opposite end portions of said axle, abutments forming seats supporting said screws when the latter depend vertically from said axle, said screws being adjusted so that, when the screws depend vertically and bear on said seats, said back-up roller is disposed for said rolling contact of said marking means with the stamping tape against the sheet material, and means for manually turning said axle, thereby to incline said screws and drop said back-up roller away from the heated die wheel to avoid damage to the sheet material during prolonged shut-down of the apparatus.

References Cited in the file of this patent

UNITED STATES PATENTS

1,022,061	Chandler	Aug. 2, 1912
1,706,033	MacCordy	Mar. 19, 1929
1,919,051	Gauer	July 18, 1933
1,949,362	Wickwire	Feb. 27, 1934
2,248,419	Auld	July 8, 1941
2,714,268	Battey	Aug. 2, 1955
2,743,671	Weber et al.	May 1, 1956
2,746,389	Alessi et al.	May 22, 1956