March 27, 1962 I. S. GOTTSCHO 3,026,797

WEB MARKING APPARATUS

Filed Oct. 21, 1959 6 Sheets-Sheet 1

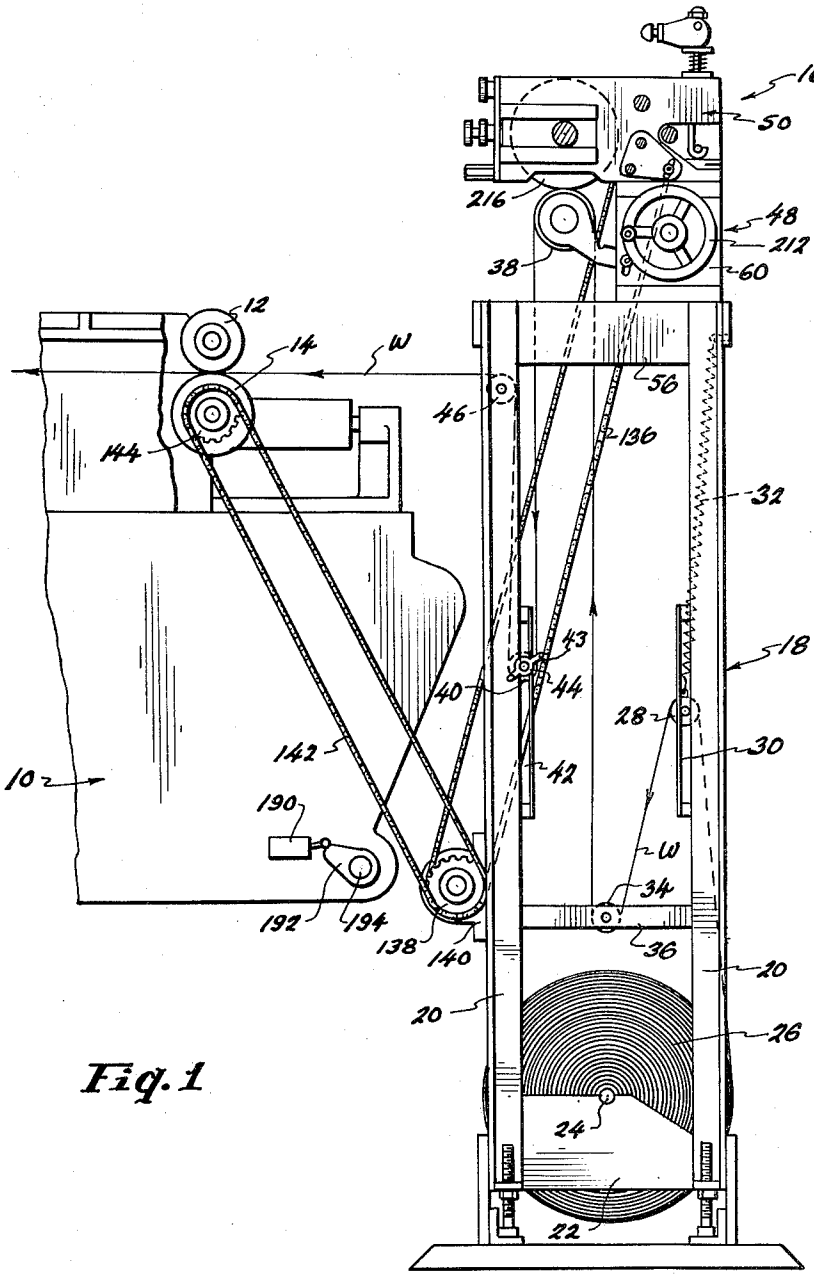


Fig. 1

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WEB MARKING APPARATUS

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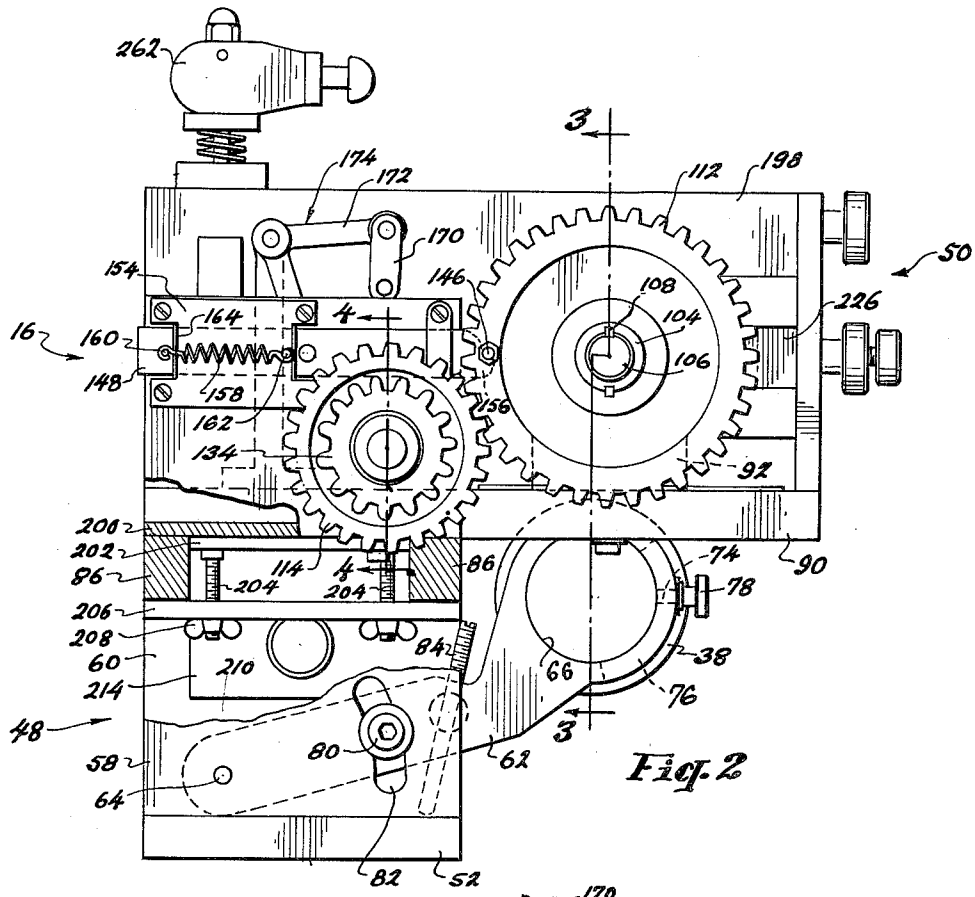


Fig. 2

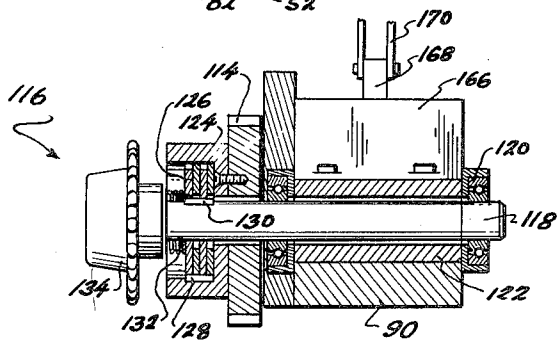


Fig. 4

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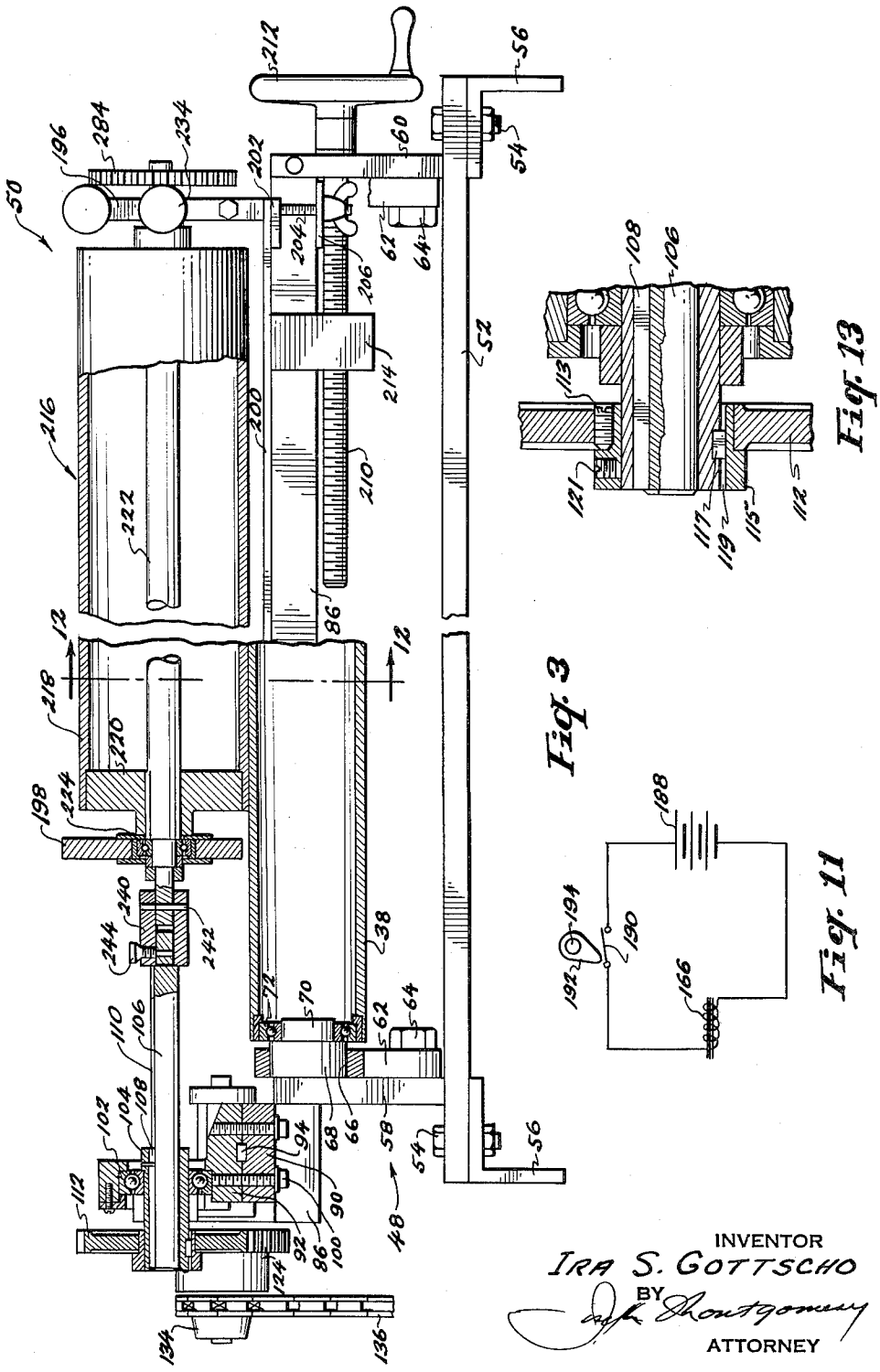


Fig. 3

Fig. 13

Fig. 11

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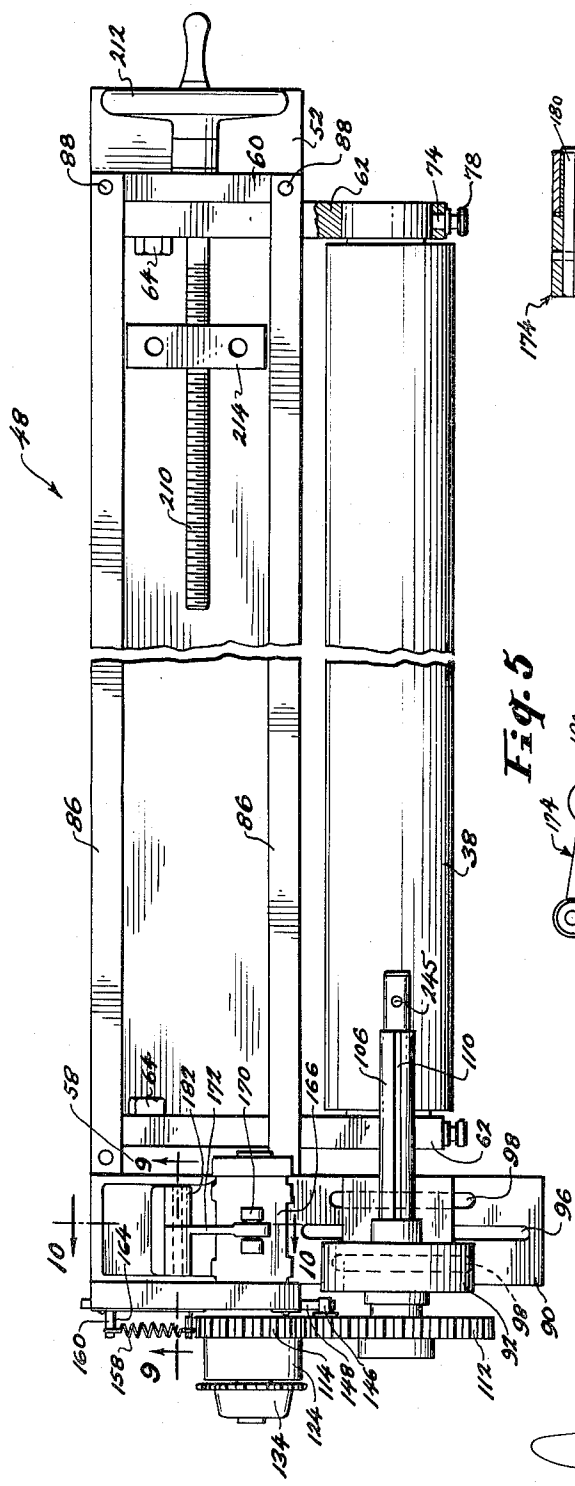


Fig. 5

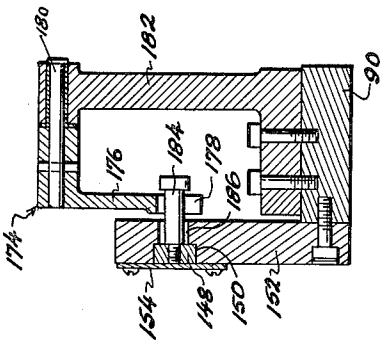


Fig. 9

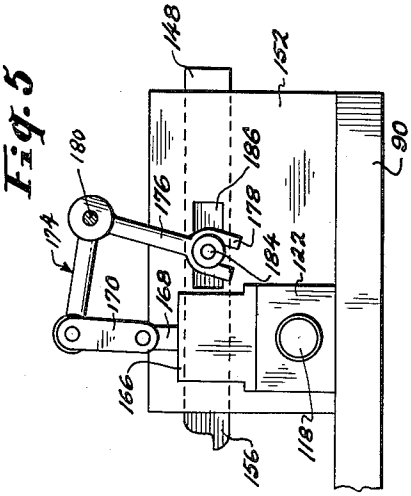


Fig. 10

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WEB MARKING APPARATUS

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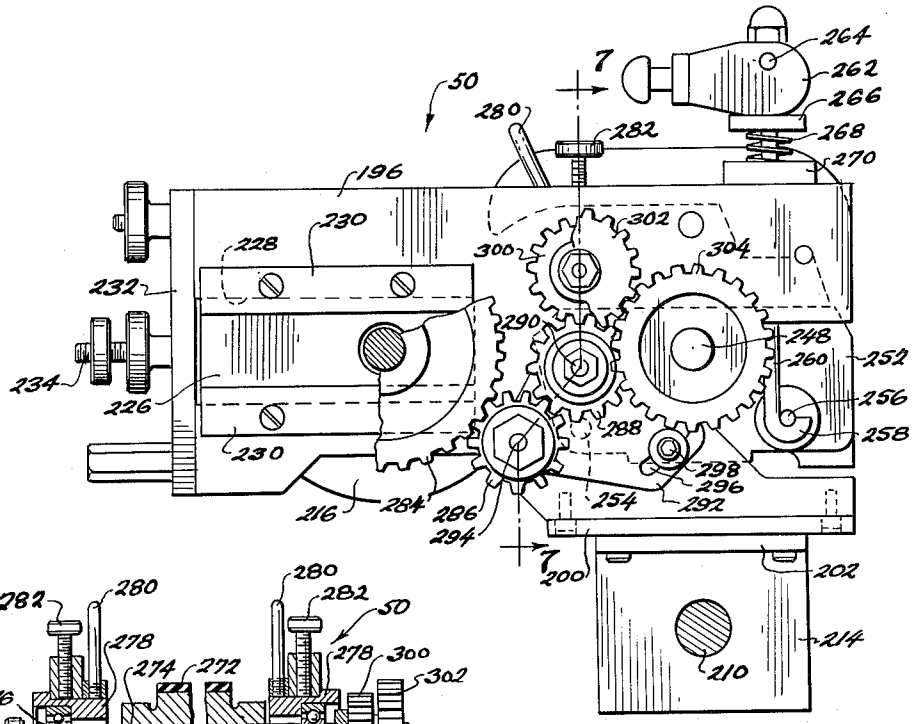


Fig. 6

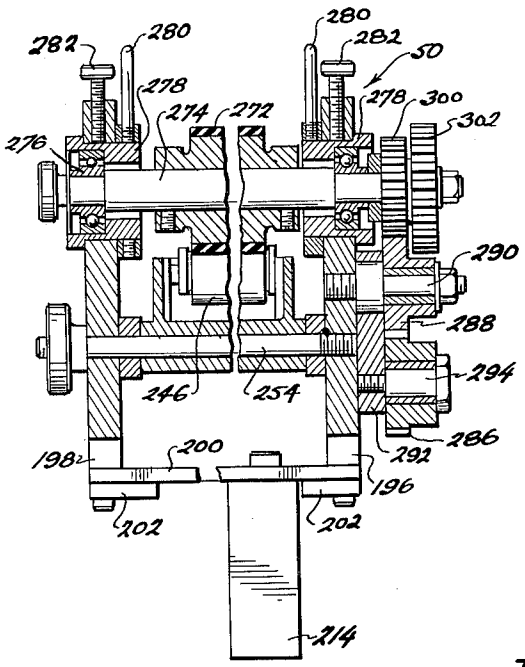


Fig. 7

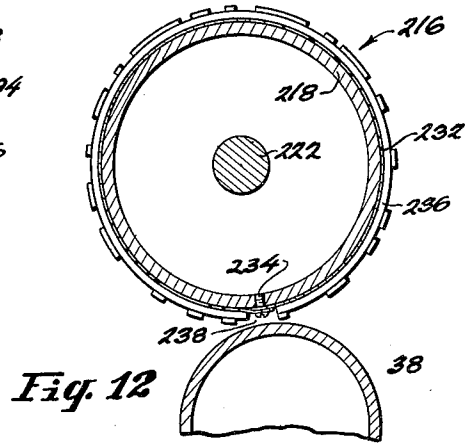


Fig. 12

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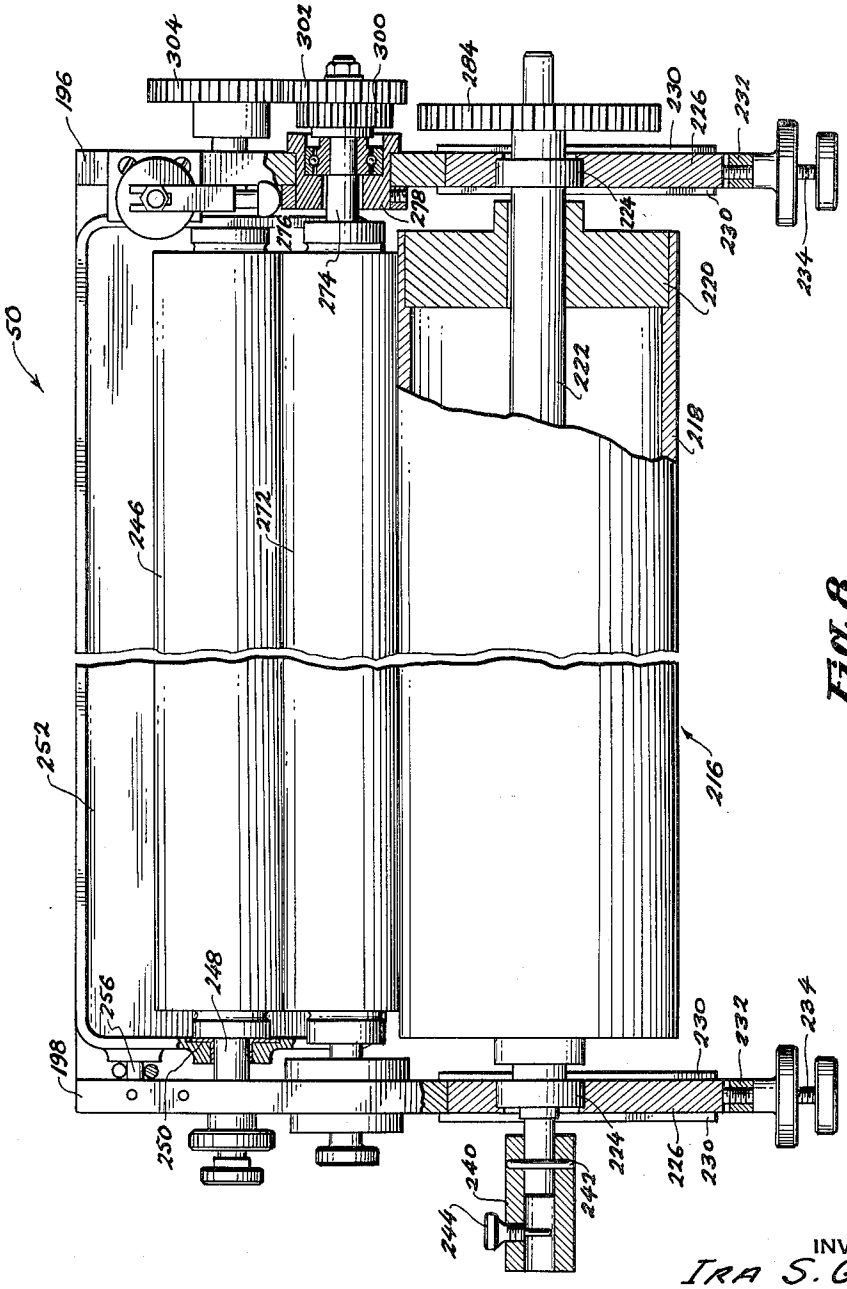


Fig. 8

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United States Patent Office 3,026,797 Patented Mar. 27, 1962

3,026,797
WEB MARKING APPARATUS

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Filed Oct. 21, 1959, Ser. No. 847,843
13 Claims. (Cl. 101—228)

This invention relates generally to a web marking apparatus, and more particularly is directed to an improved apparatus for applying repeated markings to a continuous web of sheet material.

Apparatus presently exists for applying repeated markings to a continuous web of sheet material as such web is intermittently fed to a wrapping machine or the like where the web is cut into successive sections each bearing an applied marking. With the existing apparatus it is intended to apply a marking to only a relatively small proportion of the area of the web forming each of the successive cut sections. Such existing apparatus has a marking wheel or roll with a circumference that is substantially less than the cut-off length, that is, the length of each of the successive sections cut from the continuous web, and the marking wheel or roll is normally held against rotation in an initial or starting position and is released to rotate at a surface speed equal to the speed of advancement of the web only when the area of the web to be marked passes the location of the marking wheel which then continues to turn until it completes a revolution and return to its initial position. Since the dimension of the marking extending longitudinally on the web is only a relatively small proportion of the cut-off length, it is apparent that the marking wheel may be given a correspondingly small circumference so as to complete a revolution and return to its initial position within the cut-off length even though the latter may be changed substantially, without the necessity of replacing the marking wheel or roll with one having a circumference particularly suited to the cut-off length in question.

However, it is frequently desirable that the repeated markings applied to the continuous, intermittently advanced web of sheet material occupy substantially the entire area of the latter so that, when successive lengths are cut from the continuous web, each cut length will be substantially entirely covered by the marking. In this case, it is necessary that the circumference of the marking wheel or roll correspond substantially to the cut-off length, so that, when the cut-off length is changed, the marking wheel or roll needs to be replaced by one having a circumference consistent with the new cut-off length.

Further, in marking apparatus driven from a machine which utilizes the marked web, it is necessary to avoid or compensate for any cumulative error due to differences in surface speed, whereby to effect accurate registration of the repeated markings applied to the web with respect to the successive cut-off lengths.

Accordingly, it is an object of the present invention to provide an apparatus having a marking wheel or roll for applying repeated markings to substantially the entire areas of successive lengths of a continuous web or strip of sheet material, and wherein the apparatus is designed and constructed to facilitate removal and replacement of the marking wheel or roll, when required by a change in the length of the web to be marked during each cycle of the apparatus.

Another object is to provide an apparatus of the described character having means for avoiding any cumulative error in registration of the repeated markings with respect to the successive cut-off sections as a result of variations in the lengths of the latter.

Another object is to provide an apparatus of the described character which is adapted for conveniently

marking continuous webs or strips of sheet material having different lateral dimensions.

Still another object is to provide a marking apparatus of the described character which conveniently permits adjustment of the position of the applied markings in the lateral direction with respect to the continuous web or strip of sheet material to which such markings are applied.

In accordance with an aspect of the invention, an apparatus for applying repeated markings to substantially the entire areas of successive lengths of a continuous web or strip of sheet material includes a carriage assembly suitably mounted adjacent the machine or apparatus to which the marked continuous web is to be fed and having a back-up roll around which the web passes during the marking thereof. A marking head is mounted on the carriage assembly and is conveniently displaceable with respect to the latter in order to laterally locate the repeated markings applied to the web by a marking wheel or roll forming a part of that head. The marking head has provision for the convenient removal and replacement of the marking wheel or roll thereof so that the circumference of the latter can be made consistent with the cut-off length of the successive sections of the web to which the markings are to be applied. The carriage assembly further has a drive shaft for connection to the marking roll and driven from the machine which utilizes the marked web by way of a suitable transmission having a slip clutch interposed therein, and rotation of the drive shaft, and hence of the marking wheel or roll of the head, is controlled by a solenoid operated latch device which normally holds the drive shaft against rotation in a predetermined position and which is periodically released in accordance with the operation of the machine receiving the marked web to permit a single revolution of the drive shaft and marking wheel or roll during the intermittent movement of the continuous web to the associated machine.

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 side elevational view of a web marking apparatus embodying the present invention and shown associated with a machine that receives and utilizes the marked web;

FIG. 2 is an enlarged side elevational view, partly broken away and in section, of a carriage assembly and marking head forming a part of the web marking apparatus of FIG. 1, but viewed from the opposite side of the apparatus;

FIG. 3 is a transverse sectional view taken along the line 3—3 of FIG. 2;

FIG. 4 is a fragmentary transverse sectional view taken along the line 4—4 of FIG. 2;

FIG. 5 is a top plan view of the carriage included in the marking apparatus of FIG. 1, but with the marking head removed therefrom;

FIG. 6 is a detailed side elevational view, partly broken away and in section, of the marking head included in the apparatus of FIG. 1, and as it appears when viewed from the same side as in FIG. 1;

FIG. 7 is a transverse sectional view taken along the line 7—7 of FIG. 6;

FIG. 8 is a top plan view, partly broken away and in section, of the marking head;

FIG. 9 is a detail sectional view taken along the line 9—9 of FIG. 5, but on an enlarged scale;

FIG. 10 is a detail sectional view taken along the line 10—10 of FIG. 5, but on an enlarged scale;

FIG. 11 is a wiring diagram of an electrical circuit included in the apparatus embodying the invention;

FIG. 12 is an enlarged sectional view taken along the line 12—12 of FIG. 3; and

FIG. 13 is an enlarged, fragmentary view of a portion of the structure appearing in FIG. 3.

Referring to the drawings in detail, and initially to FIG. 1 thereof, it will be seen that the marking apparatus embodying the present invention is there shown associated with an intermittently operating machine 10, such as, a Hayssen Wrapper, which is intended to receive and utilize a continuous marked web W, for example, by cutting such web into successive lengths which are then used for the wrapping of bread or other articles.

The wrapper 10 includes intermittently rotated draw rolls 12 and 14 which feed the marked web W to a suitable knife arrangement (not shown) by which the marked web is cut into the desired successive lengths.

The marking apparatus embodying the present invention is generally identified by the reference numeral 16 and, as shown in FIG. 1, is preferably mounted on a stand 18 having uprights 20 with supports 22 between the lower ends of the latter carrying an axle or spindle 24 on which there is rotatably supported a supply roll 26 of the web or continuous strip of sheet material to be marked. The web or continuous strip W withdrawn from supply roll 26 passes over a tensioning roll 28 having its opposite ends journalled in bearings which are slidable in vertical guides 30 carried by uprights 20 and urged upwardly by tension springs 32. After traveling over tensioning roll 28, web W passes under an idler roll 34 having its opposite ends journalled in cross members 36 of stand 18, and the web then travels upwardly and around a back-up roll 38 forming a part of the marking apparatus 16 and which supports the web during the application of repeated markings to the latter. The marked web travels downwardly from back-up roll 38 and passes under a registering roll 40 having its opposite ends journalled in bearings that are slidable in vertical guides 42 carried by uprights 20 and being held in adjusted positions along such guides, for example, by thumb screws 43. The marked web travels upwardly from registering roll 40 and passes over an idler roll 46 journalled in uprights 20 at the level of the nip between draw rolls 12 and 14 of the associated machine 10 so that the marked web W travels horizontally from idler roll 46 into the machine. It will be apparent that vertical adjustment of the position of registering roll 40 serves to vary the length of the marked web between back-up roll 38 and draw rolls 12 and 14 of machine 10 and thereby is effective to vary the longitudinal registration of the repeated markings applied to the web with respect to the operation of the knife assembly of machine 10.

The marking apparatus 16 embodying the present invention generally includes a carriage assembly 48 suitably mounted at the top of stand 18 and a marking head 50 which is supported by carriage 48.

Referring now to FIGS. 2, 3 and 5, it will be seen that carriage 48 includes an elongated, laterally extending base plate 52 secured, as by bolts 54 passing through its opposite ends, on top of cross members 56 of stand 18, and having end plates 58 and 60 projecting upwardly from base plate 52 adjacent the opposite ends of the latter. Support arms 62 are disposed against the inside surfaces of end plates 58 and 60 and are each pivotally mounted at one end, as at 64, on the adjacent end plate to swing in a vertical plane. The outer or free end of each arm 62 has a circular opening 66 rotatably receiving a cylindrical part 68 of a bearing support which has a cylindrical part 70 (FIG. 3) projecting axially inward from part 68 and being eccentric with respect to the latter. Each cylindrical part 70 supports a ball bearing 72 or other antifriction bearing by which the adjacent end of back-up roll 38 is rotatably mounted on support arm 62. A stud 74 (FIG. 5) extends radially from part 68 through a slot 76 (represented in broken lines in FIG. 2) opening radially from opening 66 in order to prevent axial removal of part 68 from the related opening 66, and a knurled nut 78 is threaded on the outer end of stud 74 to provide means by which part 68 can be manually turned and also means for securing that part in any angularly adjusted position.

In order to hold each support arm 62 in an angularly adjusted position relative to the adjacent end plate 58 or 60, a machine screw 80 extends through an arcuate slot 82 formed in the adjacent end plate concentric with the related pivot 64 and is threadably inserted in a tapped opening provided in the support arm 62. Angular adjustment of each support arm 62 is achieved by an elongated screw 84 (FIG. 2) extending threadably through the related support arm and bearing, at its lower end, against base plate 52. Thus, turning of screw 84 serves to angularly displace the related support arm 62 and the latter can then be secured in its angularly adjusted position by tightening of the related machine screw 80.

A pair of parallel, spaced apart, elongated guide bars 86 extend between end plates 58 and 60 parallel to the axis of back-up roll 38 and are secured, as by screws 88 (FIG. 5), to the upper edges of the end plates. The guide bars 86 have a length greater than the distance between end plates 58 and 60 and project, at one end, beyond plate 58. A support plate 90 is suitably secured on top of the projecting end portions of guide bars 86 and projects horizontally at right angles to the longitudinal axes of the latter so as to present a cantilevered forward portion lying generally alongside the adjacent support arm 62. A bearing block 92 is slidable along that cantilevered forward portion of plate 90 and is guided in such sliding movement by a key 94 (FIG. 3) engaging in a keyway 96 (FIG. 5) formed in the top surface of plate 90. Further, plate 90 has parallel slots 98 therein receiving bolts 100 (FIG. 3) threadably engaged in tapped bores of bearing block 92 for securing the latter in an adjusted position along plate 90.

Bearing block 92 supports a ball bearing 102 (FIG. 3) in which a sleeve 104 is rotatable with its axis extending parallel to the axis of back-up roll 38. A drive shaft 106 is axially slidable in sleeve 104 and is made to rotate with the latter, for example, by means of a key 108 carried by sleeve 104 and slidably received in a keyway 110 formed in the surface of shaft 106.

Drive shaft 106 is driven by a transmission that includes a spur gear 112 secured on the outer end of sleeve 104 as hereinafter described in detail and meshing with a spur gear 114 that is part of a slip clutch assembly 116 appearing, in detail, in FIG. 4. Slip clutch assembly 116 includes a shaft 118 rotatably carried by antifriction bearings 120 suitably supported by a bearing block 122 secured on plate 90. Spur gear 114 is freely rotatable with respect to shaft 118 extending loosely through a central opening in the gear, and the latter is secured to a concentric clutch housing 124 accommodating an axial series of friction clutch rings 126. The rings 126 are alternately connected rotatably to housing 124 and to shaft 118, for example, by keys 128 and 130, respectively. A helical compression spring 132 acts against one end of the series of friction clutch rings 126 so as to axially compact the latter and thereby urge the rings into frictional engagement with each other. Thus, when shaft 118 is rotated, the frictionally engaged rings 126 tend to cause rotation of housing 124 and gear 114 with shaft 118, but such rotation of gear 114 can be arrested during the continued rotation of shaft 118 while the adjacent clutch rings 126 slip relative to each other.

Shaft 118 is suitably driven in synchronism with the operation of the associated machine 10, for example, by a chain and sprocket transmission including a sprocket 134 secured on shaft 118 and engaged by an endless chain 136 running around a double sprocket 138 (FIG. 1) which is rotatably supported by a bearing block 140 carried by stand 18. Double sprocket 138 is further engaged by an endless chain 142 driven by a sprocket 144 secured

on the shaft of the intermittently rotated lower draw roll 14 of machine 10. Accordingly, whenever web W is intermittently fed into machine 10 by draw rolls 12 and 14, the described chain and sprocket transmission effects rotation of shaft 118 of the slip clutch assembly 116 and the latter tends to cause corresponding rotation of gears 114 and 112 at speeds that vary with the rotational speed of roll 14. The rotational speed of the draw rolls may vary by accelerating up to a maximum speed and then decelerating to a stop, resulting in a variation of the speed of travel of the web.

In order to effect accurate registration of the repeated markings applied to the web with respect to the successive cut-off lengths of the latter, rotation of drive shaft 106 in the described manner is only permitted during a predetermined portion of the operating cycle of the associated machine 10. Such control of the rotation of shaft 106 is effected by a latch assembly that includes a stop pin or abutment 146 (FIGS. 2 and 5) projecting axially from gear 112 adjacent the periphery of the latter so as to move along a circular path in response to rotation of that gear. A latch bar 148 (FIGS. 2, 5, 9 and 10) is longitudinally slidable in a guideway 150 formed in the outer surface of an upstanding plate 152 secured to the outer edge of plate 90. Latch bar 148 is held in guideway 150 by a retaining plate 154 and, at its end extending toward gear 112, is formed with a nose 156 adapted to normally project into the circular path of movement of stop pin 146 for engagement by the latter, whereby gear 112 is normally held in the rotational position at which pin 146 engages nose 156. A tension spring 158 (FIGS. 2 and 5) is connected between a pin 160 extending from latch bar 148 and a pin 162 extending from retaining plate 154 and yieldably urges the latch bar in the direction for projecting its nose 156 into the circular path of movement of stop pin 146. Movement of latch bar 148 in such spring-urged direction is limited by a tab 164 struck out of retaining plate 154 and engageable by the pin 160.

In order to retract latch bar 148 so as to release its nose 156 from stop pin 146, the carriage assembly 48 further includes a solenoid 166 mounted on top of bearing block 122 of slip clutch assembly 116 and having an armature 168 which normally is upwardly extended when the solenoid is deenergized. The armature 168 is pivotally connected by links 170 to the free end of an arm 172 of a bell crank 174 having a second arm 176 extending downwardly and formed with a bifurcated end portion 178. The bell crank 174 is pinned, intermediate its arms, to a shaft 180 which is rotatably supported in a suitable bearing at the upper end of a standard 182 secured to plate 90 so that arm 176 is swingable in a plane alongside the inner surface of upstanding plate 152. The bifurcated end 178 of bell-crank arm 176 receives a pin 184 which extends from latch bar 148 through an elongated slot 186 in plate 152 (FIGS. 9 and 10). When solenoid 166 is energized, the armature 168 thereof is retracted downwardly to rock bell-crank 174 in the counterclockwise direction, as viewed in FIG. 10, and thereby withdraws the nose 156 of latch bar 148 from the path of movement of stop in 146. When solenoid 166 is again deenergized, spring 158 returns the latch bar to its normal position with its nose 156 projecting into the path of movement of stop pin 146.

As shown in FIG. 11, the energizing circuit for solenoid 166 may include a source 188 of electric current to which the solenoid is connected in series with a normally open microswitch 190. Switch 190 is closed intermittently by a cam 192 mounted on a rotated timing shaft 194 of the associated machine 10 (FIG. 1). Thus, solenoid 166 is momentarily energized at the start of the feeding movement of web W during each operating cycle of the associated machine 10 in order to release latch bar 148 from stop pin 146 when feeding movement of web W commences, whereupon gear 112 is rotated and the latch bar returns to its normal position with its nose 156 projecting into the circular path of movement of pin 146 for halting the rotation of gear 112 at the completion of a single revolution.

Referring now to FIGS. 6, 7 and 8, it will be seen that the marking head 50 intended for use with the above described carriage assembly 48 includes a frame having side plates 196 and 198 extending parallel to each other in spaced apart vertical planes, and a base plate 200 extending between the side plates and secured to the latter along the rear portions of the lower edges thereof. Base plate 200 is intended to slide on guide bars 86 of carriage assembly 48 with side plates 196 and 198 of the marking head projecting forwardly from the guide bars over back-up roll 38. In order to guide the frame of marking head 50 during its movement along guide bars 86, positioning plates 202 are secured to the underside of base plate 200 at locations spaced apart along the latter and are closely received between the confronting faces of guide bars 86. Further, inadvertent removal of the frame of marking head 50 from the carriage assembly and tipping of the marking head frame are avoided by providing base plate 200 of the frame with depending screws 204 which, at their lower ends, pass through retaining plates 206 extending under guide bars 86 and held slidably against the latter by thumb nuts 208 on screws 204.

Displacement of the frame of marking head 50 along guide bars 86 of carriage 48 is effected by an adjustment screw 210 rotatably journalled in end plate 60 of the carriage assembly and extending parallel to guide bars 86 at a level below the latter. Adjustment screw 210 is rotatable by a hand wheel 212 secured on the outer end thereof, and extends threadably through a block 214 projecting downwardly from base plate 200 of the marking head frame. Thus, when hand wheel 212 is manually rotated, screw 210 cooperates with block 214 to effect the desired adjustment of the marking head frame along guide bars 86 of carriage assembly 48.

The marking head 50 further includes a marking roll 216 rotatably mounted between side plates 196 and 198, as hereinafter described in detail, and positioned above back-up roll 38 of carriage 48 so as to apply repeated markings to web W as the latter passes over the back-up roll. As shown in FIGS. 3 and 8, marking roll 216 preferably includes a hollow cylindrical body 218 supported by end walls 220 which are keyed, or otherwise rotatably connected to a central shaft 222 extending through the cylindrical body. The opposite ends of shaft 222 carry ball bearings 224 mounted in bearing slides 226. The bearing slides 226 are slidably received in slots 228 cut in side plates 196 and 198 of the marking head frame and opening at the forward edges of such side plates. The bearing slides 226 are held within the related slots 228 by retaining strips 230 (FIGS. 6 and 8) extending along the longitudinal edges of slots 228 at the inner and outer surfaces of both side plates 196 and 198. Each bearing slide 226 is held against forward removal from its related slot 228 by a bar 232 secured removably to the front edge of the related side plate 196 or 198 and which carries a clamping screw 234 adapted to be engaged against the front edge of the bearing slide 226 for urging the latter against the back end of the slot 228.

It will be apparent that, with the above described arrangement for supporting the marking roll 216 within the frame of marking head 50, removal of the bars 232 permits the marking roll along with its supporting bearings to be conveniently removed from the frame whenever it is desirable or necessary to replace the marking roll.

When the marking roll is to apply a marking to substantially the entire length of each section cut from the continuous web W by the associated machine 10, the cylindrical body 218 of the marking roll to which the marking element is suitably secured must have a circumference that is approximately equal to the cut-off length. However, the actual lengths of the successive

sections cut from web W by the associated machine **10** will vary slightly from the nominal cut-off length for which such machine is adjusted. If marking roll **216** is provided with a circumference exactly equal to the nominal cut-off length and is rotated through a complete revolution for each operating cycle of the associated machine, a succession of sections cut from the web and having lengths consistently less than, or greater than the nominal cut-off length would result in a cumulative error in registration between the repeated markings applied by the marking roll and the successive cut sections. Even when considering the marking applied to a single section to be cut from the web, it is apparent that a marking roll having a circumference exactly equal to the nominal cut-off length would provide a distorted marking in the event that the actual length of web fed by the draw rolls **12** and **14** during the application of that marking was either less than, or greater than the nominal cut-off length. In order to overcome the foregoing difficulties, the marking roll **216** of the apparatus embodying the present invention is provided with a circumference which is less than the nominal cut-off length for which the associated machine **10** is adjusted by an amount, for example, one-quarter inch, which is greater than the maximum negative error in the actual cut-off length, that is, the amount by which the actual length of the cut section and the length of web fed by the draw rolls during an operating cycle may be less than the nominal cut-off length.

With the circumference of the marking roll and the nominal cut-off length having the described relationship, the microswitch **190** is actuated by cam **192** in order to momentarily energize solenoid **166** and thereby release latch bar **148** when draw rolls **12** and **14** commence the feeding movement of web W, whereupon drive shaft **106** which is coupled to shaft **222** of the marking roll, in the manner hereinafter described in detail, serves to rotate marking roll **216** at a surface speed that is exactly equal to the speed of advancement of the web by the draw rolls. Just before the termination of the feeding movement of the web by draw rolls **12** and **14**, nose **156** of latch bar **148** is again engaged by stop pin **146** to halt rotation of marking roll **216**, and the previously described slip clutch interposed in the drive transmission to shaft **106** then slips during the final increment of movement of the web. As shown in FIG. 12, the marking element carried by the cylindrical body **218** of marking roll **216** may be in the form of a flexible metal sheet **232** wrapped around the cylindrical body and having its end edges overlapped and secured to body **218** by screws **234**, and a rubber mat or logotype **236** adhesively bonded to sheet **232** and having raised portions corresponding to the marking to be applied. The marking element is arranged on body **218** of marking roll **216** so that the gap **238** which is caused by the overlapped edges of sheet **232** and necessarily appears between the edges of logotype **236** faces toward back-up roll **38** when latch bar **148** engages stop pin **146** to arrest rotation of the marking roll, whereby the final increment of movement of the web can occur free of contact with the marking element. It is to be understood that the extent of the final increment of movement of web W occurring while marking roll **216** is held against further rotation in its initial position depends upon the amount by which the length of the web actually fed by draw rolls **12** and **14** departs from the nominal cut-off length, and also upon the duration of the unavoidably slight delay occurring between the commencement of the feeding movement of the web by the draw rolls at the start of the operating cycle and the instant when nose **156** of latch bar **148** is actually withdrawn from engagement with stop pin **146**. Thus, the previously mentioned difference between the actual circumference of the marking roll and the nominal cut-off length for which the associated machine **10** is adjusted serves both to accommodate possible deviations of the actual cut-off length and feeding length from the nominal cut-off length and also to accommodate the unavoidable delay in the actual release of the marking roll for rotation at the commencement of the feeding movement of the web.

In any case, it is apparent that any change in the cut-off length for which the associated machine **10** is adjusted requires replacement of marking roll **216** by another marking roll having a circumference corresponding to the new cut-off length, and it is an advantage of the apparatus embodying the present invention that such replacement of the marking roll is greatly facilitated by the described structure for supporting the marking roll and its bearings in the frame of marking head **50**. It will be understood that, when the marking roll is replaced by another marking roll having a different circumference, and hence a different diameter, support arms **62** carrying back-up roll **38** are angularly adjusted so as to displace the back-up roll to a position where its surface will be closely adjacent the surface of the new marking roll. The final adjustment of the positional relationship between back-up roll **38** and the new marking roll **216** is effected by manipulation of the described eccentric supports for the ball bearings **72** of back-up roll **38**, thereby to obtain the desired pressure of contact of the marking element with the web passing over the back-up roll.

In order to separably connect shaft **222** of marking roll **216** to the drive shaft **106** of carriage **48**, a coupling sleeve **240** (FIGS. 3 and 8) is secured, for example, by a pin **242**, to the end of shaft **222** projecting beyond side plate **198** of the marking head frame. Coupling sleeve **240** is adapted to have the free end of shaft **106** telescoped therein and threadably carries a locking pin **244** which is adapted to extend into a diametrical bore **245** (FIG. 5) formed in the end portion of shaft **106**. When it is desired to replace the marking roll **216** for the reasons indicated above, the locking pin **244** is merely removed from sleeve **240**, whereupon drive shaft **106** can be axially withdrawn from sleeve **240**.

When marking roll **216** is replaced in connection with a change in the cut-off length, the gear **112** having a pitch diameter equal to the diameter of the marking roll is also replaced by a similar gear corresponding to the new marking roll, and bearing block **92** supporting drive shaft **106** is then adjusted along support plate **90** to maintain the proper meshing engagement of the new gear **112** with gear **114** of the slip clutch assembly. It will be understood that the locations of the bearings **224** of each marking roll **216** with respect to the bearing slides **226** thereof vary according to the diameter of the marking roll so that, when the bearing slides **226** abut against the back ends of the related slots **228** of side plates **196** and **198**, the axis of the particular marking roll is in alignment with the axis of drive shaft **106** in the position of the latter required for meshing engagement of the related gear **112** with gear **114**.

In order to facilitate replacement of gear **112** in connection with a change in the marking roll diameter, gear **112** is removably secured, as by a set screw **113**, on a hub **115** (FIG. 13), and the hub is axially slidable on sleeve **104** and held against rotation with respect to the latter by a key **117** carried by the sleeve and received in a keyway **119** formed within hub **115**. Hub **115** is normally secured on sleeve **104** by a set screw **121**. This arrangement not only permits removal of gear **112** upon mere loosening of set screw **121**, but also permits rotational adjustment of the stop pin **146** carried by gear **112** with respect to drive shaft **106** upon loosening of set screw **113**, whereupon gear **112** can be turned relative to its hub **115** for adjusting the rotational position of drive shaft **106**, and hence of the marking roll, with respect to the operating cycle of associated machine **10**.

The marking head **50** further includes an inking system for applying ink to the raised surfaces of the rubber logotype **236** or other marking element carried by the surface of marking roll **216**. In the illustrated embodiment of the invention, this marking system has an ink supplying roll

246 mounted on a shaft 248 rotatably journalled in bearings 250 (FIG. 8) carried by the side walls of an ink reservoir 252, with the ink supplying roll dipping into a supply of ink in reservoir 252. The reservoir 252 is disposed between side plates 196 and 198 of the marking head frame at a location in back of marking roll 216, and the ink reservoir is supported by an axle 254 (FIGS. 6 and 7) which is carried by the side plates of the frame and which extends through the forward portion of the ink reservoir to permit pivotal movement of the latter about axle 254.

Pins 256 project laterally from ink reservoir 252 (FIGS. 6 and 8) at the rear portion of the latter and are suspended from hooks 258 provided at the lower ends of vertical rods 260. Each of the vertical rods 260 extends upwardly above the top edge of the adjacent side plate 196 or 198, and, at its upper end, carries a cam 262 which is rotatable about a pivot pin 264 passing through the related rod 260. Each cam 262 bears downwardly on a collar 266 slidable along the related rod 260 and supported by a helical compression spring 268 resting on a pad 270 suitably secured to the upper edge of the adjacent side plate 196 or 198. Thus, the rods 260 are resiliently supported, as is the back portion of reservoir 262, and, when the cams 262 are in the position shown in FIG. 6, the rods 260 are drawn upwardly to maintain reservoir 252 in its illustrated operative position. However, when cam members 262 are turned clockwise from the position shown in FIG. 6, the configuration of the cams permits lowering of rods 260, and reservoir 252 tilts downwardly at the back to an inoperative position where ink supplying roller 246 is spaced from a metering roll 272 also forming part of the inking system.

The metering roll 272 is mounted on a shaft 274 which, at its opposite ends, is rotatably carried by anti-friction bearings 276. The anti-friction bearings 276 are mounted in eccentric bearing housings 278 which are rotatable in side plates 196 and 198 of the marking head frame (FIGS. 7 and 8). Each bearing housing 278 has a handle 280 extending therefrom and by which the related bearing housing can be turned manually in order to adjust the parallelism of the axes of rotation of metering roll 272 and marking roll 216, as well as the distance between such axes. Further, set screws 282 are carried by side plates 196 and 198 and can be tightened against the outer surfaces of the related bearing housings 278 in order to hold the latter against turning from their adjusted positions.

In the illustrated marking head 50, metering roll 272 and ink supplying rol 246 are both driven from marking roll 216 by way of a gear transmission. This gear transmission includes a gear 284 fixed on shaft 222 of the marking roll (FIGS. 6 and 8) and meshing with an idler pinion 286 which meshes, in turn, with an idler pinion 288 (FIGS. 6 and 7). Pinion 288 is rotatable on a bearing carried by a stub shaft 290 extending from adjacent side plate 196 (FIG. 7) and also forming a pivot for an angularly displaceable plate 292 which carries a stub shaft 294 rotatably supporting pinion 286. Thus, turning of plate 292 displaces stub shaft 294 of pinion 286 in the direction generally toward and away from the axis of marking roll 216 in order to provide meshing engagement of pinion 286 with gear 284 of the marking roll assembly while maintaining the meshing engagement between pinions 286 and 288. The need for adjusting the position of pinion 286 will be appreciated from the fact that the pitch diameter of gear 284 corresponds to the diameter of the related marking roll 216 which is replaced upon a change in the cut-off length. In order to maintain plate 292 in a desired angularly adjusted position, such plate is formed with an arcuate slot 296 (FIG. 6) slidably receiving a securing screw 298 threaded into a suitable tapped hole in the adjacent side plate 196.

Continuing with the description of the gear transmission for driving rolls 246 and 272, it will be seen that pinion 288 meshes with a gear 300 secured on the shaft 274 of metering roll 272 and which is integral with, or rotatably connected to a concentric gear 302 in meshing engagement with a gear 304 secured on shaft 248 of ink supplying roll 246.

Since rolls 246 and 272 of the described inking system are rotatably driven from marking roll 216, it will be apparent that, when the latter is held against rotation in the previously described manner, rolls 246 and 272 are also at rest to interrupt the supplying of ink to the raised surfaces of the marking element. During any protracted shut-down of the marking apparatus, cams 262 of the structure by which reservoir 252 is suspended can be manipulated in order to tilt the reservoir downwardly at the back and thereby separate ink supplying roll 246 from metering roll 272 for avoiding permanent indentation of the surfaces of such rolls due to the pressure of the contact therebetween.

From the above detailed description of an illustrative embodiment of the invention, it will be seen that the latter provides a marking apparatus capable of applying repeated inked markings to substantially the entire areas of the successive sections to be cut from a continuous web of sheet material, while avoiding any cumulative error in registration of the repeated markings with respect to the successive cut sections as a result of unavoidable variations in the lengths of such cut sections. Further, it will be apparent that the described apparatus is conveniently adapted for applying the repeated inked markings to the continuous web when the cut-off length, and hence the dimension of each marking along the web, is to be substantially changed. It is also to be noted that the described arrangement for moving the frame of marking head 50 along guide bars 86 of carriage assembly 48 permits adjustment of the lateral position of the successive applied markings with respect to the web.

Although an illustrative embodiment of the invention has been described in detail herein with reference to the accompanying drawings, it is to be understood 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 applying repeated markings to successive sections of a continuous web with each marking extending over a predetermined length of the related web section; said apparatus comprising a backup roll around which the web is fed, a marking roll having a circumference slightly smaller than the length of each web section to be marked and having marking means on the periphery thereof, means rotatably supporting said marking roll for rolling and marking contact of said marking means with the web as it passes over said back-up roll, means for rotating said marking roll in accordance with the feeding movement of the web and having slip means interposed therein, latch means operative to hold said marking roll against rotation at an initial position, and control means releasing said latch means momentarily in synchronism with the feeding movement of the web to permit rotation of said marking roll through a single revolution whereupon said latch means is again operative to hold said marking roll against further rotation beyond said initial position and said slip means slips during the final increment of the movement of the web through the length of a web section.

2. An apparatus for applying repeated markings to successive sections of a continuous web with each marking extending along substantially the entire length of the related web section; said apparatus comprising a back-up roll around which the web is fed; a marking head including a marking roll having a circumference slightly smaller than the length of each web section to be marked, bearing means rotatably supporting said marking roll and forming a unit with the latter, and a frame having means releasably receiving said bearing means for rolling and mark-

ing contact of said marking roll with the web against said back-up roll; means for rotating said marking roll in accordance with the feeding movement of the web and having a slip clutch interposed therein; latch means operative to hold said marking roll against rotation at an initial position; and control means releasing said latch means momentarily in synchronism with the feeding movement of the web to permit rotation of said marking roll through a single revolution whereupon said latch means is again operative to hold said marking roll against further rotation beyond said initial position and said slip clutch slips during the final increment of the movement of the web through the length of a web section.

3. An apparatus for applying repeated inked markings to successive sections of a continuous web with each marking extending along substantially the entire length of the related web section; said apparatus comprising a back-up roll around which the web is fed; a marking head including a marking roll having a circumference slightly smaller than the length of each web section to be marked, bearing means rotatably supporting said marking roll and forming a unit with the latter, a frame having means releasably receiving said bearing means for rolling and marking contact of said marking roll with the web against said back-up roll, and inking means disposed in said frame for supplying ink to the surface of said marking roll when said bearing means are in said receiving means; means for rotating said marking roll in accordance with the feeding movement of the web and having a slip clutch interposed therein; latch means operative to hold said marking roll against rotation at an initial position; and control means releasing said latch means momentarily in synchronism with the feeding movement of the web to permit rotation of said marking roll through a single revolution whereupon said latch means is again operative to hold said marking roll against further rotation beyond said initial position and said slip clutch slips during the final increment of the movement of the web through the length of a web section.

4. In combination with a machine for utilizing sections of an adjustably predetermined length cut from a continuous web and having intermittently operated means for feeding the web through a distance equal to said predetermined length; an apparatus for applying a marking to substantially the entire length of each of said section, said apparatus comprising a back-up roll around which said web is drawn by said feeding means of the machine, a marking roll having a circumference slightly smaller than said adjustably predetermined length, means rotatably supporting said marking roll for rolling and marking contact with the web against said back-up roll, drive means for rotating said marking roll in synchronism with the intermittently operated feeding means of said machine and having a slip clutch interposed therein, latch means operative to hold said marking roll against rotation at an initial position, and control means actuated by said machine and releasing said latch means momentarily in synchronism with the commencement of operation of said feeding means of the machine to permit rotation of said marking roll through a single revolution whereupon said latch means is again operative to hold said marking roll against further rotation beyond said initial position and said slip clutch slips during the final increment of the movement of the web through said predetermined length.

5. In combination with a machine for utilizing sections of an adjustably predetermined length cut from a continuous web and having intermittently operated means for feeding the web through a distance equal to said predetermined length; an apparatus for applying a marking to substantially the entire length of each of said sections, said apparatus comprising a back-up roll around which said web is drawn by said feeding means of the machine, a marking head including a marking roll having a circumference slightly smaller than said adjustably predetermined length, bearing means rotatably supporting said marking roll and forming a unit with the latter, a frame having means releasably receiving said bearing means for rolling and marking contact of said marking roll with the web against said back-up roll, drive means for rotating said marking roll in synchronism with the intermittently operated feeding means of said machine and having a slip clutch interposed therein, latch means operative to hold said marking roll against rotation at an initial position, and control means actuated by said machine and releasing said latch means momentarily in synchronism with the commencement of operation of said feeding means of the machine to permit rotation of said marking roll through a single revolution whereupon said latch means is again operative to hold said marking roll against further rotation beyond said initial position and said slip clutch slips during the final increment of the movement of the web through said predetermined length.

6. In combination with a machine for utilizing sections of an adjustably predetermined length cut from a continuous web and having intermittently operated means for feeding the web through a distance equal to said predetermined length; an apparatus for applying an inked marking to substantially the entire length of each of said sections, said apparatus comprising a back-up roll around which said web is drawn by said feeding means of the machine, a marking head including a marking roll having a circumference slightly smaller than said adjustably predetermined length, bearing means rotatably supporting said marking roll and forming a unit with the latter, a frame having means releasably receiving said bearing means for rolling and marking contact of said marking roll with the web against said back-up roll and inking means disposed in said frame for supplying ink to the surface of said marking roll when said bearing means are in said receiving means, drive means for rotating said marking roll in synchronism with the intermittently operated feeding means of said machine and having a slip clutch interposed therein, latch means operative to hold said marking roll against rotation at an initial position, and control means actuated by said machine and releasing said latch means momentarily in synchronism with the commencement of operation of said feeding means of the machine to permit rotation of said marking roll through a single revolution whereupon said latch means is again operative to hold said marking roll against further rotation beyond said initial position and said slip clutch slips during the final increment of the movement of the web through said predetermined length.

7. An apparatus for applying repeated markings to successive sections of a continuous web with each marking extending along substantially the entire length of the related web section; said apparatue comprising a carriage including a back-up roll over which the web is fed, drive means operated in synchronism with the feeding movement of the web and having a slip clutch interposed therein, a drive shaft rotated by said drive means about an axis parallel to said back-up roll, latch means operative to hold said drive shaft against rotation in a predetermined initial position, and latch releasing means effecting release of said latch means at the commencement of the feeding movement of the web and permitting a single complete revolution of said drive shaft before reengagement of said latch means; and a marking head including a frame slidable on said carriage parallel to said back-up roll and drive shaft, an interchangeable unit including a marking roll for carrying a marking element on the surface thereof, bearings rotatably carrying said roll and bearing supports holding said bearings, means on said frame releasably receiving said bearing supports with the axis of said marking roll aligned with said axis of the drive shaft, and coupling means releasably connecting said drive shaft to said marking roll for rotating the latter.

8. An apparatus as in claim 7; wherein said carriage has arms pivoted thereon to swing about an axis parallel

to the axis of said back-up roll, said arms rotatably carrying said back-up roll to dispose the latter against said marking roll.

9. An apparatus as in claim 7; wherein said marking head further includes inking means having a metering roll journalled in said frame to transfer ink to a marking element on said marking roll; and wherein said bearings are located in said bearing supports of the interchangeable unit so as to ensure rolling contact between a marking element on the marking roll and said metering roll.

10. An apparatus as in claim 7; wherein said drive means includes a removable gear on said drive shaft having a pitch diameter corresponding to the diameter of the marking roll of said interchangeable unit of the marking head; and wherein said latch means includes a stop pin on said removable gear, and a slidable latch bar normally projecting into the path of movement of said stop pin with said gear.

11. An apparatus as in claim 10; wherein said latch releasing means includes a solenoid operative, when energized, to withdraw said latch bar from said path of the stop pin.

12. In combination with a machine for wrapping articles in sheets of material cut into predetermined lengths from a continuous web and having drive and driven means including means for advancing the web to a cut-off mechanism; apparatus for applying repeated markings to successive sections of the advancing web with each marking extending over a predetermined length of the related web section eventually to be cut into a wrapping sheet, said apparatus comprising a carriage assembly, a back-up roll around which the web is fed, a drive shaft on said carriage, means connecting said drive shaft to the driven means of said machine to be driven thereby, a marking roll, a marking roll shaft rotatably supporting said marking roll for marking and rolling contact with the continuous web as it passes over said back-up roll, and means connecting said drive shaft to said marking roll shaft for rotating the marking roll in synchronism with the advancing movement of the web, said means connecting the drive shaft and the marking roll shaft having slip means interposed therein to permit slippage of said shafts relative to each other.

13. In combination with a machine for wrapping articles in sheets of material cut into predetermined lengths from a continuous web; apparatus as in claim 12 having latch means operative to hold said marking roll against rotation at an initial position, and control means releasing said latch means momentarily in synchronism with the advancing movement of the web to permit rotation of said marking roll through a single revolution whereupon said latch means is again operative to hold said marking roll against further rotation beyond said initial position and said slip means slips during the final increment of movement of the web through the length of a web section.

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