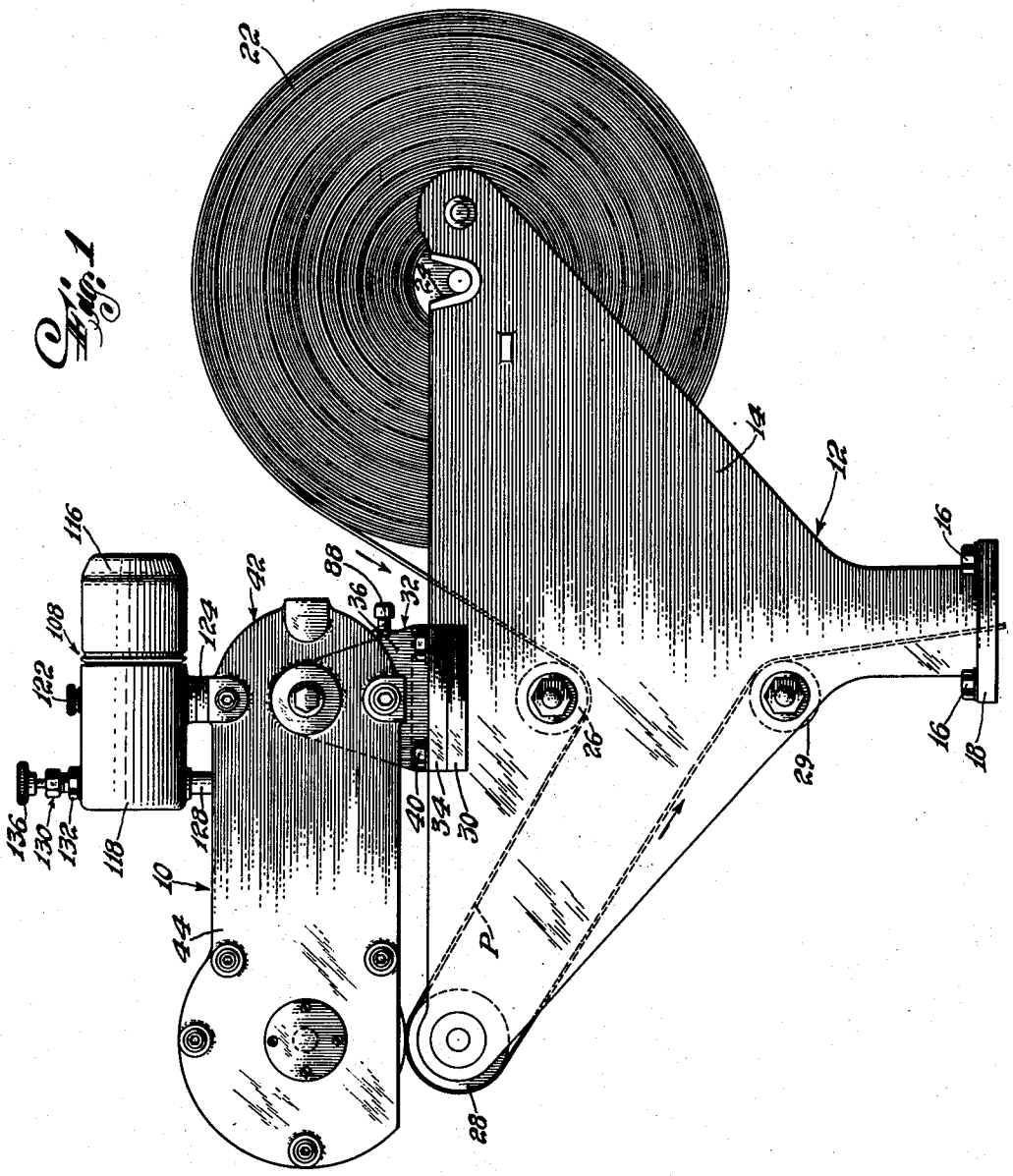
June 16, 1953 J. K. JACKSON 2,641,999

MARKING APPARATUS

Filed June 21, 1950 4 Sheets-Sheet 1

Fig. 1



INVENTOR.
JOHN K. JACKSON
BY
Joseph Montgomery
ATTORNEY

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MARKING APPARATUS

Filed June 21, 1950 4 Sheets-Sheet 2

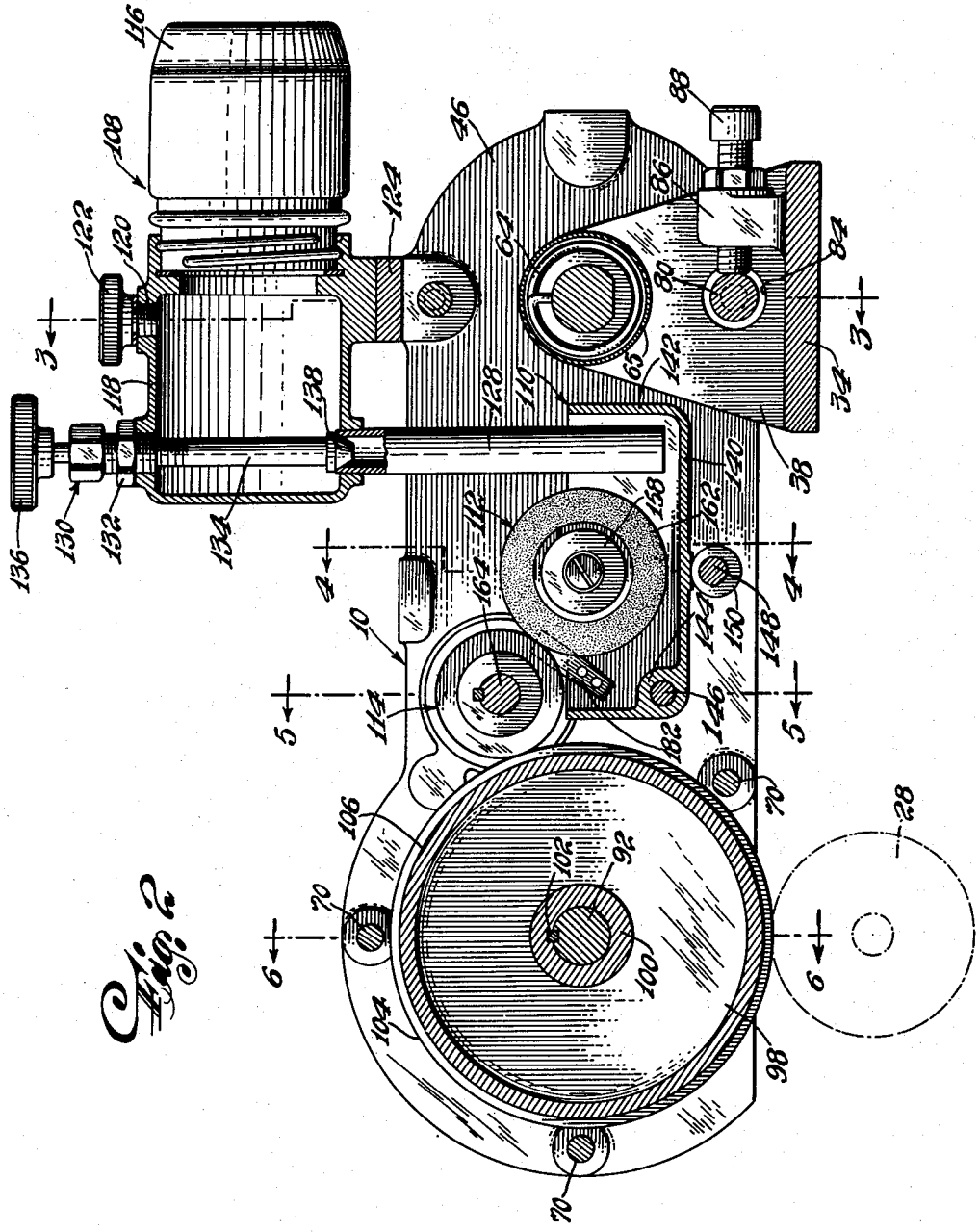

Fig. 2

INVENTOR.
JOHN K. JACKSON
BY
Joseph Montgomery
ATTORNEY

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MARKING APPARATUS

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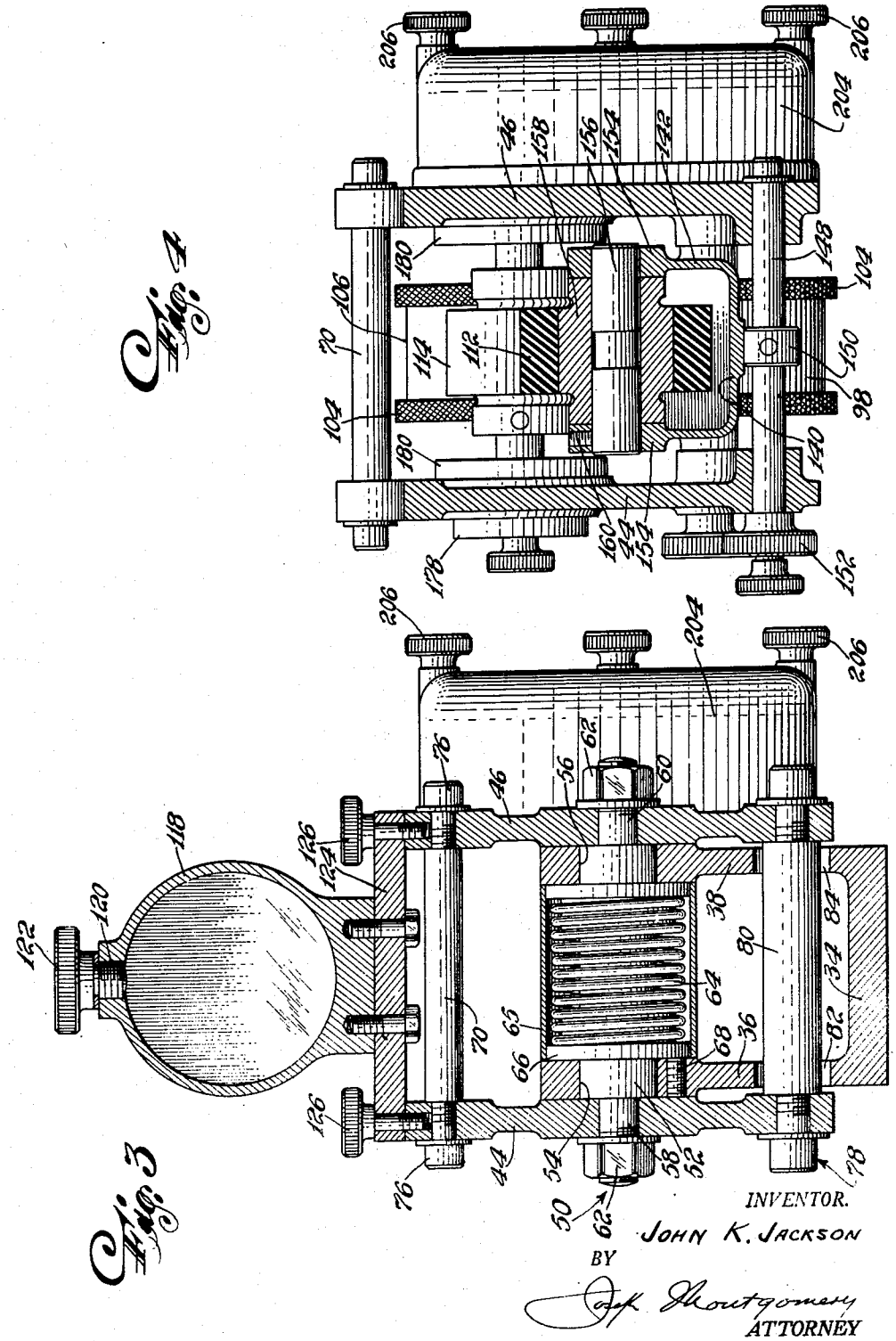

Fig. 4

Fig. 3

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MARKING APPARATUS

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Fig. 6

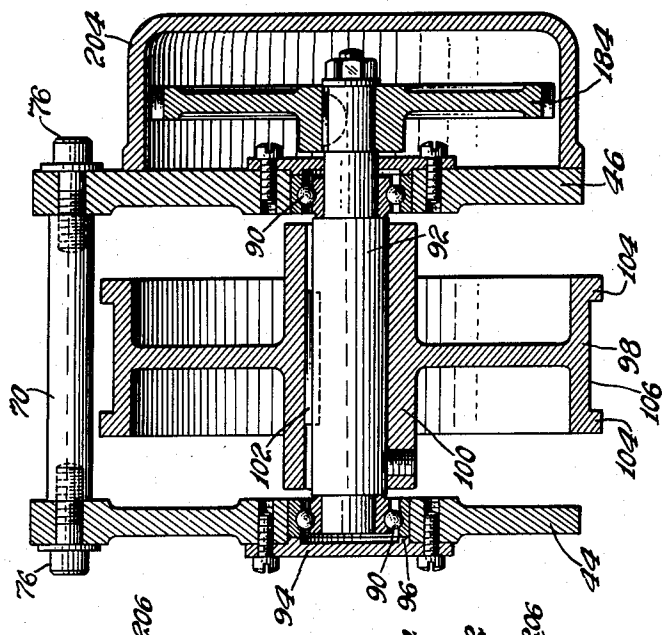
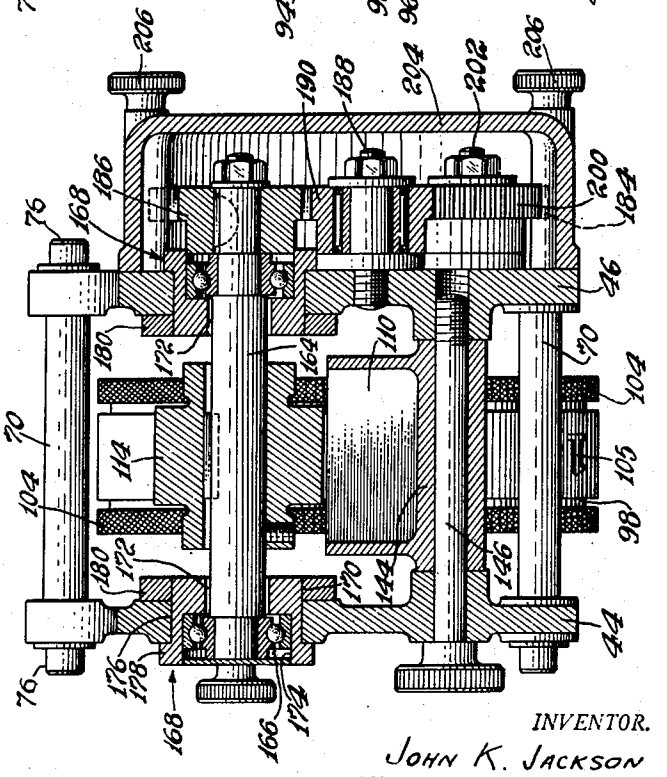


Fig. 5



INVENTOR.
JOHN K. JACKSON
BY
Jyk Montgomery
ATTORNEY

Patented June 16, 1953 2,641,999

UNITED STATES PATENT OFFICE

2,641,999

MARKING APPARATUS

John K. Jackson, Westfield, N. J., assignor, by mesne assignments, to Adolph Gottscho, Inc., Hillside, N. J., a corporation of New York

Application June 21, 1950, Serial No. 169,369

5 Claims. (Cl. 101—350)

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This invention relates to improvements in marking apparatus, and is particularly directed to apparatus for marking indicia in continuous or repeated patterns on a continuous roll, sheet, web or strip of material, or for applying indicia to other desired surfaces or objects.

More specifically the invention is directed to marking apparatus for use with existing wrapping, cutting or similar machinery through which a continuous roll, sheet, web or strip of material, or other object to be marked is fed, which apparatus imprints a continuous or repeated pattern, trade-mark, code marking, date or the like on the material or object during the feeding of the latter through machinery of the character indicated.

One of the objects of the present invention resides in the provision of a marking or imprinting attachment for existing machinery through which a continuous web, sheet or strip of material, or object is fed, for printing continuous or repeated indicia or pattern thereon of uniform intensity and sharply defined clarity.

Another object is the provision of an attachment of the character indicated which operates on the principle of an aniline printing press for printing continuous or repeated indicia of uniform intensity and sharply defined clarity upon the continuous roll, sheet, web or strip of material, or object fed to or through existing machines performing operations thereon, and without interfering with such operations.

A further object is the provision of an attachment of the character indicated wherein the marking attachment includes means for controlling the printing pressure on the material or object being marked, and means for controlling the coating of printing ink upon the impression element or printing roller or cylinder.

A further object of the invention is the provision of a marking or printing attachment of the character indicated, wherein the contact of the impression or indicia bearing roller or cylinder with the sheet, strip or object to be marked is limited and the printing pressure may be effectively varied; and wherein structure is provided for varying and controlling the transfer of printing ink to the impression roller or cylinder to thereby provide a printing impression of uniform intensity and sharply defined clarity.

A further object of the invention is the provision of a printing or marking attachment of the character indicated embodying an improved system for transferring ink from the ink supply to the impression roller; which system includes an

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ink supply roller dipping into an ink fountain having a constantly maintained ink level therein, a transfer or metering roller interposed between the ink supply roller and the impression roller or cylinder, and mechanism for adjusting the surface contact of the ink supply roller with the transfer or metering roller, and the surface contact of the latter with the impression roller, to thereby achieve the even distribution of ink over the impression roller or cylinder.

A still further object of the present invention resides in the provision of a marking attachment of the character indicated for existing machinery through which a continuous web or sheet of material, or object is fed, which attachment is simple in construction, sturdy and easily cleaned and otherwise maintained, and which attachment is adapted to be installed on a variety of machines of the type referred to above to thereby eliminate the necessity for subjecting the material or object to a separate marking or printing operation.

Other and further objects of the present invention will be manifest from the following description and the accompanying drawings, wherein:

Fig. 1 is a side elevational view of the apparatus of the present invention, shown associated with a portion of a wrapping machine;

Fig. 2 is a longitudinal sectional view of the apparatus with parts shown in elevation;

Fig. 3 is a cross sectional view taken substantially on line 3—3 of Fig. 2;

Fig. 4 is a cross sectional view taken substantially on line 4—4 of Fig. 2;

Fig. 5 is a cross sectional view taken substantially on line 5—5 of Fig. 2; and

Fig. 6 is a cross sectional view taken substantially on line 6—6 of Fig. 2.

Referring to the drawings in detail, a marking or imprinting apparatus constructed according to one embodiment of this invention is illustrated and generally referred to by the reference numeral 10. This marking apparatus is shown as mounted upon a portion of a wrapping machine 12, for example, which machine forms no part of this invention, except insofar as it illustrates one of the many applications or uses of the apparatus of the present invention. It is to be understood that the marking apparatus 10 may be mounted upon any machine through which a continuous sheet, strip or web of material, or other objects or articles are fed, at a location where the material or object is exposed to permit the printing of indicia, pattern, trade-mark, code marking, or the like thereon.

The wrapping machine 12, of which the paper

or other web or strip material supplying portion is illustrated, includes a pair of substantially triangular, spaced apart, vertically disposed side plates 14, having one apex thereof extending downwardly and supported on the remainder of the wrapping device (not shown) by bolts 16, or similar fastening members, extending through flanges 18 formed on the lowermost apex of each side plate 14. A feed roll 22, providing a source of paper or other strip material P to be fed through the wrapping machine for marking, is rotatably journalled in upwardly opening notches 24 formed in the substantially horizontal upper edges of the side plates 14 adjacent one end thereof. The paper or other material to be marked, in the form of a continuous web or strip is drawn off the roll 22 in the direction of the arrow and is extended under the guide roller 26, which is suitably journalled between the side plates 14. From the guide roller 26, the web P travels upwardly over and substantially around the backing roller 28 which is journalled between the side plates 14 and extends above the upper edges of the latter adjacent the ends thereof remote from the notches 24. From the backing roller 28, the paper P passes over a second guide roller 29, also journalled between the side plates, and thence downwardly out of the machine, and into the portion (not shown) which performs the wrapping function. While the roller 28 has been identified as a backing roller, it is to be understood that it is an element of the wrapping machine, and that any roller, similarly exposed, over which the strip of material passes in continuous fashion could be utilized, or adapted to be utilized as a backing surface for the marking apparatus. Where the existing machines do not include a roller such as 28, but do advance the material or articles to be marked over a relatively rigid table, or the like, then the latter may be utilized as the backing surface.

In the illustrated arrangement a plate 30, or similar supporting member for the marking apparatus 10, spans the top edges of the plates 14 between the opposite ends thereof. This marking or imprinting apparatus 10 includes a supporting base or stand 32, which in the illustrated embodiment of the invention is formed of a bottom plate 34 having the upstanding standards 36 and 38 extending from the opposite side edges thereof. The bottom plate 34 of the stand 32 is secured to the supporting member 30 of the wrapping machine by bolts 40 tapped into the member 30, or by similar securing means.

A frame, generally indicated at 42, is pivotally mounted upon the supporting base 32. The frame 42 includes a pair of substantially elongated, spaced apart, side plates 44 and 46. The standards 36 and 38 are disposed inwardly of the side plates 44 and 46, respectively. A pivot member 50, having a central portion 52 of relatively greater diameter extending rotatably through the horizontal bores 54 and 56 formed through the upper portions of the standards 44 and 46, is formed with reduced diameter threaded end portions 58 and 60 which extend through the plates 44 and 46 adjacent one end of the latter. Nuts 62 are threaded on the end portions 58 and 60 and secure the pivot member 50 relative to the frame 42. A coiled torsion spring 64 extends about the central portion 52 of the pivot member, and has one end fixed to the pivot member 50 (Fig. 2). The other end of the spring 64 is fixed to a spring seat 66 which is fixed relative to the standard 38 by the set screw 68. A tubular cover 65 extends around the spring 64 to shield the spring and pivot member from foreign matter. The torsion spring 64 is so disposed as to tend to lift the end of the frame 42 remote from the pivot member 50. By loosening the nuts 62 and adjusting the angular position of the pivot member 50 relative to the plates 44 and 46, the force exerted by the spring 42 may be varied, to thereby regulate the printing pressure, as will be hereinafter described in detail.

The side plates 44 and 46 are secured together to form the unitary frame 42 by a plurality of cross-members 70, each of which includes a pair of cap screws 76 extending through the side plates, and into cross-members, with the caps of the screws 76 engaging the side plates whereby to urge the side plates against the ends of the cross-members 70 in clamping relation. In addition to the cross-members 70, a cross-member 78 disposed below the pivot member 50 similarly connects the side plates 44 and 46 at that point. The member 78 is formed with an increased diameter central portion 80 which forms a part of the mechanism for adjusting the printing contact. The central portion 80 extends loosely through the openings 82 and 84 formed in standards 36 and 38, so that the frame 42 may rock slightly relative to the supporting base 32. A lug 86 is formed on the bottom plate 34 of the base 32, and threadedly receives an adjusting screw 88 which bears against the portion 80 of the cross-member 78. By moving the screw 88 into and out of the lug 86, the limitation on the downward movement of the end of the frame 42 remote from the pivot 50 may be adjusted.

The plates 44 and 46 are formed with horizontally aligned openings extending therethrough adjacent the ends remote from the pivot member 50. Anti-friction bearings 90, which are shown to be ball bearings but which may be roller bearings, are disposed in these openings and rotatably support the opposite ends of a shaft 92. Bearing covers 94 are secured to the side plates 44 and 46 and are formed with annular flanges 96 extending into the bearing receiving openings and abutting against the outer races of the bearings 90 for retaining the latter in place. A printing roller or cylinder 98 is formed with a hollow hub 100 disposed upon the shaft 92, and is fixed to the latter by a key 102. The peripheral surface of the printing cylinder 98 is provided with a pair of circumferentially extending, spaced apart, bearing ribs or flanges 104 disposed adjacent to the opposite side edges thereof. The bearing ribs or flanges 104 form an annular recess 106 therebetween for receiving an impression or marking element 105 which is preferably of the adhesive type, but may be of any other suitable known type. The impression element is provided with the desired indicia with which the web P is to be marked. The supporting base 32 is so disposed on the machine to which the marking apparatus 10 of the present invention is attached, that the printing roller 98 is positioned for surface contact with the impression roller 28. The ribs 104 of the printing roller, and the adjustable screw 88 acting against the cross-member 78 determine the extent of contact of the impression element 105 on the printing roller 98 with the continuous web or sheet of material P passing over the impression roller 28. Similarly, the torsion spring 64, which tends to lift the plate roller 98 away from the impression roller 28, determines the printing pressure.

The driving of the several movable parts of

the marking device, to be described hereinafter, is derived from the rotatable printing or plate roller 98, which may be driven in several ways. This printing roller or cylinder may be rotated by frictional engagement of the ribs or flanges 104, having knurled surfaces, with the moving strip or web P, or by positive driving connection with the shaft of the impression roller 28, or with an auxiliary source of power, as by gears for example. When gears are employed to provide a positive drive one may be mounted on the shaft of the impression roller 28 and the other on the shaft of the printing roller 98. The teeth of the gears will slide slightly in mesh with each other during relative movement between the said rollers.

The marking device embodies an ink supplying assembly for evenly and continuously distributing a supply of printing ink onto the impression element or dies carried by the plate roller 98. The ink supplying assembly includes an ink reservoir 108 from which ink is fed to an open ink fountain 110, an inking roll 112 dipping into the open fountain 110 and having surface contact with a metering roll 114 which engages the plate roller 98 for distributing the ink on the latter. The ink reservoir 108 consists of a cylindrical transparent portion 116, open and threaded at one end, and a preferably metallic cylindrical portion 118 threadedly receiving the open end of the portion 108 to provide a closed container. The cylindrical portion 118 is provided with a filler opening 120 in the top thereof, which is sealed by the filler plug 122. The ink reservoir 108 is mounted on a transversely extending plate 124 extending across the top edges of the side plates 44 and 46 adjacent the ends thereof receiving the pivot member 50. The plate 124 is removably secured to the side plates 44 and 46 by the bolts 126 tapped into the side plates. An open ended transfer pipe 128 depends from the bottom of the portion 118 of the reservoir for conveying the ink to the ink fountain 110 disposed therebelow. A valve assembly 130 includes an internally threaded coupling 132 threaded into an opening formed in the portion 118 of the reservoir and axially aligned with the transfer pipe 128. A valve stem 134 is provided with a threaded portion received by the coupling 132, an operating knob 136 secured to the outer end of the stem, and a conical valve member or plug 138 for seating upon the upper end of the pipe 128. This valve assembly serves to control the flow of ink through the transfer pipe 128, and particularly is employed to shut off the said flow during removal of the container 116. The ink fountain 110 is formed of a substantially rectangular bottom 140, and an upstanding peripheral wall 142. The wall 142 and the bottom 140 meet in a thickened portion 144 at the forward end of the ink fountain, and a transverse shaft 146 extends rotatably through this thickened portion 144. The opposite ends of the shaft 146 are journalled in the side plates 44 and 46 and thereby provide a pivotal mounting for the ink fountain. A shaft 148 is disposed below substantially the center of the bottom 140 of the ink fountain 110, and an eccentric cam member 150 is fixed thereto. The opposite ends of the shaft 148 are journalled in the side plates 44 and 46, and the cam 150 engages the bottom 140 providing for the adjustment of the ink fountain. A knob 152 is fixed to one end of the shaft 148 for rotating that shaft and the cam 150.

Upstanding apertured lugs 154 are formed on the top edges of the side portions of the wall 142 of the ink fountain, and receive the opposite ends of the shaft 156 upon which a hub portion 158 of the inking roll is rotatably mounted. A set screw 160, extending into one of the lugs 154, engages the shaft 156 and secures the latter. The inking roll 112 includes a rim 162 on the hub 158, formed of rubber or similar material, and dipping into the ink fountain 110.

The metering roll 114 is rotatable about an axis parallel to the axes of rotation of both the plate roller 98 and the ink roller 112, and spaced upwardly therefrom. As will be apparent from this relationship, as the cam 150 is rotated to pivot the ink fountain 110 about the shaft 146, the contact of the ink roller 112 with the metering or transfer roller 114 will be varied. The metering roller 114 is formed with a ground chrome plated surface etched or engraved with fine lines or indentations for maximum wear and precision in transferring ink to the impression element or die. The roller 114 is keyed to a shaft 164 having the opposite ends supported in the inner races of antifriction bearings 166. The outer races of the bearings 166 are pressed or otherwise secured, in the bearing supports 168. Each bearing support 168 is formed with a cylindrical outer surface 170, a bore 172 through which the shaft 164 extends, and a counterbore 174 receiving the bearing 166. The bore 172 and the counterbore 174 are concentric with each other, and not concentric with the outer cylindrical surface 170. The outer surfaces 170 of the bearing supports 172 are rotatable in axially aligned circular openings 176 formed in the side plates 44 and 46. A flange 178 formed on each bearing support abuts against the outer surfaces of the side plates and is provided with a knurled or roughened periphery to facilitate the gripping thereof for rotating the bearing support 172 in the opening 176. Rings 180, secured to the inner ends of the bearing supports, prevent movement of the latter axially relative to the respective side plates, and are also provided with roughened peripheries for turning the bearing supports. Since the bearing supports 172 are independently rotatable in each of the side plates 44 and 46, the axis of rotation of the metering roll 114 may be adjusted relative to the axis of the printing roller 98 both angularly and with respect to the perpendicular distance therebetween. Therefore, the specific mounting of the metering roll provides a control of both the thickness of the ink coating deposited on the impression element or die, and of the equality of thickness of such coating across the width of the plates.

A scraping blade 182 mounted upon the upstanding wall 142 of the ink fountain engages the end edges of the metering roll 114 and the inking roll rim 162 to thereby remove excess ink from the rollers.

In order to provide a positive drive for the metering or transfer roll 114, the shafts 92 and 164 of the printing roller 98 and the metering or transfer roll 114, respectively, are extended through the side plate 44. A spur gear 184 is keyed or otherwise secured, to the extending portion of the shaft 92, and a smaller spur gear 186 is similarly secured to the extending portion of the shaft 164. A stub shaft 188 is tapped into the side plate 46, and a pinion 190 is rotatably secured thereon. The shaft 188 is so disposed as to mesh the pinion 190 with the gear 186 on the transfer or metering roll shaft 164. A second pinion gear 200 is rotatably mounted on another stub shaft

202 extending from the side plate 44, and meshes with the gear 184 secured to the plate roller shaft and with the pinion 190. The gears 184, 200, 190 and 186 transmit rotation from the plate roller shaft 92 to the shaft 164 of the transfer or metering roll, with the respective shafts being rotated in opposed directions. The gears 184, 200, 190 and 186 are so positioned as to rotate the transfer or metering roll 114 at a peripheral velocity equal to the peripheral velocity of the impression roller or die carried by the printing roller 98. In order to provide a positive drive for the inking roll 112, the gear 186 on the shaft 164 of the metering roll will mesh with a gear (not shown) keyed to the shaft of the inking roll 112. A cover 204 engages over the gears 152, 200, 190 and 186, and is removably secured to the side plate 46 by the threaded bolts 206 which are tapped into that side plate. The bolts 206 are provided with knobs having roughened peripheries to facilitate the removal thereof.

In operating the marking device described above, a supply of quick drying aniline printing ink of any color is introduced into the reservoir 108 through the filler opening 120. To prevent loss of ink during such filling of the reservoir, the valve 138 is seated upon the upper open end of the transfer tube 128. The level of ink in the reservoir may be observed through the transparent portion 116. The forming of the reservoir 108 in two separable portions 116 and 118 facilitate the cleaning thereof. After the filler cap or plug 122 has been replaced, the valve 138 is raised to thereby permit flow of ink into the ink fountain 110. Since the reservoir is sealed relative to the atmosphere, the ink will rise in the fountain 110 only to a constant level determined by atmospheric pressure. This ink level will be higher than the lowermost portion of the ink roll 112, so that the latter will pick up ink during its rotation.

The adjusting screw 88, bearing against the cross-member 80, is adjusted to provide the desired contact between the impression element or die on the printing roller 98 and the web or strip P passing over the impression roller 28. The torsion spring 64 is also adjusted to provide the desired printing pressure. As the web or strip P is drawn over the impression roller 28, the knurled bearers 104 which frictionally engaging the web or strip will effect rotation of the roller 98, and through the gears 184, 200, 190, and 186 rotation of the transfer or metering roll 114 and the inking roll 112. As previously mentioned, instead of relying on the frictional engagement of the web with the roller 98, a positive drive may be employed for the latter roller from the shaft of the roller 28, or some other source.

The contact of the transfer or metering roll 114 with the printing roller 98 is regulated by adjusting the eccentric bearing supports 168, to provide a uniform ink coating of the desired thickness upon the impression element or die. The contact of the ink roller 112 with the metering roll 114 is regulated by adjustment of the fountain supporting cam 150 which rocks the ink fountain 110 and the ink roller shaft 156 about the pivot 146.

The several adjustments provided in the described marking device for regulating printing contact, printing pressure, and the thickness and uniformity of the ink distribution on the impression element carried by the printing roller 98, along with the constant ink level in the ink fountain 110, achieve a printed impression of uniform clarity and sharpness.

It is to be understood, that while the device of the present invention is adapted for use as an attachment for existing machines of the character indicated, and has been so illustrated and described, the device is equally adapted for operation as an independent unit, in which event the sheet, web or strip after receiving the impression may be rolled up or folded for storage or subsequent use. It is also to be understood that the device of the present invention is adapted for marking articles and objects other than sheets or webs of material, such articles being fed to the impression element successively in any suitable or well known manner.

While I have illustrated and described one embodiment of my invention, it is to be understood that various changes and modifications may be made therein without departing from the spirit and scope of my invention.

What I claim is:

1. An ink supplying device for a printing roller journalled in a frame and having an impression element thereon for printing engagement with a continuous web; said ink supplying device comprising a metering roller journalled for rotation about an axis substantially parallel to the axis of said printing roller, eccentric means supporting said metering roller on said frame at its opposite ends and adjustable to vary the contact between said printing and metering rollers, a sealed ink containing reservoir on said frame, a transfer pipe depending from said reservoir, an open ink fountain disposed below said reservoir and into which said transfer pipe extends to thereby provide a supply of ink in said fountain maintained at a level at least as high as the lower end of said pipe, an ink roller journalled on said ink fountain with its axis below that of said metering roller and arranged for surface contact with said metering roller and dipping into the supply of ink in said fountain, and means supporting said ink fountain on said frame and adjustable to displace said fountain substantially vertically for varying the distance between the axes of said metering and ink rollers and the position of said lower end of the transfer pipe with respect to said fountain.

2. In marking apparatus for a machine advancing a continuous web of material over an exposed roller and including a frame, and a printing roller journalled in said frame and having an impression element thereon engageable with the moving web for imprinting a repeated pattern on the latter; an inking system for evenly distributing ink to said impression element, comprising a metering roller journalled for rotation about an axis substantially parallel to the axis of said printing roller, eccentric means supporting said metering roller on said frame and adjustable to vary the contact between said printing and metering rollers, a sealed ink containing reservoir on said frame, an open ink fountain disposed below said reservoir, a transfer pipe depending from said reservoir and into said fountain to thereby maintain a substantially constant supply of ink in the latter at a level at least as high as the lower end of said pipe, an ink roller rotatably supported on said ink fountain and dipping into said constant ink supply, and means supporting said ink fountain on said frame and adjustable to displace said fountain substantially vertically for varying the surface contact between said ink roller and said metering roller and for varying the position of said lower end of the transfer pipe with respect to said fountain.

3. In marking apparatus for a machine advancing a continuous web of material over an exposed roller and including a frame, and a printing roller journalled in said frame and having an impression element thereon engageable with the moving web for imprinting a repeated pattern on the latter; an inking system for evenly distributing ink to said impression element as set forth in claim 2, including means for removably supporting said reservoir and the depending transfer pipe on said frame, and a shut-off valve adapted to block the flow of ink through said transfer pipe.

4. In an inking system for evenly distributing ink to an impression element carried by a printing roller journalled in a frame; the combination of a metering roller journalled in said frame and having variable surface contact with the printing roller, an ink roller disposed for rolling contact with said metering roller along a line disposed below a horizontal plane extending through the axis of rotation of said metering roller, an upwardly open ink fountain, means movable supporting said fountain on said frame to permit substantially vertical displacement of said fountain, means rotatably supporting said ink roller on said fountain for substantially vertical movement with the latter, a sealed ink reservoir mounted on said frame above said fountain, a transfer pipe extending downwardly from said reservoir and opening into said fountain to supply ink to the latter, said pipe being effective to maintain the supply of ink in said

fountain at a level which falls only slightly below the lower end of said pipe, said ink roller dipping into said fountain to below said level for immersion in the supply of ink in said fountain, and means for vertically displacing said fountain to vary the contact pressure between said metering and ink rollers and to vary said level of the ink in said fountain.

5. In an inking system; the combination according to claim 4, wherein said means movably supporting the fountain on the frame includes a horizontal pivot pin carried by said frame and extending through said fountain at a location remote from said transfer pipe, and said means for vertically displacing said fountain includes cam means rotatably carried by said frame and engaging said fountain from below for rocking the latter about said horizontal pivot pin.

JOHN K. JACKSON.

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