March 6, 1956 I. S. GOTTSCHO 2,737,388

FEEDING MECHANISMS FOR MARKING MACHINES

Filed May 26, 1951 3 Sheets-Sheet 1

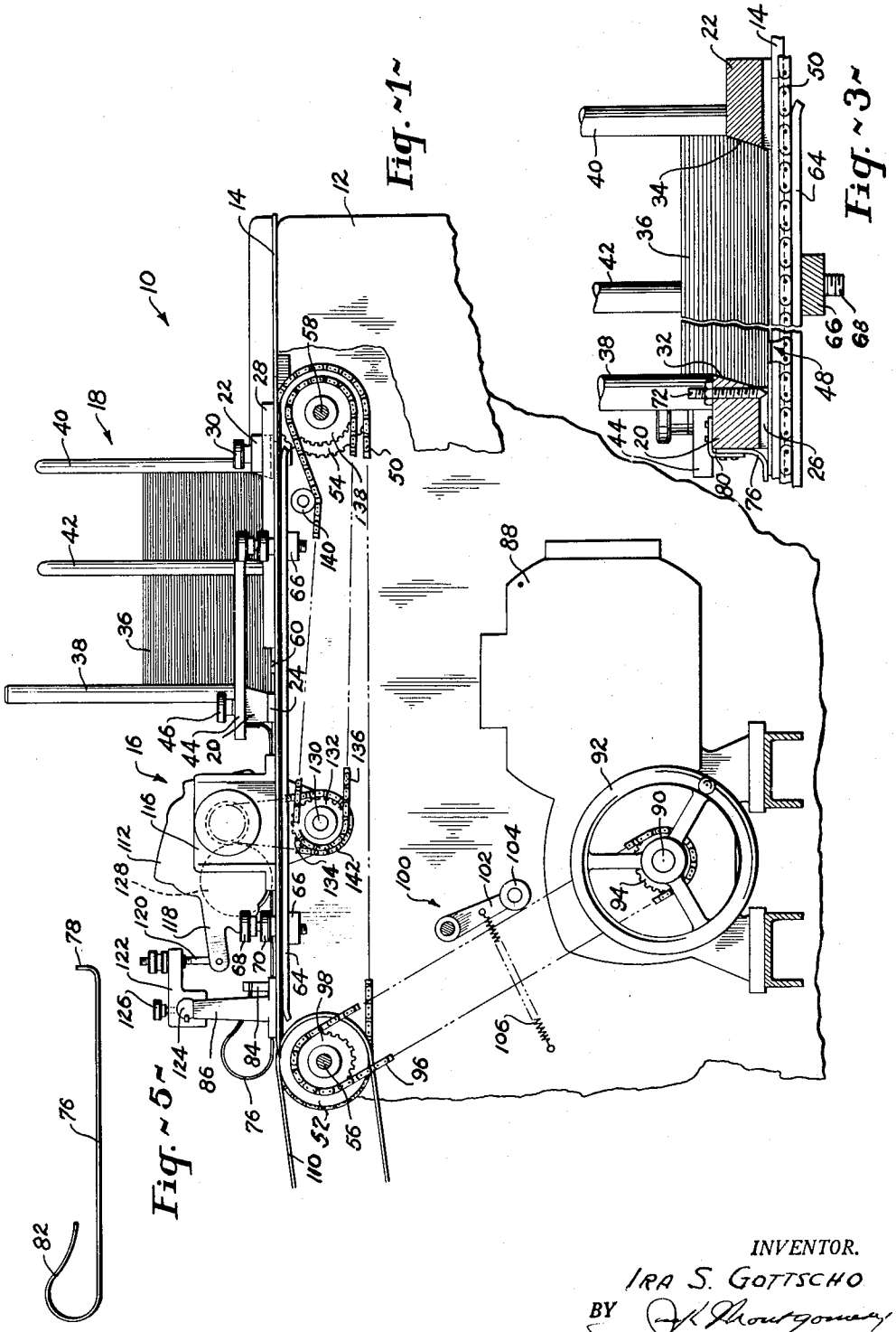


Fig. 1

Fig. 3

Fig. 5

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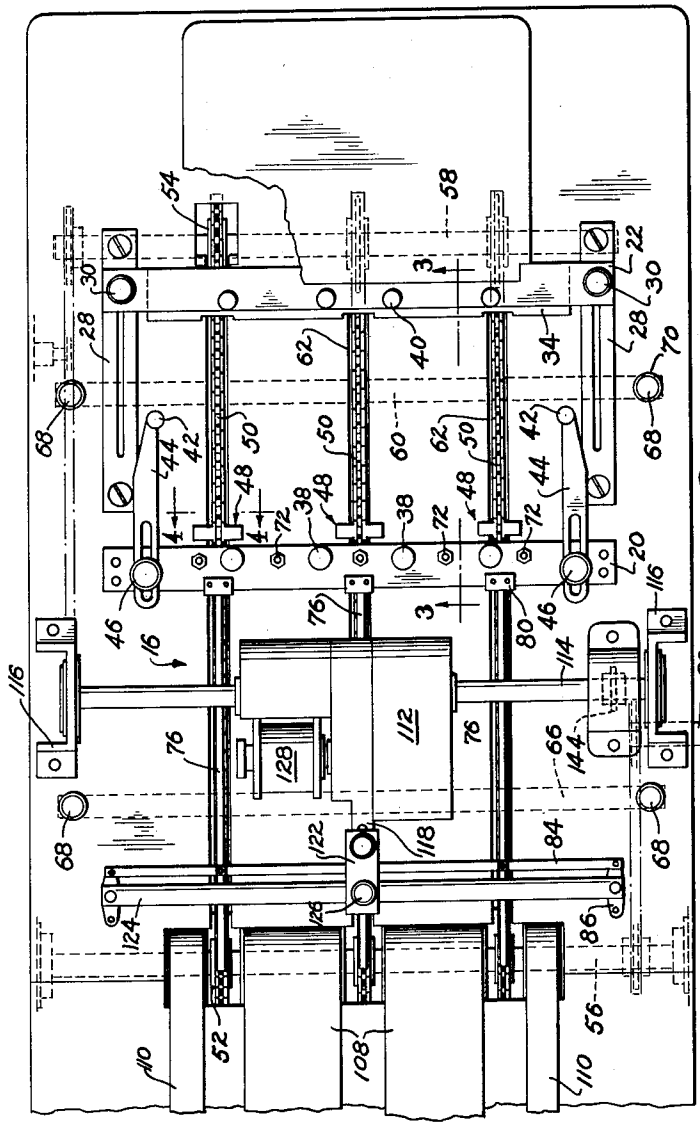


Fig. 2

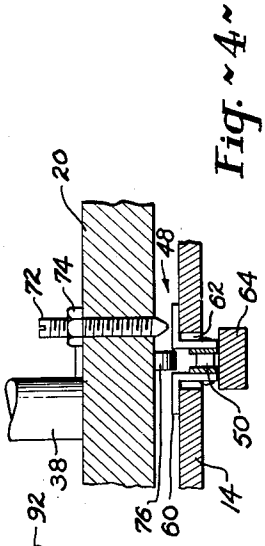


Fig. 4

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FEEDING MECHANISMS FOR MARKING MACHINES

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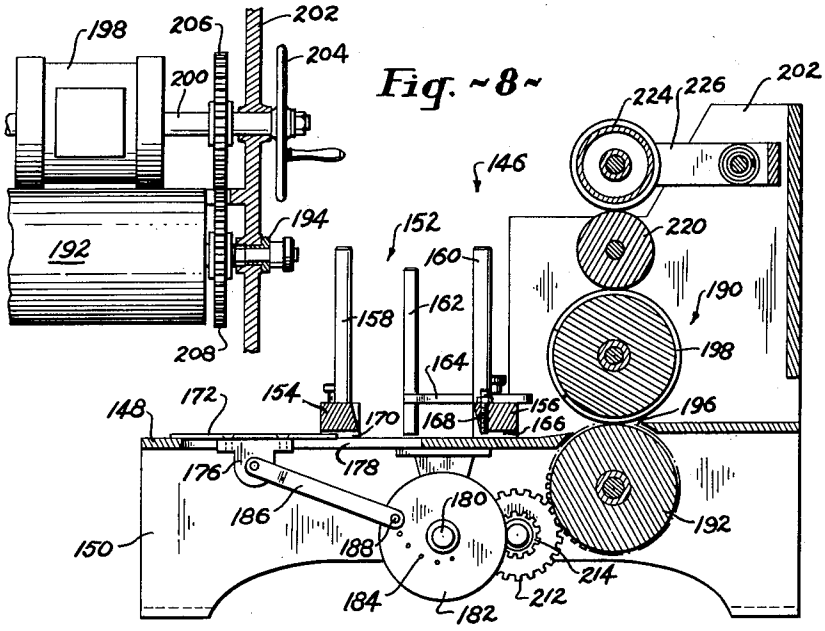


Fig. ~8~

Fig.~6~

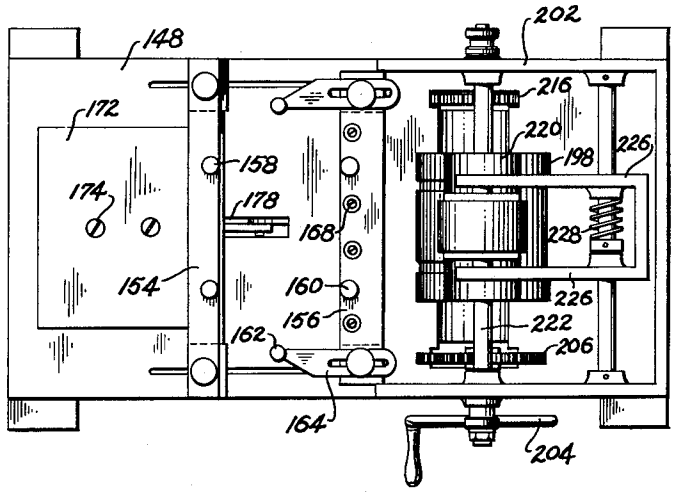


Fig.~7~

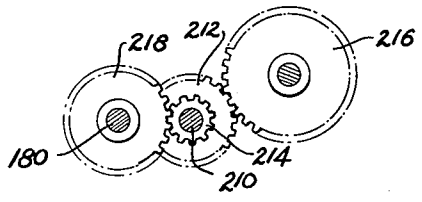


Fig.~9~

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FEEDING MECHANISMS FOR MARKING MACHINES

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Application May 26, 1951, Serial No. 228,460

7 Claims. (Cl. 271—35)

The present invention relates to feeding mechanisms for marking machines and the like, and is particularly directed to mechanisms for individually feeding flattened articles, such as, for example, folded cartons, from a stack and past the marking station of a marking machine.

An object of the present invention is to provide feeding mechanisms of the described character which are adapted for efficiently handling flattened articles of different thicknesses and forms.

Another object resides in the provision of feeding mechanisms of the described character constructed to feed flattened articles from the bottom of a stack one at a time and having adjustable devices embodied therein to ensure the individual feeding even of articles of different thicknesses.

Another object resides in the provision of feeding mechanisms of the described character for feeding flattened articles one at a time from the bottom of a stack on a supporting surface to a remote marking station, which embody a pushing element or elements moved linearly over the supporting surface to engage against the trailing end edge of the bottom article and push the latter out from under the stack to the marking station, and wherein the extension of the pushing element or elements above the supporting surface is conveniently adjustable to permit feeding of flattened articles of different thicknesses while assuring the maximum area of contact between such pushing elements and the edge of the engaged article.

Another object resides in the provision of feeding mechanisms of the described character for feeding flattened articles one at a time, each of which includes a magazine arranged on top of a supporting surface and adapted to hold a stack of the articles of different size or form with at least the lower portion of the stack inclining downwardly in the feeding direction, vertically adjustable abutments mounted above the supporting surface at the front of the stack to provide clearance above the supporting surface sufficient for the passage of only one of the flattened articles, and pushing means moving over the supporting surface to engage the trailing end of the bottom article of the stack and to push the bottom article from under the stack and between the adjustable abutments and the supporting surface to a marking station on the latter.

The present invention provides a feeding mechanism which includes a feeding table having two parallel members extending transversely thereon and formed with confronting faces which are inclined downwardly in the feeding direction, at least one of these members being longitudinally movable on the feeding table toward and away from the other for accommodating articles of different sizes or shapes therebetween, magazine uprights are mounted on each of the transverse members in facial alignment with the top of the inclined face of the related member to support the front and back of a stack of articles arranged therebetween, and other magazine uprights extend from the free ends of supporting arms which

are mounted for angular and longitudinal movement on the ends of one of the transverse members to position these uprights at, and support, the sides of the stack of articles. The transverse member nearest to the marking station is spaced upwardly from the feeding table, at least for a substantial central portion thereof, and carries abutment members extending threadedly therethrough to project from the bottom surface of that member for adjustably restricting the vertical space above the feed table so that only one of the flattened articles may be passed under that member at a time, and pushing means are intermittently movable over the feeding table toward the marking station to engage the bottom article of the stack supported between the front, back and side uprights and to push or propel the engaged article through the restricted space under the transverse member nearest the marking station to the marking station.

According to one embodiment of the present invention, the pushing means consists of pushing elements carried by continuous chains to project through and move along transversely spaced longitudinal slots formed in the feeding table with vertically adjustable chain guides being provided to vary the extent that such pushing elements project above the top surface of the feeding table so that flattened articles of different thicknesses may be conveniently fed. In this one embodiment, spring members are supported to engage the flattened article being pushed from above after the article has been removed from under the remainder of the stack so that the article is then held down on the feeding table to maintain the contact of the pushing elements with the trailing end edge of the flattened article.

According to another embodiment of the present invention, the pushing means includes a support block reciprocatable along a longitudinal slot formed in the feeding table and removably carrying a pusher plate over the top surface of the feeding table so that replaceable pusher plates of various thicknesses may be employed for flattened articles of different thicknesses, mechanism for reciprocating the support block which consists of a rotated crank-wheel and a connecting rod pivotally connected at one end to the support block and attached removably to the crank-wheel at one of a plurality of radially spaced openings in the latter so that the length of the stroke of the pushing plate may be adjusted, and marking mechanism at a marking station including an impression roller and a die wheel positioned to engage the fed articles therebetween and rotated in synchronism with the rotated crank-wheel to advance the fed article at a linear speed greater than the linear speed of the pusher plate.

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

Fig. 1 is a fragmentary side elevational view of a marking machine embodying a feeding mechanism according to the present invention with the side wall of a support housing facing the viewer being broken away to expose the driving devices of the feeding mechanism;

Fig. 2 is a top plan view of the marking machine of Fig. 1;

Fig. 3 is a longitudinal, vertical sectional view, on an enlarged scale, taken along the line 3—3 of Fig. 2;

Fig. 4 is a transverse, vertical sectional view, on an enlarged scale, taken along the line 4—4 of Fig. 2;

Fig. 5 is a detail side elevational view of a spring element included in the marking machine of Fig. 1;

Fig. 6 is a longitudinal, vertical sectional view of a marking machine including a feeding mechanism according to another embodiment of the present invention;

Fig. 7 is a top plan view of the marking machine of Fig. 6;

Fig. 8 is a fragmentary transverse elevational view showing the drive of the marking rollers of the machine of Fig. 6; and

Fig. 9 is a diagrammatic side elevational view of the driving arrangement for the feeding mechanism of Fig. 6.

Referring to the drawings in detail, and initially to Figs. 1 to 5, inclusive, thereof, a marking machine, generally indicated by the reference numeral **10**, is there shown to include a support housing **12** carrying a feed table **14** at the top over which the flattened articles, such as, for example, flattened cardboard cartons, are to be advanced past a marking station **16**.

The flattened articles are stored or held in a stack within a magazine, generally indicated by the reference numeral **18**, on the feed table **14** at a location remote from the marking station **16**, and are withdrawn, one at a time, from the bottom of the stack for feeding past the marking station. The magazine **18** includes two transverse members **20** and **22** extending across the table **14** with the opposite ends of the member **20**, the member closest to the marking station, being mounted on spacers **24** (Fig. 1) and fixed relative to the table so that the bottom surface of the member **20** is raised above the feed table **14**, at least at a substantial central portion of the latter, to provide a space **26** (Fig. 3) through which the articles may be fed to the marking station. The opposite ends of the other transverse members **22** are slidable on longitudinal guides **28** fixed to the feed table and formed with undercut slots to receive clamping nuts (not shown) into which vertical clamping bolts **30**, extending rotatably through the opposite end portions of the member **22**, are threaded for holding the member **22** in a selected spaced apart, parallel position relative to the fixed transverse member **20**. The confronting faces **32** and **34** of the transverse members **20** and **22**, respectively, are inclined downwardly in the direction toward the marking station **16** (Fig. 3) so that the lower portion of the stack **36** of flattened articles guided or supported at the front and back by these inclined surfaces is slanted toward the marking station to thereby longitudinally separate the trailing end edges of the articles in the slanted lower portion of the stack **36**.

In order to support the upper portion of the stack **36** at the front and back, series of uprights **38** and **40** extend from the top surfaces of the transverse members **20** and **22**, respectively, and are arranged so that the surfaces of the uprights **38** and **40** are in facial alignment with the top edges of the inclined faces **32** and **34**, respectively, of the related transverse members. The opposite sides of the stack **36** are supported or guided by uprights **42**, each of which is carried by the free end of a support arm **44** mounted for angular and longitudinal adjustment on the adjacent end portion of the transverse member **20**. Such mounting of the support arms **44** is achieved by forming the latter with longitudinal slots through which clamping bolts **46** extend for threaded engagement in suitable tapped bores formed in the member **20**. Thus, the member **22** and its uprights **40** may be moved longitudinally toward and away from the transverse member **20**, while the side uprights may be displaced laterally toward and away from each other and longitudinally toward and away from the member **20** to adapt the magazine **18** for the reception of flattened articles of different sizes and forms.

The removal of the bottom article from the stack **36** and its feeding past the marking station are accomplished by a plurality of pushing elements, generally indicated by the numeral **48** (Figs. 2 and 3), moved over the feed table **14** along longitudinally extending, transversely spaced paths in the direction from the magazine **18** toward the marking station **16**. Each pushing element **48** is carried by a continuous chain **50** running over sprockets **52** and **54** fixed on a transverse driving shaft **56** and a

transverse driven shaft **58** which are rotatably supported below the opposite ends of the table **14** so that the top run of each chain moves longitudinally below the table **14** past the magazine and the marking station. Each pushing element **48** includes two pushing members **60** (Fig. 4) extending outwardly from the opposite sides of a link of the supporting chain **50** to project through a suitably positioned and dimensioned longitudinal slot **62** in the table **14** when the pushing element is moving along the top run of the related chain. The pushing members **60** are formed with oppositely directed flanges at their outer ends to overlie the top surface of the feed table **14** (Figs. 2 and 4) at the sides of the slot **62** during movement of the pushing members along the related slot. As seen in Fig. 2, the opposite ends of the slots **62** are laterally enlarged to permit the passage of the flanged pushing members **60** through the table at the opposite ends of the top run of the supporting chain **50**.

While only one pushing element **48** is shown on each of the three chains in the illustrated embodiment of the invention, it is to be understood that each chain is intended to carry several of these pushing elements at suitably spaced locations so that several of the flattened articles may be fed during the period required for one complete passage of the chain **50**. Further, while the elements **48** on the three chains **50** (Fig. 2) are illustrated as being in transverse alignment, these elements may be longitudinally staggered, that is, in the feeding direction to effect simultaneous engagement with the trailing end edge of an article having a trailing end edge of irregular configuration.

In order to provide for adjustment of the extent or distance that the flanges of the pushing members **60** project above the top surface of the feeding table **14**, a longitudinal guide **64** extends along the bottom of the upper run of each chain **50** and is supported from the table **14** for vertical adjustment relative to the latter. The several chain guides **64** are supported adjacent their opposite ends by transverse support members **66** which are in turn supported at their opposite ends by bolts **68** extending threadedly through the feed table **14** and having locking nuts **70** threaded thereon for movement against the top surface of the table **14** to hold the bolts **68** in adjusted position. Thus, the guides **64** may be moved upwardly to position the flanges of the pushing members **60** relatively high above the table **14**, when flattened articles of relatively great thickness are to be fed, and moved downwardly to position these flanges close to the feed table, as in Fig. 3, when relatively thin articles are being handled, and in either case the structure permits the engagement of the flanges of the pushing members with substantially the entire thickness of the article being fed to avoid the tendency of the pushing members to slide under the trailing edge of the article.

Since the space **26** (Fig. 3) between the bottom surface of the transverse member **20** and the surface of the table **14** must be sufficiently high to permit the passage of the thickest of the flattened articles intended to be handled by the feeding mechanism of the machine **10**, it is desirable to provide some means for adjustably restricting this space so that, when relatively thin articles are to be fed, only one of such articles may pass through the space **26** at a time. For this purpose, a series of abutment screws **72** are threaded downwardly through the member **20** at transversely spaced locations (Fig. 2) and are each preferably formed with a conical lower end (Figs. 3 and 4) to project into the space **26** with the conical tip or lower end serving substantially as a continuation of the inclined face **32**. A lock nut **74** is threaded on each abutment screw **72** above the member **20** to bear against the latter and thereby hold the related screw **72** in its adjusted position. Thus, when relatively thin articles are being fed, the abutment screws **72** are extended more or less downwardly into the space **26** to engage the leading edges of the articles immediately above the lowermost arti-

cle in the stack 36 and to thereby prevent frictional entrainment of those articles immediately above the bottom article as the latter is pushed by the elements 48 engaging its trailing edge out from under the stack 36 and toward the marking station 16.

When the article being fed has been pushed clear of the stack 36, so that the weight of the stack no longer operates to keep the article flat on the feeding table, there is some tendency for the article being fed to buckle or to ride over the flanges of the pushing members 60. To avoid this tendency, longitudinal spring members or shoes 76, one of which is shown in detail in Fig. 5, are arranged above the slots 62 and extend from the transverse member 20, past the marking station 16, and to the exit end of the feeding table 14, to resiliently engage the successive articles from above as the latter are fed from the stack along the table 14. As seen in Fig. 4, each spring member 76 is sufficiently narrow to engage between the two pushing members 60 of the pushing element 48 moving along the related slot 62. The end of each spring member or shoe 76 adjacent the transverse member 20 is bent upwardly, as at 78, and is secured to the transverse member 20 by a suitable bracket 80 (Figs. 2 and 3). The opposite end portion of each spring member 76 is looped, as at 82, and is secured at its free end to a cross member 84 carried above the table 14 by the bases of standards 86 mounted on the latter in back of the marking station 16.

In order to drive the several chains 50, a motor 88 (Fig. 1) is mounted within the support housing 12 and is connected, through a suitable reduction gearing of conventional form (not shown), to a stub shaft 90 extending out of a side of the support housing and having a hand-wheel 92 thereon for manual actuation of the machine when the various adjustments are being made. A sprocket 94 is also fixed on the stub shaft 90 and drives a continuous chain 96 which runs over a sprocket 98 on the driving shaft 56. A tensioning device 100 operates on the chain 96 and includes a pivotally mounted arm 102 carrying a roller 104 at its free end for engagement against a run of the chain 96, and a spring 106 connected to the arm 102 for continuously urging the latter in the direction moving the roller 104 against the chain 96.

Although it forms no part of the present invention, a belt type conveyor is shown extending from the exit end of the table 14 to receive and carry away the marked articles. This conveyor, insofar as it is illustrated, includes continuous belt members 108 and 110 running over rollers or pulleys on the driving shaft 56 between, and outside of, the sprockets 52, respectively.

A marking device is positioned at the marking station 16 and in the illustrated machine 10 is a device of conventional form for applying an inked or printed impression to the articles fed successively thereby, however, it is to be understood that other marking devices, such as, for example, a marking device which merely indents the fed article, may be employed if desired. The illustrated marking device, being of conventional form, is illustrated only in outline, and it is sufficient, for the purpose of describing the present invention, to indicate that it includes a housing 112 mounted loosely on a shaft 114 which is journalled above the table 14 in bearing brackets 116 which receives the opposite ends thereof. The housing 112 is pivotally and axially movable on the shaft 114 and is formed with a lug 118 which is supported by a hangar screw 120 vertically adjustable and depending from an arm 122 mounted on a cross-member 124 extending between the previously mentioned standards 86. A set-screw 126 extends through the arm 122 to bear against the cross member 124 for holding the arm 122, and therefore the housing 112 of the printing device, in adjusted lateral position. A die wheel 128 is mounted on the housing 112 for rotation about an axis parallel to, and spaced from, the axis of the shaft 114 so that the contact pressure of the die wheel with the successively fed articles may be varied by adjusting the vertical position of the hangar screw 120. The die wheel 128, and means (not shown) for supplying printing ink thereto are rotated by the shaft 114 so that the peripheral speed of the die wheel is the same as the linear speed of the pushing elements 48 carried by the chains 50. In order to obtain this synchronous rotation of the die wheel 128 and movement of the pushing elements 48, a shaft 130 is journalled below the table 14 and carries two axially spaced sprockets 132 and 134, the sprocket 132 being driven by a chain 136 which runs over a sprocket 138 fixed on the shaft 58 and past a tensioning roller 140 (Fig. 1), while the other sprocket 134 on the shaft 130 drives a chain 142 which extends upwardly through a suitable opening in the table 14 and runs over a sprocket 144 fixed on the shaft 114 within a suitable cover (Fig. 2).

Referring now to Figs. 6 to 9, inclusive, a marking machine, generally indicated by the reference numeral 146, is there illustrated including feeding mechanism constructed according to another embodiment of the present invention. The machine 146 includes a feeding table 148 mounted on a suitable supporting structure 150 and carrying a magazine, generally indicated by the numeral 152, which is similar in most respects to the magazine 18 of the machine in Figs. 1 to 5 and is adapted to support a stack of the flattened articles to be fed over the table 148 to a marking station. As before, the magazine 152 includes two transverse members 154 and 156, with the member 154 being mounted for movement toward and away from the other member 156, and with both members being formed with confronting faces inclined downwardly toward the marking station to slant the lower portion of a stack of articles arranged therebetween in the same direction. Uprights 158 and 160 extend from the transverse members 154 and 156, respectively, to support or guide the stack of articles at the front and back, and uprights 162 carried by longitudinally and angularly adjustable arms 164 extending from the opposite ends of the members 156 are provided to support the opposite sides of the stack. The fixed member 156, as in the first described embodiment, is raised from the table 148 over a substantial central portion thereof to define a space or passageway 166 (Fig. 6) through which the flattened articles may be individually fed, and carries a series of transversely spaced abutment screws 168 threadedly extending into the space 166 for adjustably restricting the vertical dimension of the latter.

In the embodiment now being described, the member 154 is also raised from the table 148 to define a space or passageway 170 through which may pass a reciprocatable pusher plate 172 slidable on the feeding table. The pusher plate 172 is removably attached by flush fastening member 174 to a support block 176 which extends through a suitable longitudinal slot 178 formed in the table 148. Pusher plates of different thicknesses may be provided and conveniently replaced one by the other on the block 176 to accommodate the machine for the feeding of flattened articles of different thicknesses. As the pusher plate 172 moves through the space 170 toward the marking station, the leading edge of the plate engages the trailing edge of the bottom article in the stack (not shown) held by the magazine 152 to push the bottom article out from under the stack and to the marking station. The plate 172 is dimensioned in plan so that a substantial portion thereof will remain under the stack when the plate has reached the limit of its movement toward the marking station.

The plate 172 is longitudinally reciprocated by an arrangement which includes a rotated shaft 180 journalled below the table 148 in suitable bearing hangars and having a crankwheel 182 fixed thereon and formed with a series of radially spaced openings 184. A connecting rod 186 is pivotally connected at one end of the support block 176 and at its other end is removably attached to the crank-wheel 182 by a suitable fastening member 188 extending through a selected one of the

openings 184 so that the length of the stroke of the pusher plate 172 may be conveniently varied for feeding flattened articles of different longitudinal dimensions.

In the marking machine 146, the marking device 190, which is merely illustrative, also applies an inked or indented mark to the fed articles, but the feeding mechanism included in this machine is not limited to association with the particular marking device that I have illustrated. The marking device 190 includes an impression or backing roller 192, journalled below the table 148 in eccentric bearing sleeves 194 (Fig. 8) rotatably carried by the supporting structure 150, and extending through a suitable opening 196 in the feeding table. A die wheel 198 is fixed on a shaft 200 which is journalled at its opposite ends in an upwardly extending section 202 of the supporting structure for line contact with the backing roller 192, and a hand-wheel 204 is fixed on an end portion of the shaft 200 to provide for the manual actuation of the die wheel 198. The eccentric bearing sleeves 194 supporting the backing roller 192 provide for the adjustment of the contact pressure between that roller and the die wheel 198. In order to synchronously rotate the die wheel and backing roller, meshing gears 206 and 208 are respectively fixed on the shafts thereof. A driving arrangement is provided (Fig. 9) for rotating the shaft 180 of the crank-wheel 182 in fixed relation to the rotation of the backing roller and die wheel. This driving arrangement includes an idler shaft 210 rotatably carried by the supporting structure 150 and having two spur gears 212 and 214 fixed thereon to respectively mesh with a gear 216 on the shaft of the backing roller 192 and with a gear 218 on the crank-wheel shaft 180. The gears 212, 214, 216 and 218 are preferably proportioned so that the peripheral speeds of the die wheel and backing roller are greater than the linear speed of the plate 172, when the latter has reached a point in its stroke toward the marking station at which the leading edge of the fed article engages between the die wheel and backing roller so that the latter are then operative to move the fed article away from the pusher plate.

Ink is applied to the marking or printing element on the die wheel 198 by an ink transfer roller 220 on a shaft 222 which is journalled above the shaft 200 by suitable eccentric bearing sleeves (not shown) carried by the section 202 of the supporting structure so that the contact pressure between the wheel 198 and transfer roller 220 may be varied to control the thickness of the ink layer deposited on the printing element. Finally, an ink fountain roller 224, of conventional design, is journalled in a swingable frame 226 which is urged by a torsion spring 228 in the direction moving the ink fountain roller against the ink transfer roller 220 to apply ink to the surface of the latter.

While several specific embodiments of the present invention have been illustrated and described in detail, it is to be understood that the invention is not limited to these specific embodiments, and that numerous changes and modifications, obvious to one skilled in the art, may be made therein without departing from the scope or spirit of the invention.

What is claimed is:

1. A feeding mechanism comprising a feeding table, a magazine on said feeding table for holding a stack of flattened articles with at least the articles in the lower portion of the stack being stepped longitudinally, said magazine including a first transverse member on said feeding table at the side of the stack of articles toward which the latter are stepped, said transverse member being raised from said feeding table over a substantial central portion thereof to define a passage through which the articles may be successively fed, vertically adjustable members carried by said transverse member at transversely spaced locations on the latter and extending into said passage from above to adjustably restrict the vertical dimension of the latter so that only one article at a time may pass through said passage, a second transverse member on said feeding table, means for guiding said second transverse member in movement longitudinally of said feeding table and for holding said second transverse member in a selected position spaced from the first mentioned transverse member, said transverse members being formed with confronting faces inclined downwardly in the direction from said second transverse member toward said first transverse member, transversely spaced uprights extending from each of said transverse members and in facial alignment with the upper edge of the inclined face of the related transverse member for longitudinally supporting a stack of articles arranged therebetween, angularly and longitudinally movable support arms carried by said first transverse member adjacent the opposite ends of the latter, uprights extending from the free ends of said support arms for laterally supporting a stack of articles arranged therebetween, and pushing means moving longitudinally across said feeding table in the direction through said magazine toward said first transverse member for engaging the lowermost article in said magazine and pushing the engaged article out from under the remainder of the stack and through said passage.

2. A feeding mechanism according to claim 1; wherein said feeding table is formed with a plurality of transversely spaced longitudinal slots, and said pushing means includes continuous chains supported below said table to provide upper runs extending along said longitudinal slots, at least one pushing element on each of said chains formed to project upwardly through the related slot during movement along the upper run, vertically movable guide means supporting the upper run of each of said chains for adjusting the distance said pushing elements extend above said table, and means for driving said chains so that the upper runs thereof move in said direction.

3. A feeding mechanism according to claim 2; wherein each of said pushing elements includes a pair of pushing members extending from the related chain at the opposite sides of the latter and formed at their outer ends with oppositely directed flanges adapted to overlie said feeding table at the sides of the related longitudinal slot during movement of said pushing element along said upper run of its supporting chain.

4. A feeding mechanism according to claim 3; including a longitudinal spring member supported over each of said longitudinal slots and having straight portions of substantial length extending parallel to said table from said first mentioned transverse member in the direction away from said second transverse member for holding the successively fed articles flat on said table after the articles have been pushed out of said magazine.

5. A feeding mechanism according to claim 1; wherein said pushing means includes a pushing plate reciprocatable longitudinally on said table, and means for reciprocating said plate, said plate being dimensioned in the longitudinal direction so that a substantial portion thereof remains within said magazine when said plate reaches the limit of its movement in the article feeding direction.

6. A feeding mechanism according to claim 5; wherein said table is formed with a longitudinal slot, and said means for reciprocating said plate includes a support block reciprocatable along said longitudinal slot, means for removably attaching said plate to said support block, a crank-wheel rotatably mounted below said table and formed with a series of radially spaced attaching openings, means for rotating said crank-wheel, a connecting rod pivotally connected at one end to said support block, and means at the other end of said connecting rod removably engageable in a selected one of said series of attaching openings in said crank-wheel for pivotally connecting the latter to said connecting rod so that the length of stroke of said plate may be varied.

7. A feeding mechanism comprising a feeding table having a plurality of transversely spaced longitudinal slots,

a magazine on said feeding table for holding a stack of flattened articles with at least the articles in the lower portion of the stack being stepped longitudinally, said magazine including a transverse member on said feeding table at the side of the stack of articles toward which the latter are stepped, said transverse member being raised from said feeding table over a substantial central portion thereof to define a passage through which the articles may be successively fed, vertically adjustable members carried by said transverse member and extending into said passage from above to adjustably restrict the vertical dimension of the latter so that only one article at a time may pass through said passage, continuous chains supported below said table to provide upper runs extending along said longitudinal slots, at least one pushing element on each of said chains formed to project upwardly through the related slot during movement along the upper run, vertically adjustable guide means supporting the upper run of

each of said chains for varying the distance said pushing elements extend above said table, and means for driving said chains so that the upper runs thereof move in the direction through said magazine toward said transverse member and the pushing elements engage the lowermost article of the stack and push the engaged article out from under the remainder of the stack and through said passage.

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