United States Patent [19]

Styers et al.

[11] **3,867,883**

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[54] **STRIP LABEL PRINTER**

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[52] **U.S. Cl.** **101/125,** 101/291, 101/333

[51] **Int. Cl.** **B41l 13/02,** B41l 27/26

[58] **Field of Search** 101/98, 69, 67, 68, 66, 101/288, 291, 292, 125, 122, 115, 301, 333; 226/67; 74/47

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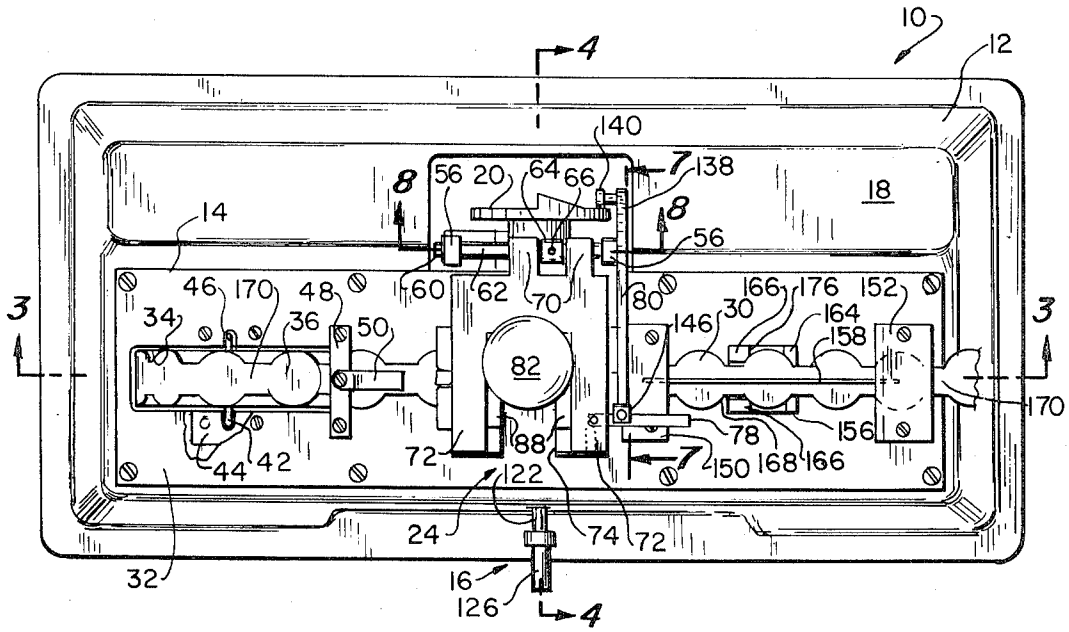
Assistant Examiner—Paul J. Hirsch
Attorney, Agent, or Firm—Edwards, Spangler, Wymore & Klaas

[57] **ABSTRACT**

This invention relates to a machine for printing a series of adhesive-backed labels joined together to form a continuous chain by relatively narrower disposable link-forming members formed integral therewith. The unit is characterized by a supply reel from which the label chain is drawn in intermittent fashion beneath a synchronized printing head by a reciprocating shuttle that has upstanding fingers which bridge the neck of the chain and successively engage the trailing edge of each label so as to push it forward along with the rest of the chain trailing therebehind. The head is pivotally mounted alongside the chain for rockable movement between a retracted inoperative position and an extended one in indicia forming engagement therewith. A common drive shaft turns a crank that reciprocates the shuttle and, at the same time, rotates a head-rocking cam wheel that activates the head during the return stroke of the shuttle.

15 Claims, 9 Drawing Figures



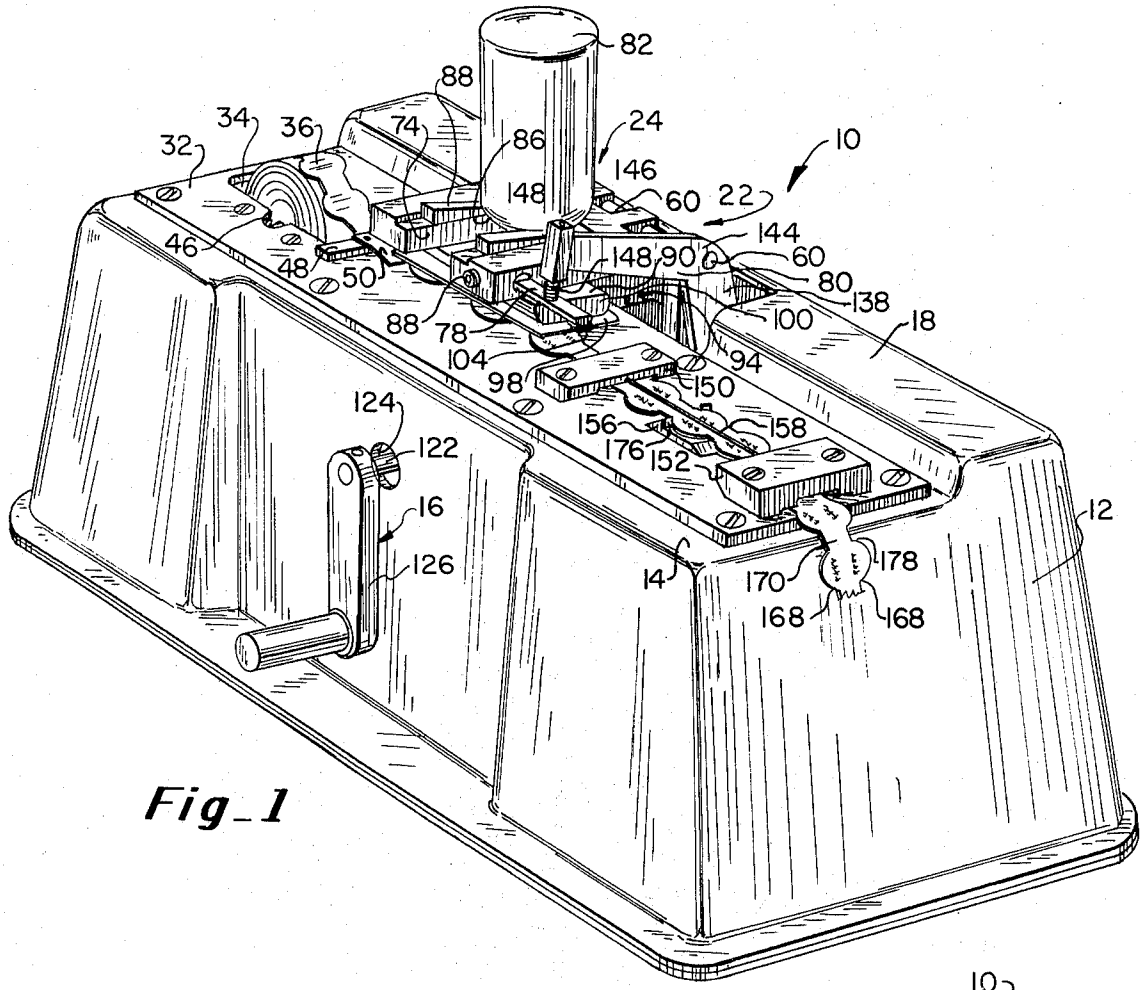

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Fig_1

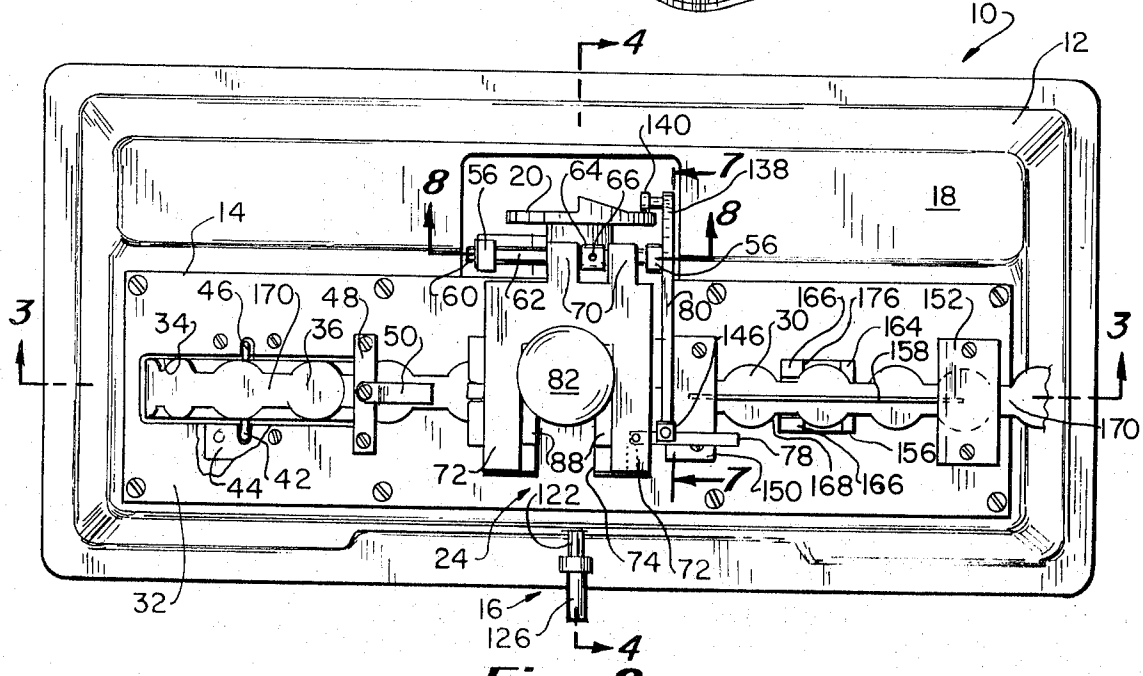
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Fig_2

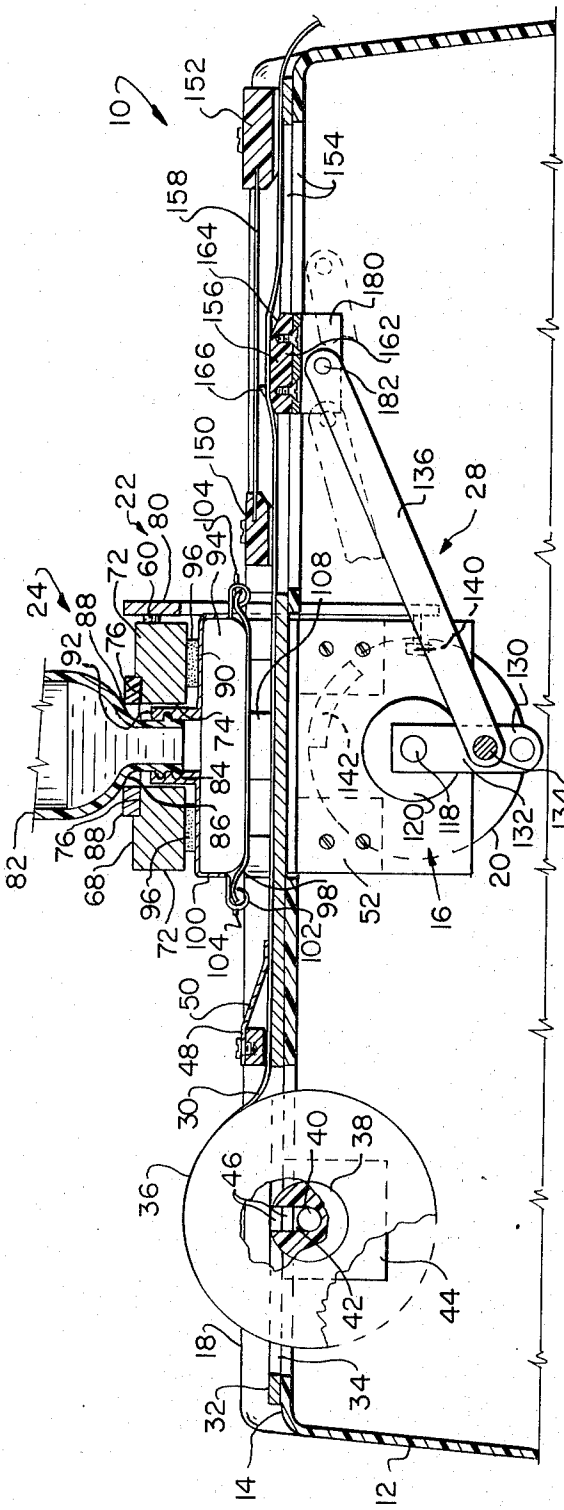

Fig_3

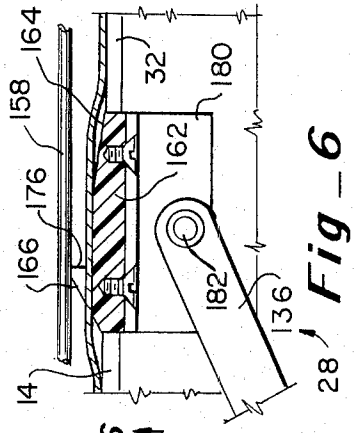

Fig_6

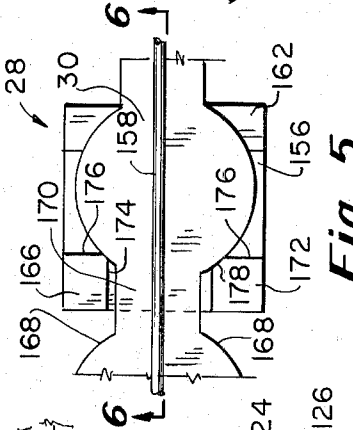

Fig_5

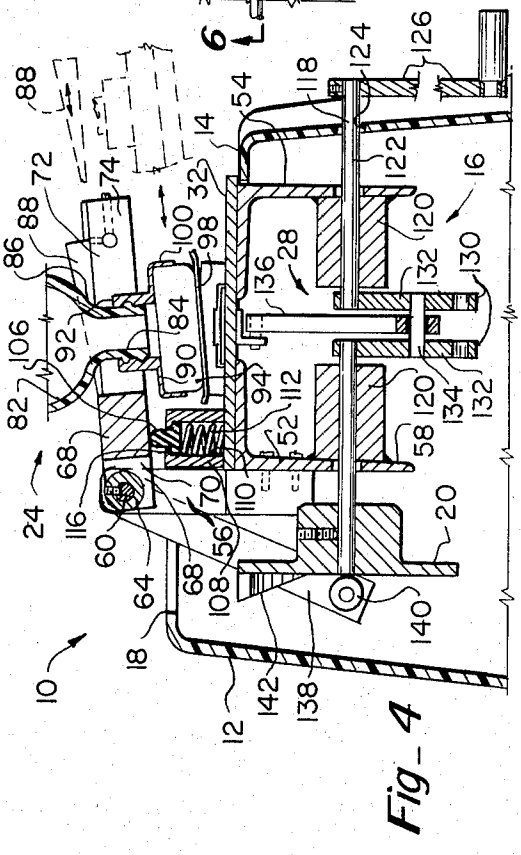

Fig_4

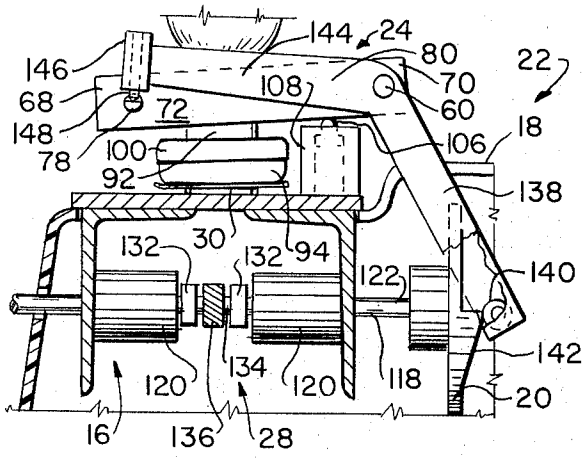

Fig_7

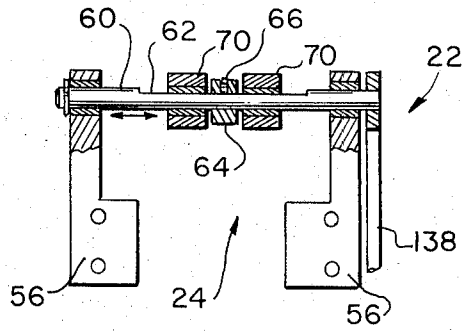

Fig_8

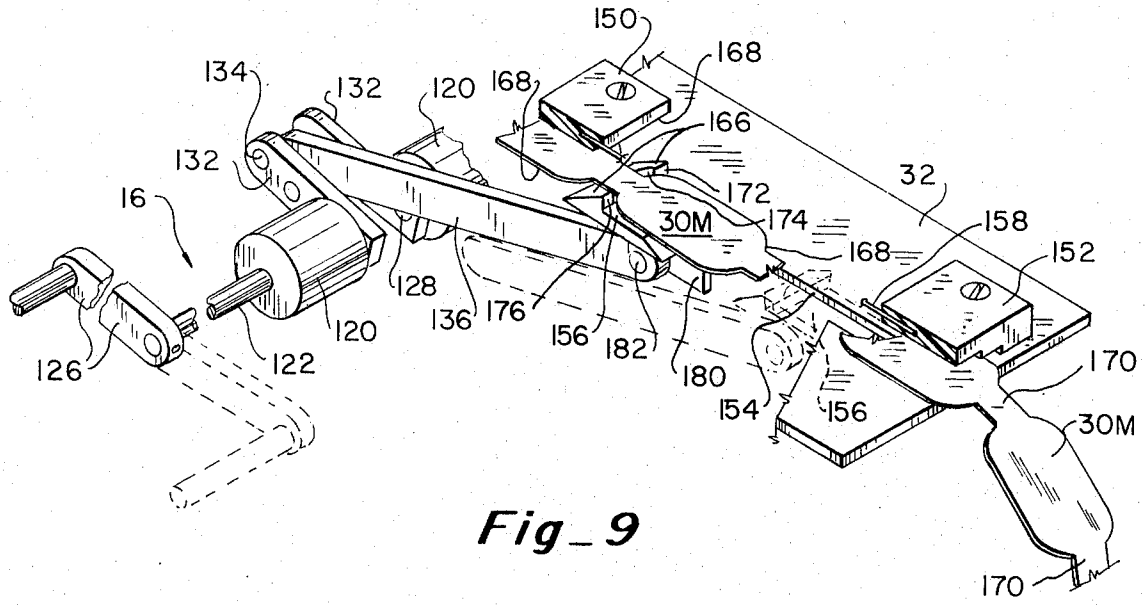

Fig_9

STRIP LABEL PRINTER

Printing processes capable of printing gummed labels are quite common in the prior art, however, most of them aree suitable only for large scale commercial operations. One well known type, for example, requires the use of a metal printing plate and that the labels be fed onto the platen one-at-a-time. Another uses a special indicia-carrying roller that both prints and feeds the label chain at the same time. These and other processes require special equipment and skills to make the unit that transfers the printed impression to the label which are far beyond the scope of a person untrained in the printing arts.

There remains, however, a need for a simple label-printing machine that will utilize a typed stencil and will transfer the information threon to a chain of labels quickly and at minimal cost by persons having no special skills applicable to such an operation. A good example of a place where such a lable-printing machine would fill a widespread need is in a hospital where unit-dosage cups containing various types of medication are distributed to the patients on a recurrent basis.

It is, therefore, the principal object of the present invention to provide a novel printing machine especially suited for use in placing printed indicia on a chain of labels joined together by relatively narrower integrally formed connecting portions.

A second objective of the within-described invention is to provide a label-printing apparatus that utilizes a simple typed stencil as the information transfer medium.

Another object of the invention forming the subject matter thereof is to provide a unit of the class described wherein a common drive mechanism both advances the label strip and actuates the printing head in synchronous fashion.

Still another objective is the provision of a label printer that will accommodate labels of two different lengths and various shapes of each length.

An additional object of the invention herein disclosed and claimed is to provide a label-printing apparatus that requires no special skills or auxiliary equipment other than an ordinary typewriter.

Further objects are to provide a device of the type aforementioned that is compact, portable, versatile, simple to operate, inexpensive, easy to service, rugged and even decorative in appearance.

Other objects will be in part apparent and in part pointed out specifically hereinafter in connection with the description of the drawings that follows, and in which:

FIG. **1** is a perspective view of the label printing machine as seen from a point above the right front corner thereof;

FIG. **2** is a top plan view of the unit to a slightly smaller scale;

FIG. **3** is a longitudinal section to an enlarged scale taken along line **3—3** of FIG. **2,** portions of the base having been broken away to conserve space;

FIG. **4** is a fragmentary transverse section taken along line **4—4** of FIG. **2** and to the same scale as FIG. **3**;

FIG. **5** is a further enlarged fragmentary detail showing the manner in which the shuttle engages the label chain and advances the same incrementally;

FIG. **6** is a fragmentary section taken along line **6—6** of FIG. **5**;

FIG. **7** is a fragmentary section taken along line **7—7** of FIG. **2,** but greatly enlarged showing the drive shaft and associated cam disc and rocker arm that actuate the printing head;

FIG. **8** is a fragmentary view taken along line **8—8** of FIG. **2** and to the same scale as FIG. **7,** portions of which have been broken away and shown in section; and,

FIG. **9** is a fragmentary perspective view in somewhat diagrammatic form looking down and to the left upon the drive mechanism and shuttle subassembly operatively associated therewith as these elements would be used to feed a chain of long labels.

Referring next to the drawings for a detailed description of the present invention and, initially, to FIGS. **1** and **2** for this purpose, reference numeral **10** has been chosen to broadly represent the strip-label printing machine forming the subject matter hereof which will be seen to include a base **12** that defines a support for several operative subassemblies associated therewith. In the particular form shown, base **12** comprises a molded open-bottomed shell having a long flat more or less horizontally disposed supporting surface **14** extending along the top thereof and beneath which is housed the drive mechanism that has been indicated in a general way by numeral **16.** A raised ledge **18** has been shown extending along the rear marginal edge of the supporting surface **14,** the sole purpose of which is to provide clearance for the cam disc **20** (see FIG. **7**) that forms a part of the head-rocking subassembly that has been indicated in a general way by reference numeral **22.** The latter subassembly is operatively connected to the drive mechanism **16** and defines the link by means of which the printing head referred to broadly by reference numeral **24** is rocked up and down between its retracted inoperative position shown in FIGS. **1, 2** and **4** and the extended operative one revealed in FIGS. **3** and **7.** Another of the important subassemblies operatively linked to drive mechanism **16** is the shuttle subassembly that has similarly been designated in a general way by reference numeral **28** which functions upon actuation of the latter to advance the label chain **30** in incremental fashion.

continuing with reference to FIGS. **1** and **2** and also referring to FIG. **3,** it can be seen that the lower level of supporting surface **14** is overlaid with a metal plate **32** which defines a somewhat more rigid and flatter working area. Near the head or upstream end of the unit, plate **32** and the horizontal surface **14** of the base **12** therebeneath are provided with registering slots **34** extending longitudinally thereof that receive a roll **36** of the labels **30.** This roll of labels is loosely mounted on a hub-forming spool **38** that has a stubshaft **40** in the center thereof, the projecting ends of which drop into a pair of vertically extending transversely aligned slots **42** milled in the opposed faces of support blocks **44** that are suspended from the underside of the plate **32** alongside the slot **34** therein, all of which is most clearly revealed in FIGS. **2** and **3.** Registering slots **46** in the plate and underlying surface **14** of the base allow the spool to be removed and placed in the open center of a roll of labels.

Immediately downstream of slot **34** is fastened a tunnel-forming guide mmber **48** through which the label chain passes and is held down against the surface of

plate 32 by spring clip 50 depending therefrom. As the chain-forming strip of labels leaves spring 50 it passes into the printing area where the desired indicia is placed thereon.

Referring next to FIGS. 1–4, 7 and 8, the printing head 24 will be seen to lie at approximately the center of the base between the storage reel and the shuttle subassembly 28. The central area of the supporting surface 14 of the base is cut away to expose the undersides of plate 32 to which is attached a pair of angle iron brackets 52 and 54 that are most clearly revealed in FIGS. 4 and 7. A pair of upright posts 56 are fastened in longitudinally spaced parallel relation to the vertically disposed flange 58 of rear bracket 52. These posts project well above the level of even raised ledge 18 on top of the base where they journal shaft 60 for independent relative rotational movement. Intermediate the ends of this shaft, a flat 62 is milled that extends a substantial distance therealong as shown most clearly in FIGS. 2 and 8. A shaft collar 64 is adjustably fastened to shaft 62 with its set screw 66 bearing against the flat as seen in FIG. 8.

A rocking frame 68 has a pair of rearwardly projecting tongues 70 that are journaled on shaft 62 for independent rotational movement relative thereto in bracketing relation to the collar 64. This collar, therefore, cooperates with the aforementioned tongues to adjust the frame longitudinally so that the printed indicia to be placed on the face of the label can be centered with respect to the ends of the latter as indicated by the double-ended arrow in FIG. 8.

This same frame 68 has a pair of forwardly extending arms 72 coopeating to define a slot 74 therebetween. The marginal areas of the frame bordering this slot are recessed to produce parallel tracks 76 shown most clearly in FIG. 2. An elongate ear 78 projects longitudinally from one of the arms and defines a foot against which the rocker arm 80 of the head-rocking subassembly 22 acts.

An ink bottle 82 has the neck 84 thereof extending down through slot 74 with the annular shoulder 86 separating the neck from its body resting atop a pair of wedges 88 that slide along the tracks as shown most clearly in FIG. 1. Screwed onto the neck of the ink bottle is a combination stencil and ink pad frame 90 which includes an upstanding internally threaded collar 92 that screws onto the neck of the bottle and defines the conduit by which ink is transferred from the latter to pad 94. The slot 74 in rocking frame 68 is wide enough to accommodate the collar of the pad and stencil frame. In the particular form shown, a pair of resilient cushions 96 (FIG. 3) are mounted atop the pad frame 90 alongside the collar thereof in position to bear against the underside of the rocking frame 68. By removing the wedges 88, the subassembly which includes the ink bottle, pad and stencil frame, ink pad and stencil 98 can be adjusted from front to rear as a unit for proper registry of the printed material between the side margins of the label. Once adjusted, the wedges 88 can be reinserted so as to bear tightly against shoulder 86 of the bottle raising cushions 96 up into tight contact with the underside of the rocking frame.

The pad and stencil frame has a downturned skirt 100 bordering same that receives and holds the ink pad 94. Integrally formed downturned hooks 102 project from opposite ends of the skirt and hook into corresponding notches 104 in the ends of the stencil. These interlocking hooks and notches cooperate with one another to hold the stencil 98 snugly up against the underside of pad 94 where the ink is readily transferred thereto whenever an impression is made.

Now, with specific reference to FIGS. 4 and 7, it will be seen that the printing head 24 is normally biased into the retracted inoperative position shown by a spring-pressed ball detent 106 bearing against the underside of the rocking frame 68 ahead of its axis of rockable movement. A block 108 is fastened to the top of plate 32 underneath a portion of the rocking frame. The block has a spring socket 110 in the bottom thereof that houses a compression spring 112 that biases the detent upwardly to a point where the annular flange 114 at the base thereof contacts shoulder 116 in the block.

The drive mechanism 16 is most clearly revealed in FIGS. 3, 4, 7 and 9 to which detailed reference will now be made. A crankshaft 118 is journalled for rotation within collars 120 welded to the opposed faces of the downturned flanges 58 of angle iron brackets 52 and 54. The front section 122 of the crankshaft projects through an opening 124 in the skirt bordering the base 12 where a hand crank 126 is attached thereto for turning same. The rear section 128 of the crankshaft carries the cam disc 20 as shown. The adjacent ends of front and rear sections 122 and 128 of the crankshaft are joined together by double cranks 130 located between the journals 120. The webs 132 of each crank have one end fixedly attached in the usual manner to one of the aligned shaft sections while a pin 134 connects the opposite ends thereof together for conjoint rotation. Link 136 pivotally attached to pin 134 completes the operative connection between the drive means 16 and the shuttle subassembly 28, the overall functional result being one of converting rotary motion to reciprocating motion in the well known manner. Before getting into the construction of the shuttle subassembly, however, it would be wise to first consider the details of the head-rocking subassembly 22 which can best be done in connection with FIGS. 1, 2, 4, 7 and 8 to which reference will now be made.

Rocker arm 80 is, in actuality, a bell crank that is mounted on the end of shaft 60 in the conventional manner for conjoint movement therewith. The downturned leg 138 of the bell crank thus formed carries a cam follower 140 on the lower extremity thereof. This cam follower rolls along the peripheral edge of cam wheel 20 from which projects the generally wedge-shaped inclined cam 142. As the follower rolls up the inclined face of this cam, it rocks the horizontally disposed leg 144 downwardly against ear 78 which, in turn, depresses the printing hed into the operative or activated position shown in FIG. 7. Note also that only a single cam is used and by far the greater length of the path along the marginal area of the cam wheel traversed by the cam follower is planar. This planar surface leaves the printing head in its elevated or retracted inoperative position during the interval in which the shuttle subassembly advances the label strip.

In the particular form shown, the front end of the horizontal leg 144 of rocker arm 80 carries a foot member 146 into which a vertically adjustable tip 148 is threaded. By raising and lowering tip 148, the printing pressure can be adjusted to that which produces the best impression.

Directing the attention next to FIGS. **1, 2, 3** and **9**, it will be seen that as the label strip leaves the printing section, it passes beneath a pair of longitudinally spaced tunnel-forming guide members **150** and **152** that maintain it in proper position over registering slots **154** in plate **32** and surface **14** of the base within which the shuttle **156** reciprocates. A wire element **158** extends longitudinally between the tunnel-forming members above slot **154** and performs the function of insuring that the label strip does not buckle upwardly to a level where the shuttle **156** can move back and forth therebeneath without engaging same.

In FIGS. **1, 2, 3, 5, 6** and **9**, to which reference will now be made, it can be seen that the shuttle itself comprises a slide block **160** having an elongate tongue **162** on the undersurface thereof which rides within the track formed by slot **154.** The leading edge of the slide block is chamfered as indicated at **164** to pass smoothly underneath the label strip. The trailing edge of the shuttle, on the other hand, is more steeply inclined in order to produce a pair of rearwardly sloping cam surfaces **166** positioned to engage the leading corners **168** of each label and lifts same during the return stroke so as to pass freely therebeneath. These corners of the label **30** joined the integrally formed relatively narrower connecting portions **170** that link them together into a chain in the manner shown most clearly in FIG. **5.**

The rearwardly inclined cam surfaces **166** continue on up the backside of a pair of transversely spaced upstanding ears **172.** The notch **174** left between these ears is of a width adapted to receive the connecting portions **170** linking the labels together while the forwardly facing shoulders **176** defined thereby engage each label by its trailing corners **178** and push it forward during the power stroke of the shuttle.

FIGS. **3** and **6** reveal the fact that the shuttle **156** has an angle iron bracket **180** attached to the underside of the tongue **162** depending from the slide. The vertical flange of this angle iron bracket carries the pivot pin **182** that connects the front end of link **136** operatively thereto.

FIGS. **3** and **9** show the link **136** having alternative points of attachment to the double cranks **130** achieved by placing pin **134** at different distances from the axis of crankshaft rotation. Obviously, this arrangement give the shuttle either a short or a long throw to accommodate labels of different lengths, those shown in FIGS. **1, 2** and **5** requiring the short throw while the modified form **30M** illustrated in FIG. **9** requires the long throw.

Finally, in FIG. **3** it will be seen that upon clockwise rotation of the crankshaft, the shuttle will be drawn to the left on its return stroke when the cam follower **140** rides up on cam **142** to actuate the printing head. During this return stroke of the shuttle, the label strip "dwells" in stationary position while the one under the stencil is receiving the indicia to be placed thereon. Then, as soon as the cam follower drops off the end of the cam in the cam disc, the spring detent will raise the head out of the way well in advance of the commencement of the power stroke of the shuttle and leave it there until the strip has advanced a new label into position to be printed.

What is claimed is:

1. The printing press for imprinting a plurality of labels joined together to form a chain by relatively narrower connecting portions which comprises: a base defining an upwardly facing supporting surface; a printing head adapted to carry an indicia transfer medium on the undersidde thereof mounted for rockable movement about an axis paralleling the supporting surface between an extended operative position in face-to-face contact with the latter and a retracted inoperative position raised thereabove; strip storage means located at one side of the printing head adapted to hold a supply of the labels in strip form; strip-advancing means carried by the base on the opposite side of the printing head from the strip storage means, said strip-advancing means including a shuttle mounted for reciprocal movement between an extended and a retracted position underneath the label strip as it leaves the printing head, said shuttle having a pair of transversely-spaced upstanding projections positioned and adapted to engage the trailing corners of each label alongside the connecting portion and advance same upon movement thereof from retracted into extended position; and, drive means connected to the printing head and strip-advancing means operative upon actuation to alternately shift the printing head and strip advancing means between their extended and retracted positions, said drive means including a rotatable drive shaft, cam-carrying means and crank-forming means mounted on said drive shaft for conjoint rotation therewith, link means interconnecting said crank-forming means and shuttle operative upon rotation of the shaft to reciprocate the latter, means comprising a bell crank mounted for independent rockable movement about said axis intermediate its ends interconnecting the cam-carrying disc and printing head, said bell crank being operative in rsponse to rotation of said cam-carrying disc to intermittently advance said printing head into its extended operative position whenever said strip-advancing means is retracting the shuttle; and, yieldable biasing means normally urging said printing head into retracted position while cooperating therewith to hold said bell crank against the cam-carrying disc.

2. The strip label printing press as set forth in claim **1** in which: biasing means are interposed between the base and printing head normally biasing the latter into retracted position.

3. The strip label printing press as set forth in claim **1** in which: a manually adjustable foot is carried on the end of the bell crank that engages the printing head, said foot being adapted upon actuation to vary the pressure exerted upon the labels in the label strip while printing same.

4. The strip label printing press as set forth in claim **1** in which; the crank-forming means of the drive means includes alternative points of attachment for the link means located at different distances from the axis of drive shaft rotation, said crank-forming means and link means cooperating with one another and with the shuttle to vary the length of travel thereof so as to accommodate labels of different lengths.

5. The strip label printing press as set forth in claim **1** in which: the leading edge of the shuttle is chamfered to pass beneath and lift the trailing corners of each label into the path of the upstanding projections following therebehind during the forward stroke thereof.

6. The strip label printing press as set forth in claim **1** in which: the upstanding projections on the shuttle include sloping cam surfaces positioned to engage and lift the leading corners of each label alongside the con-

necting portion during the return stroke of the latter.

7. The strip label printing press as set forth in claim **6** in which: the leading edge of the shuttle is chamfered to pass beneath and lift the trailing corners of each label into the path of the upstanding projections following therebehind during the forward stroke thereof.

8. The strip label printing press as set forth in claim **1** in which: a shaft is mounted atop the base in spaced parallel relation to the surface thereof and to the direction of shuttle movement; and, in which the printing head is mounted on said shaft for both longitudinal adjustment therealong and rockable movement relative to the supporting surface.

9. The strip label printing press as set forth in claim **8** in which: the bell crank is mounted on the same shaft as the printing head; and, in which at least one of said bell crank and printing head elements is mounted on said shaft for independent rotation relative therto.

10. The strip label printing press as set forth in claim **9** in which: the printing head is freely rotatable on the shaft and the bell crank is fastened thereto for conjoint rotation.

11. The strip label printing press as set forth in claim **1** in which: the printing head includes a frame having an opening therethrough, an ink reservoir having a narrow neck sized to fit within the opening in the frame, an ink pad adapted to receive ink from the ink reservoir attached to the latter in inverted position through the opening in the frame, and fastener means carried by the ink pad positioned and adapted to detachably retain a stencil against the inked surface thereof.

12. The strip label printing press as set forth in claim **11** in which: the opening in the frame is transversely elongate so as to permit the subassembly which includes the ink reservoir, ink pad, stencil and fastening means for the latter to be adjusted laterally across the label strip.

13. The strip label printing press as set forth in claim **12** in which: ink reservoir and ink pad in assembled relation cooperate to define a pair of oppositely facing notches alongside the neck sized to slidably receive the portions of the frame bordering the sides of the elongate opening therein; the upper surface of the frame bordering the sides of the elongate opening is cut away to define a pair of recessed tracks; and, in which a pair of wedge-shaped fasteners are mounted for slideable movement in said tracks, said fasteners being shaped and adapted to engage the ink reservoir alongside the neck and raise same up to a position where the ink pad contacts the underside of the frame so as to maintain the adjusted position of the printing head relative to the label strip.

14. The strip label printing press as set forth in claim **1** in which: tunnel-forming guide means are fastened to the base adjacent the extremities of shuttle excursion, said guide means being adapted to freely pass the label strip therethrough while holding same in position for engagement by the strip-advancing means.

15. The strip label printing press as set forth in claim **14** in which: strip-retention means bridge the gap between the tunnel-forming guide means above the strip-advancing means, said retention means being located and adapted to hold the label strip in position to be advanced by the shuttle.

* * * * *