Oct. 16, 1962 C. PETERSON 3,058,641

ROLL FEED MECHANISM

Filed July 5, 1960

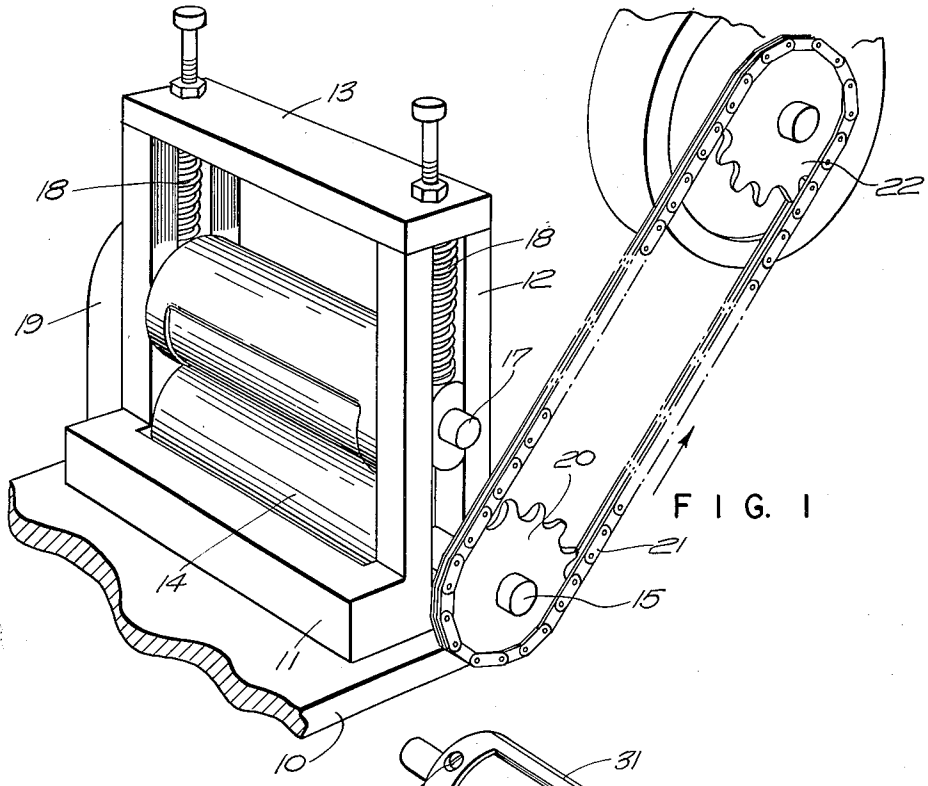


FIG. 1

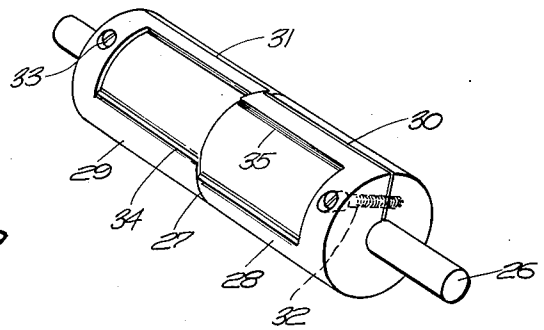


FIG. 3

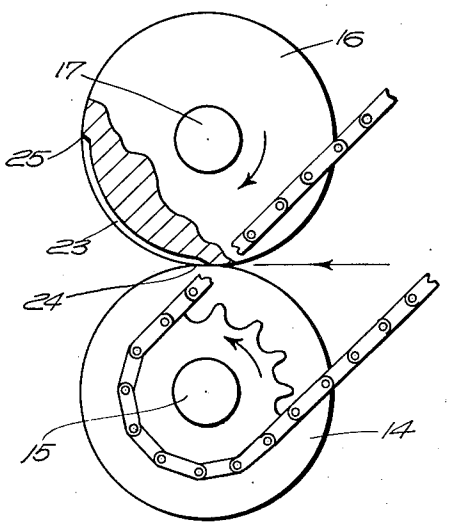


FIG. 2

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United States Patent Office 3,058,641 Patented Oct. 16, 1962

3,058,641

ROLL FEED MECHANISM

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Filed July 5, 1960, Ser. No. 40,875
4 Claims. (Cl. 226—140)

My present invention relates to feed mechanisms for stamping presses and similar machines and more particularly to a simplified feed mechanism designed for a fixed feeding increment.

The principal object of the present invention is to provide a roll feed mechanism which eliminates many moving parts and permits the feeding of stock at high speed with great accuracy.

Another object of the present invention is to provide a roll feed mechanism synchronous to the stamping die for each particular job.

A further object of the present invention is to provide a roll feed mechanism which is simple in construction and easy and economical to assemble.

A further object of the present invention is to provide a high speed roll feed mechanism which eliminates the need for brakes.

With the above and other objects and advantageous features in view my invention consists of a novel arrangement of parts more fully disclosed in the detailed description following in conjunction with the accompanying drawings and more particularly defined in the appended claims.

In the drawings,

FIG. 1 is a perspective view of a roll feed mechanism embodying my invention.

FIG. 2 is a side elevation of the feed roll partly in section.

FIG. 3 is a perspective view of a modified form of feed roll.

Stock is usually fed to a stamping press or similar device by a pair of vertically mounted rollers geared to each other with the bottom roller being driven intermittently. An indexing mechanism is mounted at the end of the shaft of the bottom roller and driven by an arm eccentrically mounted on the fly wheel of the press. The indexing mechanism drive is adjustable for the length of the feed for each job. Recent developments in press manufacture have produced presses which operate in the range of a thousand or more revolutions per minute. Such high speeds place a great deal of strain on the moving parts. The applicant has found that many jobs require a great deal of work from particular dies. The present invention is therefore designed to eliminate the indexing and eccentric drive mechanism and to design the roller feed itself to the particular job, making it interchangeable with the die. This also eliminates a great deal of time now consumed in setting up the press.

Referring more in detail to the drawings, the mechanism is mounted on the press 10 and comprises the conventional roll feed frame. This consists of a heavy base 11 having spaced vertical slotted supports 12 surmounted by a horizontal cover member 13. As in the conventional mechanisms, a bottom roller 14 is mounted on a shaft 15 which extends through the slotted portions of the members 12. Mounted above the roller 14 is a second roller 16 mounted on a shaft 17 which also extends into the slotted portions of the members 12. A heavy adjustable spring 18 is positioned in each slotted portion above the bearing of the upper roller 16 to adjustably force the upper roller 16 against the lower roller 14. At one end the shafts 15 and 17 are connected by gears in a gear box 19.

With the above construction the material is fed between

the rollers 14 and 16. In the conventional drive mechanisms an indexing or friction feed device is mounted at the end in the shaft 15 for providing an intermittent feed. However, in accordance with the present invention the shaft 15 is driven through a sprocket wheel 20 and sprocket chain 21 which extends to a sprocket wheel 22 mounted in the center of the press drive shaft. The sprocket wheels 20 and 22 are of the same size so that there is a 1–1 ratio between them. With this construction each revolution of the press drive shaft produces one stroke of the press and also produces one revolution of the rollers 14 and 16.

Since the rollers 14 and 16 are now hooked directly to the press drive they will not operate intermittently but will produce a constant speed rotation with the press drive. The intermittent feed of the stock is provided by constructing the upper roller 16 as shown in FIGS. 1 and 2. The roller 16 is milled out at 23 to a depth of approximately twice the thickness of the stock being fed. The longitudinal width of the milled out portion 23, parallel to the axis of the roller 16, is greater than the width of the stock being fed. The arcuate length of the milled out portion 23 around the perimeter of the roller 16 is governed by the length of stock fed under the die on each stroke. For example, viewing FIG. 2, the directions of rotation of the rollers 14 and 16 are such that the stock will be moved from right to left. In FIG. 2 the rollers 14 and 16 are positioned at a point 24 where the roller 16 is unmilled. Further rotation of the rollers will therefore produce a positive stock feed until the point 25 is reached. At this point the milled portion 23 releases the pressure on the stock and there is no further stock feed until the point 24 again engages the stock. Therefore, viewing FIG. 2 the length of the feed is equivalent to the circumferential measurement of the unmilled portion.

At high speeds there will be a certain amount of inertia in the stock. It will therefore be necessary to test the roller 16 and to increase the length of the unmilled area 23 to compensate for the inertia. Also, to prevent marking of the stock, the line between the milled and unmilled portions at the point 24 should be gradual and rounded whereas the line at the point 25 may be an abrupt drop. With this construction the roller 16 is thus constructed to produce a fixed length of feed for a particular die. Similar rollers can be constructed for each die. Thus when the work is completed and the die is removed, the roller 16 is removed with it. In setting up the job the die and its roller 16 are inserted together and no further adjustment is necessary to produce the proper feed. For synchronizing the roller feed with the die the sprockets 20 or 22 may be loosened and turned.

The above construction has one other great advantage. With the conventional lever arm the stock feed is limited to a maximum rotation of 180 degrees of rotation of the rollers. With the present construction the maximum feed is only limited by the width of the milled portion 23. This can be made short enough to permit the point 24 to start feeding as soon as the die punches clear the stock on their upward stroke. A greatly increased stock feed can thus be effected without increasing the diameter of the feed rolls. This construction also permits high speed operation without strain since eccentric and intermittent movements are eliminated.

In producing the roller 16 the width of the milled portion 23 is critical for great accuracy. It will have to be tested, removed, milled again and retested until it is accurate. To avoid this, the roller 16 may be made adjustable as shown in FIG. 3. In this form the adjustable roller is mounted on a shaft 26 which is equivalent to the shaft 17. The roller is split in two at 27 at right angles to the shaft 26. Each split portion 28

and 29 is then split radially at 30 and 31. A screw 32 extends into the portion 28 adjacent one end, bridging the split portion 30. A similar screw 33 extends through the portion 29 adjacent the other end. Tightening of the screws 32 and 33 pulls the split portions 30 and 31 together to lock the portions 28 and 29 of the roller to the shaft 26. The roller is milled in a manner similar to the roller 16 with the milled portion extending acorss the portions 28 and 29. This milling is produced as nearly accurate as possible for the desired feed length and possibly a little longer. If during the test it is found that the milled portion is too long and it is desired to lengthen the feed, the screw 32 is loosened and the portion 28 is rotated relative to the portion 29 and locked into the position shown in FIG. 3. The amount of rotation shown in this figure is exaggerated as it will usually amount to only a small fraction of an inch. As a result, the points between which the stock will be unfed has been reduced to the distance between the lower edge 34 of the milled portion of the portion 29 and the upper edge 35 of the milled portion of the portion 28. This is less than the full width of the milled portion. It is true that with this construction for a short distance the stock will be fed by only one half of the roller. However, this will make little or no difference in the feed. The construction shown in FIG. 3 therefore provides a fine adjustment which can be made after the roller is mounted in its frame.

The feed of the present invention thus eliminates many of the moving parts necessary in an intermittent feed and permits smooth high speed operation. While it is contemplated that the rollers 16 be constructed for dies which are frequently used for long runs, they can of course be used in any type of stamping operations. The illustrated drive shows a sprocket and chain arrangement. However, this can obviously be replaced with any other suitable drive such as belt and pulley or shaft and worm. Other advantages of the present invention will be readily apparent to a person skilled in the art.

I claim:

1. An intermittent feed for a power press or the like comprising a rectangular frame, a lower roller mounted on a shaft horizontally in said frame, an upper roller mounted on a shaft horizontally in said frame, said shafts having interlocking gears at one end thereof, means for adjustably forcing said upper roller against said lower roller, said upper roller having a generally rectangular area depressed from the surface of said roller and defining a non-feeding portion, and means for rotating said rollers in response to the rotation of the press drive shaft, said upper roller being transversely split to form a pair of roller portions, each roller portion being longitudinally slotted to its center and having an adjustment screw passing through said slot to lock said roller portions to said upper roller shaft to permit adjustment of said roller portions with relation to each other.

2. An intermittent feed for a power press or the like comprising a rectangular frame, a lower roller mounted on a shaft horizontally in said frame, an upper roller mounted on a shaft horizontally in said frame, said shafts having interlocking gears at one end thereof, means for adjustably forcing said upper roller against said lower roller, said upper roller having a generally rectangular area depressed from the surface of said roller and defining a non-feeding portion, said portion having a depth of approximately twice the thickness of the stock being fed, and means for rotating said rollers in response to the rotation of the press drive shaft, said upper roller being transversely split to form a pair of roller portions, each roller portion being longitudinally slotted to its center and having an adjustment screw passing through said slot to lock said roller portions to said upper roller shaft to permit adjustment of said roller portions with relation to each other.

3. An intermittent feed for a power press or the like comprising a rectangular frame, a lower roller mounted on a shaft horizontally in said frame, an upper roller mounted on a shaft horizontally in said frame, said shafts having interlocking gears at one end thereof, means for adjustably forcing said upper roller against said lower roller, said upper roller having a generally rectangular area depressed from the surface of said roller and defining a non-feeding portion, the forward edge of said portion having an abrupt shoulder and the rear edge of said portion curving gradually to the surface, and means for rotating said rollers in response to the rotation of the press drive shaft, said upper roller being transversely split to form a pair of roller portions, each roller portion being longitudinally slotted to its center and having an adjustment screw passing through said slot to lock said roller portions to said upper roller shaft to permit adjustment of said roller portions with relation to each other.

4. An intermittent feed for a power press or the like comprising a rectangular frame, a lower roller mounted on a shaft horizontally in said frame, an upper roller mounted on a shaft horizontally in said frame, said shafts having interlocking gears at one end thereof, means for adjustably forcing said upper roller against said lower roller, said upper roller having a generally rectangular area depressed from the surface of said roller and defining a non-feeding portion, said portion being wider than the stock being fed, said portion having a depth of approximately twice the thickness of the stock being fed, the forward edge of said portion having an abrupt shoulder and the rear edge of said portion curving gradually to the surface, and means for rotating said rollers in response to the rotation of the press drive shaft, said upper roller being transversely split to form a pair of roller portions, each roller portion being longitudinally slotted to its center and having an adjustment screw passing through said slot to lock said roller portions to said upper roller shaft to permit adjustment of said roller portions with relation to each other.

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