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FOLDING BLADE ACTUATING MECHANISM

Original Filed March 16, 1938

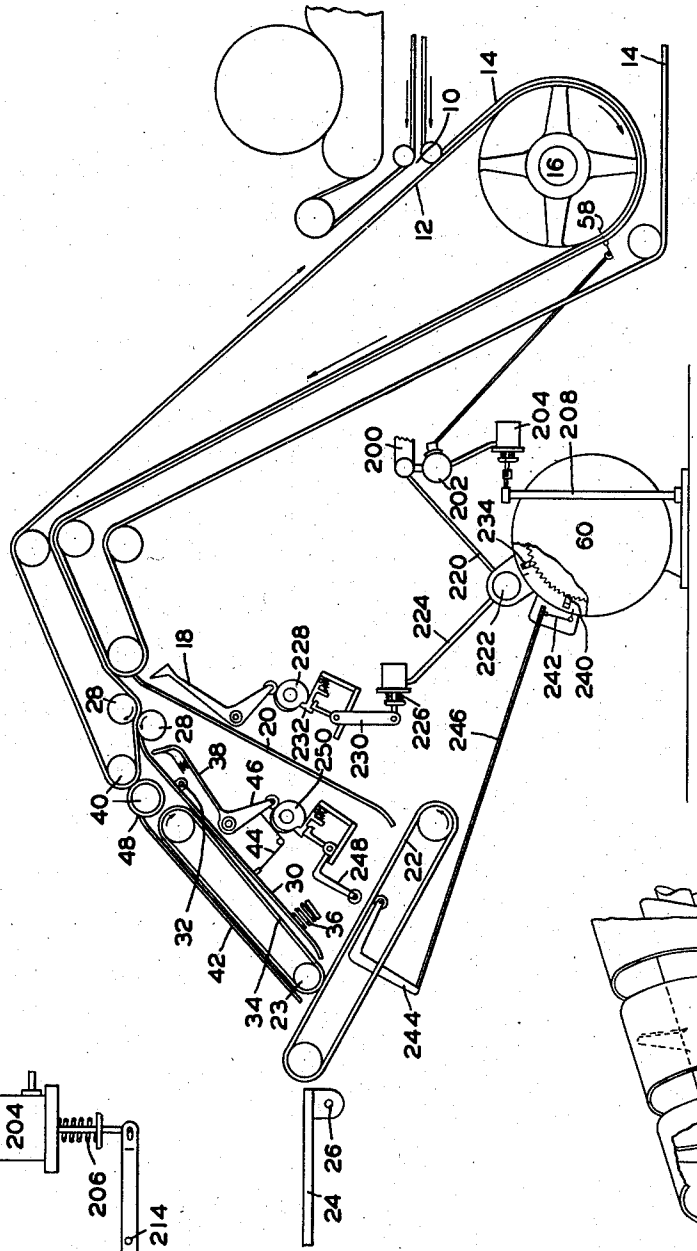


FIG.-1

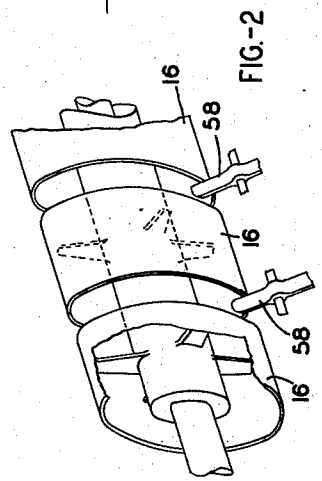


FIG.-2

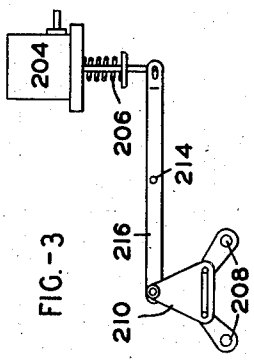


FIG.-3

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FOLDING BLADE ACTUATING MECHANISM

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Original application March 16, 1938, Serial No. 196,133. Divided and this application November 12, 1940, Serial No. 365,172

3 Claims. (Cl. 270—81)

This invention relates to blade actuating mechanism for folding machines, and more particularly to improved mechanical connections for operating such blades.

This application is a division of my copending application Serial No. 196,133, filed March 16, 1938, now Patent No. 2,222,076, dated November 19, 1940.

An object of the present invention is to provide a direct mechanical connection to a folding blade so constructed and arranged that the entire mechanism may lie in the lane traversed by the article to be folded. In a machine having a plurality of lanes for feeding articles to folding blades, many advantages may be realized by the use of mechanical connections from the actuating device to the folding blade with a complete set of the actuating mechanisms located in each lane. The apparatus is greatly simplified by my construction which makes it possible to use direct connections without going outside of the limits of the lane immediately affected and without mechanical devices extending around the edges of the articles to be folded which in the case of wide sheets, leads to cumbersome constructions.

Another object of the present invention is to provide apparatus for actuating a folding blade by a mechanical connection adapted to operate directly through an article when the same is lying on a conveyor in the course of the folding operation.

Other objects of the invention will in part be obvious and will in part appear hereinafter. The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth and the essential features of which will be indicated in the claims.

In the drawing, Fig. 1 is a diagrammatic vertical sectional view of certain essential elements in a machine of the character described; Fig. 2 is a perspective view with parts broken away of the feeding drum of the device shown in Fig. 1; while Fig. 3 is a plan view of a detail of the fluid actuating mechanism employed in connection with the timer shown in Fig. 1.

While the improvements of the present invention are adapted for use in various types of apparatus they have been shown here as forming part of a machine comprising a frame supporting cooperating feed ribbons, feed rolls and platens, for passing an article of flatwork, such for example as a sheet, towel or the like through the machine at a predetermined speed. Such a machine is shown generally in my Patents No. 1,519,733 dated December 16, 1924, and No. 2,011,934 dated August 20, 1935; and in the patent to O. W. Johnson, No. 2,034,040 dated March 17, 1936. It may comprise measuring, timing and folding devices cooperating with the feed ribbons and rolls in such a way that the length of the article to be folded is measured as it enters the folding machine and thereafter the article is folded a predetermined number of times or in any other predetermined and desired manner.

In Fig. 1 there is shown diagrammatically a folding machine embodying certain features of the present invention. Flatwork to be folded may be introduced into the machine from the ironer as at 10 and may be fed initially between the tapes 12, 14 about the drum 16 in the direction of the arrow shown in the drawing. The drum, as shown, may be placed beneath and behind the outlet from the ironer. Feeding the work in the manner shown, i. e., back around the drum and then in one direction and again in another direction past the first folding mechanism 18 until the work or a portion thereof lies upon the pan 20, makes possible a compact space-saving form of folding mechanism which is greatly to be desired.

If the work passes through the device without being folded it will be delivered from the pan 20 to the travelling tapes 22 moving beneath the tape-carrying roll 23 in the direction indicated by the arrow and thence to the delivery table 24, which, as shown, may be pivoted as at 26 so as to be raised and lowered at the option of the operator.

If the work is to be folded the folding mechanism shown generally as at 18 is caused to pivot forwardly through suitable openings in the pan 20 so as to strike the under surface of the work and carry a fold thereof between the rolls 28, which are rotating in the direction shown by the arrows. The work is thus carried through these rolls and folded in a manner hereinafter to be described, as for example at the central portion of the work or at a distance spaced one-third of the distance from the front to the rear edge of the work, or at any other desired point.

The folded work is delivered after passing through the rolls 28 to the pan 30. This pan may be pivoted as at 32 and caused to press lightly aganst the tapes 34 by the action of the spring 36. Tapes 34 may preferably travel in the direction indicated by the arrow and the pressure between the tapes and the work on the pan may be

such as to suitably hold any small article released from rolls 28 at high speed.

If the work is not to be given a second fold it may pass directly from the pan 30 to the tapes 22 and from thence to the delivery table 24. If the work is to be given a second fold, the fold may be effected by folding mechanism shown generally at 38. This mechanism, which may comprise as hereinafter indicated a plurality of folding fingers, may force the work between the rolls 40, and a second fold thus effected at any desired place in the work, as for example at the center of the folded work or near one edge thereof. The work twice folded is then delivered to the pan 42 from whence it passes to the tape 22 and the delivery table 24.

The work-receiving pans, for example pan 30, may comprise a plurality of separated sections spaced so as to permit the folding fingers 38 to pass between the sections and act upon work resting upon the pan.

Where a pivoted pan, such as that shown at 30, is employed, held normally under spring tension against a cooperating moving feed tape, it may be desirable at the moment of effecting the fold to retract the pan from contact with the tape so as to facilitate the folding operation. To this end, as shown in Fig. 1, the pan 30 may be affixed through the cable 44 to the arm 46 of the pivoted folding element 38 and, as the element 38 moves upward to effect the fold, tension upon the cable 44 through the arm 46 will pull the pan 30 away from engagement with the tape 34, thus momentarily releasing the work from the feeding action of the tape. After the work has been introduced between the rolls 40 and the fold effected, the work will continue to be fed between these rolls, even should the pan 30 return to its light pressing engagement against the tape 34.

The feeding drum 16 may, if desired, be formed in the manner shown in Fig. 2 in sections so designed that the measuring fingers 58 associated with the timing device hereinafter to be described may extend past the outer surface of the drum and thus insure contact with the work fed between the tapes 12 and 14.

Obviously with a sheet or other flat article held tightly against the pulley 16 by means of the tapes, the front edge of the article is held sufficiently taut to enable it to exert a strong force on the trip or measuring finger 58 so as to provide sufficient means to operate the mechanical connection from finger 58 to valve 202. If the trip finger were placed along a straight run of the conveyor the article would not be held tightly enough to exert sufficient force to operate a mechanical connection although in such positions trip fingers have been used to establish electrical connections. If it were attempted to operate a mechanical connection with a trip finger along the straight run of the conveyor, the only result would be to crumple up the article on the tapes. The new arrangement here disclosed provides sufficient force to operate a valve or other mechanical device.

The folding machine may be provided with a plurality of timing devices 60 adapted to control the operation of the folding means 18 and 38 so as to effect the desired folds. These devices may, as shown in Fig. 1, be positioned intermediate the folding mechanism and the driving drum 16, or they may be positioned in any predetermined manner, preferably, however, within the general framework of the machine and directly in line with the corresponding feed lane, to insure a compact, efficient device. Preferably, one timing device is provided for each of the predetermined number of feed lanes through the machine and, generally speaking, there may be a plurality of such lanes, for example three or more, in a machine having an over-all effective operating width of 120 inches.

The timers or measuring devices actuating the folding mechanism and intended for use with each feed lane may take the form of the corresponding devices shown and described in the Johnson Patent No. 2,034,040, and will not be described here in detail. Speaking generally, these devices are adapted to actuate the folding mechanism associated with the feed lane controlled by the timer so that the article of flatwork traversing the machine is suitably folded. The articles traverse the machine at uniform speed. The length of each article in each feed lane may be measured and the timers adapted to control the folding mechanism in ways known to the art.

With reference to Fig. 1, there is shown pneumatic means for actuating the timing mechanism in the timer 60. This means may take generally the form shown and may comprise an air inlet conduit 200, valve control means 202, a cylinder 204 having a piston, the motion of which may be controlled by the coaction of a spring, for example the spring 206 in Fig. 3, and air pressure within the cylinder. The timer-actuating shafts are shown generally as at 208, and there may be a plurality of these shafts to control the timing mechanism. They may be actuated by the toggle arrangement shown generally at 210. The coaction of the spring 206 and the air pressure within the chamber 204 may control the pivoting of the arm 216 about the pivot 214, thus controlling the timer-actuating mechanism. The spring 206 may be adapted to impart a sudden motion to the rod 212 with the release of air-pressure within the cylinder, as for example to register instantaneously the front edge of a rapidly moving article through the device.

Pneumatic means shown generally in Fig. 1 and comprising the feed line 220, the valve 222, the feed line 224, and the spring-air controlled piston 226, may actuate the folding mechanism shown generally at 18. This may be accomplished by rotation of the cam element 228. Motion of the piston 226 may cause a pivoting of the element 230 and a corresponding release of the cam latch 232. The valve 222 may be actuated by the element 234 within the timer 60.

The second folding mechanism 38 is shown in Fig. 1 as mechanically actuated. When the element 240 within the timer 60 comes into contact with the pivoted arm 242, the L-shaped pivoted arm 244 is swung upward through the motion of the shaft 246 and contacts the arm 248, thus releasing the cam latch associated with the cam 250, which in turn rotates to move the folding fingers into operative folding position. The contact between the end of the arm 244 and the arm 248 may be made as shown through roller means in the event that any work should happen to be resting upon the tapes 22 at the moment of contact. This may occur if the forward end of a long article passes onto conveyor tapes 22 while awaiting the action of the first folding blade.

While the finger-actuating means have been shown diagrammatically and have been but briefly described, it is believed that the descrip-

tion will be adequate to enable one skilled in the art to employ either the pneumatic system or the mechanical system illustrated. Either can be used directly opposite the folding section when a plurality of timers is used.

What I claim is:

1. Folding blade actuating mechanism adapted to act through conveyor tapes spaced in a plane comprising two levers having ends adapted to mutually engage, and said ends being positioned normally on opposite sides of said plane.

2. A folding machine comprising a plurality of feed lanes, means for conveying foldable articles in said lanes including a conveyor formed of parallel tapes upon which rests an article to be folded, means located on one side of said conveyor for folding the articles in each lane, and a timer in each lane located on the other side of said conveyor for controlling said folding means to effect predetermined desired folds in said article, said timers being positioned directly in line with said lanes and being directly connected mechanically to an element for actuating said folding means, the mechanical connection between one of said timers and the folding means associated with one fold comprising members abutting each other when actuated, said members being normally spaced apart on opposite sides of said parallel-tape conveyor.

3. A folding machine comprising a plurality of feed lanes, endless conveyor means for conveying foldable articles in said lanes at predetermined speed, folding means in each lane for folding articles passing through the lane, timing means in each lane for controlling the folding means, trip means in each lane for initiating operation of its associated timer, a mechanical connection between each trip means and its associated timer, a timing member in each timer movable in timed relation to an article moving in its associated lane, means operable by said mechanical connection for starting said timing member, a mechanical operating connection in each lane for its associated folding means, and means for actuating said last named mechanical operating connection by said timing member upon completion of predetermined travel of the latter.

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