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[54] **APPARATUS FOR SHIFTING A DEFLECTOR IN A MACHINE FOR PROCESSING PAPER OR PLASTICS MATERIAL SHEETING, PREFERABLY A TUBE-MAKING MACHINE**
3 Claims, 1 Drawing Fig.

[56] **References Cited**

UNITED STATES PATENTS

2,670,835	3/1954	Huttmann	198/31(A3)
3,179,234	4/1965	Bloom	271/64

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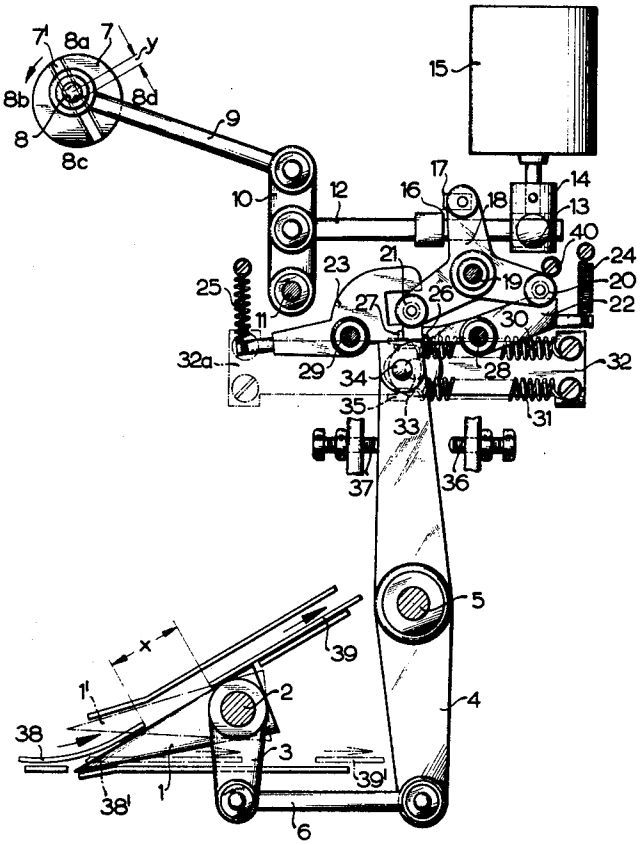
ABSTRACT: The shifting apparatus serves to change the path of travel of the workpieces. A clutch which is engageable electromagnetically, hydraulically or pneumatically is provided between the lever for shifting the deflector and a mechanical shifting means which performs a shifting movement in each machine cycle. Said clutch when engaged transmits the shifting movement to the lever for shifting the deflector.



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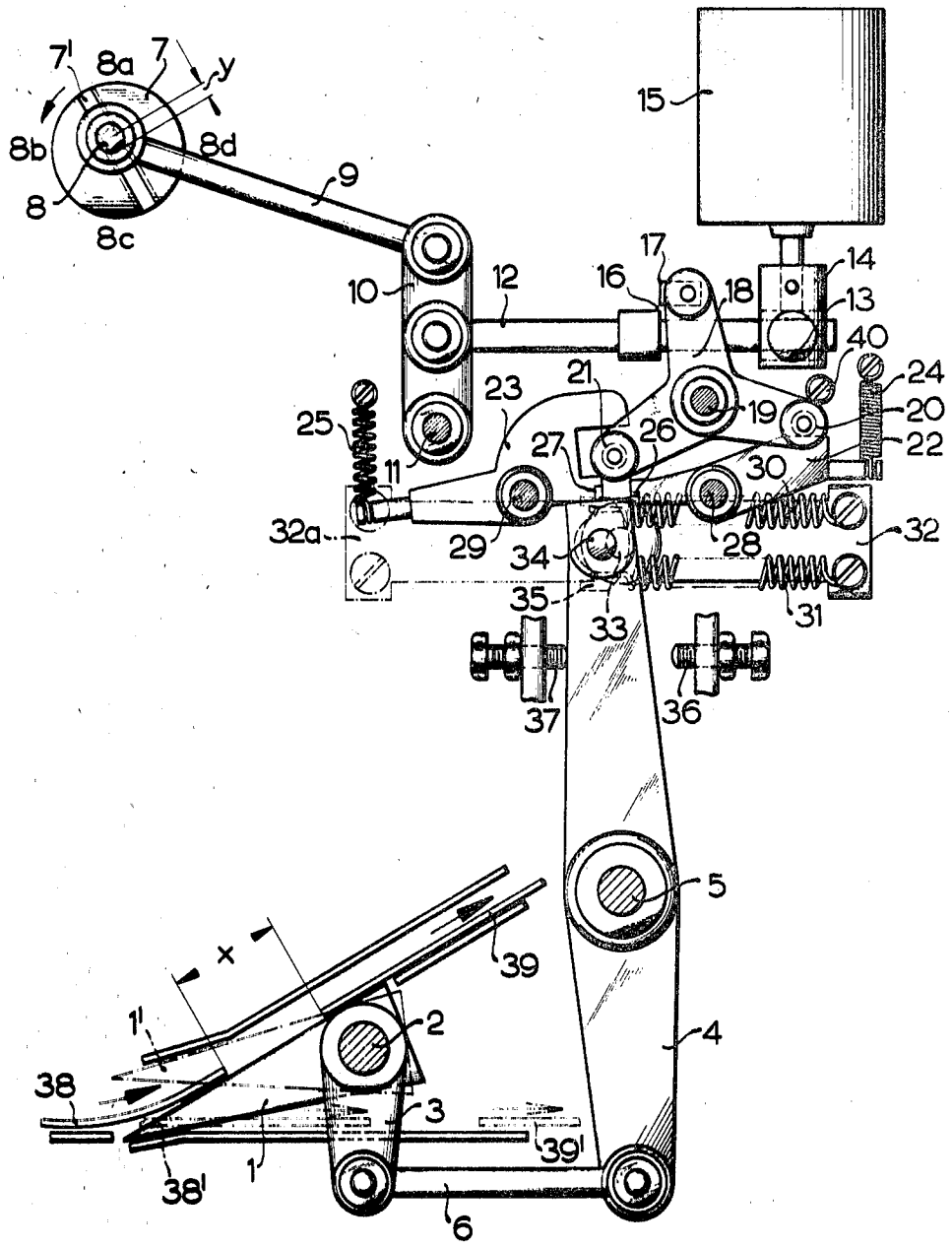

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APPARATUS FOR SHIFTING A DEFLECTOR IN A MACHINE FOR PROCESSING PAPER OR PLASTICS MATERIAL SHEETING, PREFERABLY A TUBE-MAKING MACHINE

In machines for processing paper and plastics material sheeting, e.g. in tube-making machines, which are used in the manufacture of bags, it is usual to supply counted sets of workpieces, which exit from the machine at a high speed, to upper and lower delivery stations in alternation. To this end, the sections are caused to move over a deflector, which supplies sets of the desired number of workpieces in alternation to upper and lower belt conveyor systems.

As the technical development has enabled an increase in the machine speed, the deflector must be shifted at very high speed. The shifting operation must be initiated while the end of the preceding workpiece has left the deflector and must be terminated before the next workpiece reaches the deflector. In a high-duty tube-making machine, e.g., the shifting operation must be performed within less than 1/100 second. Besides, the shifting operation must be most precisely synchronized with the cycle of the machine, independently of the speed of the machine.

Only mechanical apparatus have been available so far to meet these requirements. Serving for a periodical change of the path of travel of the tube sections, these apparatus are combined with a mechanical counter and positively shift the deflector at the proper instant and at the required high speed. Apparatus arranged for electromagnetic, hydraulic or pneumatic operation operate with an excessively long delay so that an exact synchronization of the shifting of the deflector would require a considerable expenditure and a correspondingly large number of sources of error. For this reason, such apparatus cannot be used if the tube sections are delivered at a very high and possibly at a changing rate.

With a strictly mechanical control, a change to another number of workpieces to be counted is time consuming and complicated so that the counter of such apparatus is preset in most cases to some counts, such as 15, 20, 30 and 40, in order to simplify the shift. Nevertheless, the change is time consuming and the restriction to some possible numbers of workpieces which can be incorporated in the stacks of workpieces is undesirable.

It is an object of the invention to provide a mechanical control apparatus which operates with a good synchronization and a high shifting rate and which can be combined with an electric counter enabling a very fast change to any desired count, or with other electric control means. This object is accomplished according to the invention in that a clutch which is engageable electromagnetically, hydraulically or pneumatically is provided between the lever for shifting the deflector and a mechanical shifting means which performs a shifting movement in each machine cycle, and said clutch when engaged transmits the shifting movement to the lever for shifting the deflector. The clutch is engaged, e.g., in response to an electric pulse, which is delivered from a settable repeating counter, which is coupled to the machine. A device for engaging the clutch, e.g., a solenoid, is preferably arranged to change the position of a driver in such a manner that the linkage connected to the lever for shifting the deflector engages the driver of the shifting device during the next following shifting movement of the shifting device.

Where the shifting device according to the invention is used, the clutch can be shifted at any time during the cycle and such shifting will not involve a shifting of the deflector at an improper time. For instance, the shifting of the clutch could begin one half of a cycle before the time when the deflector is to be shifted. For this reason, the shifting of the deflector may be initiated by a solenoid or an electric clutch or a hydraulic or pneumatic piston-cylinder unit of normal type although such means operate with a relatively long delay or a long stroke time.

In a development of the invention, the lever for shifting the deflector is under the action of a work storage device urging the lever toward the other deflector position and said lever is locked by a latch, which is releasable by the shifting movement. Hence, the deflector is not shifted by the shifting member, which performs its shifting movements in synchronism with the cyclic operation of the machine, but the shifting of the deflector is only initiated by said shifting member and the linkage which is connected to the lever for shifting the deflector, which initiation releases the latch which is in locking position at the time. The actual shifting movement can then be performed at very high speed by the work storage device, e.g., by one or more tension springs which are highly prestressed.

The invention will be described more fully in the subsequent specification with reference to the drawing, which shows an embodiment by way of example.

A deflector **1** having a triangular deflector tongue is secured to a shaft **2**, which is rotatably mounted in the machine frame. The deflector can be pivotally moved into position **1'** shown in dash-dot lines by a deflector shifting lever **3**, which is also secured to the shaft **2**. In the position **1** shown in the drawing, the tube sections **38**, **39** move in the direction of the arrow over the deflector from the left to the right. The conveyor rollers or belts required for this movement of the tube sections are not shown. When the deflector is pivotally moved into the position **1'**, the tube sections **38'**, **39'** move below the deflector from the left to the right. The deflector must be shifted from position **1** to **1'** or vice versa at the instant at which a gap *x* between successive tube sections is just over the tongue of the deflector **1** and must be terminated before the leading edge of the following section has reached the tip of the tongue of the deflector **1**.

The lever **3** is operated by a rod **6** and a lever **4**, which is pivoted to the machine frame by the pin **5**.

The mechanical operation of the deflector is initiated by an eccentric disc **7**, which revolves in the direction of the arrow in synchronism with the cyclic operation of the machine so as to perform exactly one revolution for each tube section **38** or **39** travelling over the deflector **1**. The amount of the eccentricity of the crankpin **8** is adjustable in known manner by a groove **7'**, which consists preferably of a dovetail groove. To illustrate the function, the crankpin **8** is shown in four positions **8***a*, **8***b*, **8***c*, and **8***d*, which are spaced 90° apart in the direction of revolution of the eccentric disc **7**, and in a position **8** on the left of position **8***a*. The angular position of the eccentric disc relative to the cyclic shaft of the machine is preferably selected so that the pin **8** is in position **8***c* when the trailing edge of the tube section **39** is just over the tip of the deflector tongue **1**, i.e., at the time when the shifting operation must be initiated. In this position, the rod **9** and with it the entire shifting device has the highest velocity. The rod **9** transmits the movements of the crankpin **8** as reciprocating movements to the lever **10**, which is pivoted to the machine frame by a pin **11**. The lever **10** transmits the reciprocating movement to the rod **12**, which is slidable in the guide **13**. The guide **13** is rotatably mounted in the rod head **14**, which is secured in the stroke rod of the solenoid **15**. The latter is shown in its deenergized condition. The rod **12** carries centrally an enlarged portion having an edge **16**, which can freely reciprocate, when the solenoid **15** is in the position shown in the drawing, under the pressure member **17**, which is secured to the three-armed lever **18**. The latter is pivoted to the machine frame by the pin **19**. One arm of the lever engages the stop screw **40**, which is secured in the machine frame, so that a rotation to the left is prevented. When the solenoid **15** is energized at the instant at which the pin **8** is in position **8***d* and consequently the rod **12** is in its right-hand end position, the solenoid attracts so that the enlarged portion of the rod engages the pressure member **17** from below. As the revolution of the eccentric disc **7** is continued, the rod **12** is moved to the right and the solenoid **12** can attract further at the instant at which the pressure member **17** releases the edge **16** of the rod **12**. This is effected approximately at the time at which the pin **8** is between positions **8***a* and **8***b*. When the revolution of the ec-

centric disc 7 is continued via the positions 8*b*, 8*c* to the position 8*d* of the crankpin 8, the rod 12 is displaced to the right and the edge 16 of the rod 12, which is raised by the solenoid, bears on the pressure member 17 and imparts to the pressure rollers 20 and 21 a rotation to the right. When the three-armed lever 18 is in its position of rest, which is shown in the drawing, the upper surface of a latch lever 22 engages the pressure roller 20. The latch lever 22 is rotatably mounted in the machine frame by a pin 28. A tension spring 24 is secured at one end to the latch lever 22 and at the other end to the machine frame and urges the latch lever 22 firmly into engagement with the pressure roller 20 so that the three-armed lever 18 is urged against the stop screw 40. If the three-armed lever 18 is turned to the right as is described above, it will bear by the roller 20 onto the latch lever 22 so that the latch 26 thereof is raised to release the right upper edge of the lever 4. A pin 34 is secured to the lever 4. The hanger 35 is pivoted to the pin 34 and under the action of two highly stressed tension springs 30, 31. Instead of the tension springs 30, 31, other work storage devices may be used, such as cylinders containing compressed air, or the like, provided that they operate without inertia and without delay. The tension springs 30, 31 now pull the lever suddenly against the stop screw 36, which is secured to the machine frame. As a result, the rod 6 is moved to the right and the tongue of the deflector 1 is shifted upwardly. This operation is performed very fast under the action of the prestressed springs 30, 31 and at the instant which is exactly determined by the position of the eccentric disc 7 and is independent of the time when the solenoid 15 attracted during the cycle.

At the end of the above-described rotation of the three-armed lever 18 to the right, its pressure roller 21 has engaged the lower surface of a second latch lever 23. This latch lever 23 is rotatably mounted in the machine frame by the pin 29 and under the tension of a tension spring 25, which is secured to the lever 23 and the machine frame. The tension spring 25 caused latch 27 of the lever 23 to engage the upper surface of the lever 4 until that time. During its shifting operation, described above, the lever 4 has released the latch 27 so that the latch lever 23 under the action of the tension spring causes the pressure roller 21 to bear on the left-hand arm of the three-armed lever 18. As the revolution of the eccentric disc 7 is continued to move the crankpin 8 from position 8*d* via position 8*a* to position 8*b*, the tension spring 25 causes the pressure member 17 to follow the rod 12 as the same is moving the left. As a result, the three-armed lever 18 moves to the right and the latch 27 engages the left-hand edge of the lever 4 whereas the latch 26 bears on the upper surface of the lever. When the three-armed lever bears on the stop screw 40, the edge 16 of the rod 12 disengages the pressure member 17. As the solenoid 15 has been deenergized during the movement of the rod 12 to the left, the latter falls into the position shown in the drawing and can now reciprocate without moving the pressure member 17.

At their second end, the tension springs 30, 31 are secured to the rocker lever 32, which is pivotally movable about the pin 33 to the position 32*a* by a gear motor or a hydraulic or pneumatic drive. This operation is performed after the above-described shifting operations and is controlled, e.g., by a time-limit relay, which is controlled by the pulse that is applied to the solenoid and to said time-limit relay at the same time. As a result, the tension springs 30, 31 are stressed in the opposite direction so that the device is now prepared for the downward shifting of the deflector tongue. When the next pulse is delivered to the solenoid 15, the latch 27 is lifted in the manner which has been described above so that the rotation of the lever 4 to the right against the stop screw 37 is initiated and results in a downward shift of the deflector 1.

The pulses applied to the solenoid 15 may be transmitted by an adjustable repeating counter of known type arranged to make contact in response to a desired count. The duration 140 the time of arrival of the pulse may be variable within wide limits. As soon as the edge 16 is passed under the pressure member 17 on its way from the left to the right, the solenoid 15 may attract although the shifting of the deflector is not initiated until the edge 16 moves from the left to the right for the next time. It will also be sufficient if the solenoid is deenergized at any desired time during the subsequent return movement of the rod 12. The time between two shifts of the deflector is available for the shifting of the rocker lever 32 so that this movement may also be slowly performed.

We claim:

1. Apparatus for shifting a deflector in a machine for processing paper or plastics material sheeting, preferably a tube-making machine, so as to change the path of travel of the workpieces, having a mechanical shifting means and a lever on which said shifting means acts to move the deflector, characterized in that a clutch which is engageable electromagnetically, hydraulically or pneumatically is provided between the lever for shifting the deflector and a mechanical shifting means which performs a shifting movement in each machine cycle, and said clutch when engaged transmits the shifting movement to the lever for shifting the deflector.

2. Shifting apparatus as claimed in claim 1, characterized in that the clutch contains a driver which is actuated by means to change the position of a driver in such a manner that the transmitting member leading to the lever for shifting the deflector engages the driver of the shifting device during the next following shifting movement of the shifting device.

3. Shifting apparatus according to claim 1, characterized in that the lever for shifting the deflector is under the action of a work storage device tending to move said lever to the respective other deflector position and is held by a latch, which is releasable by the shifting movement.