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DEVICE FOR FOLDING STRIPS OF CLOTH

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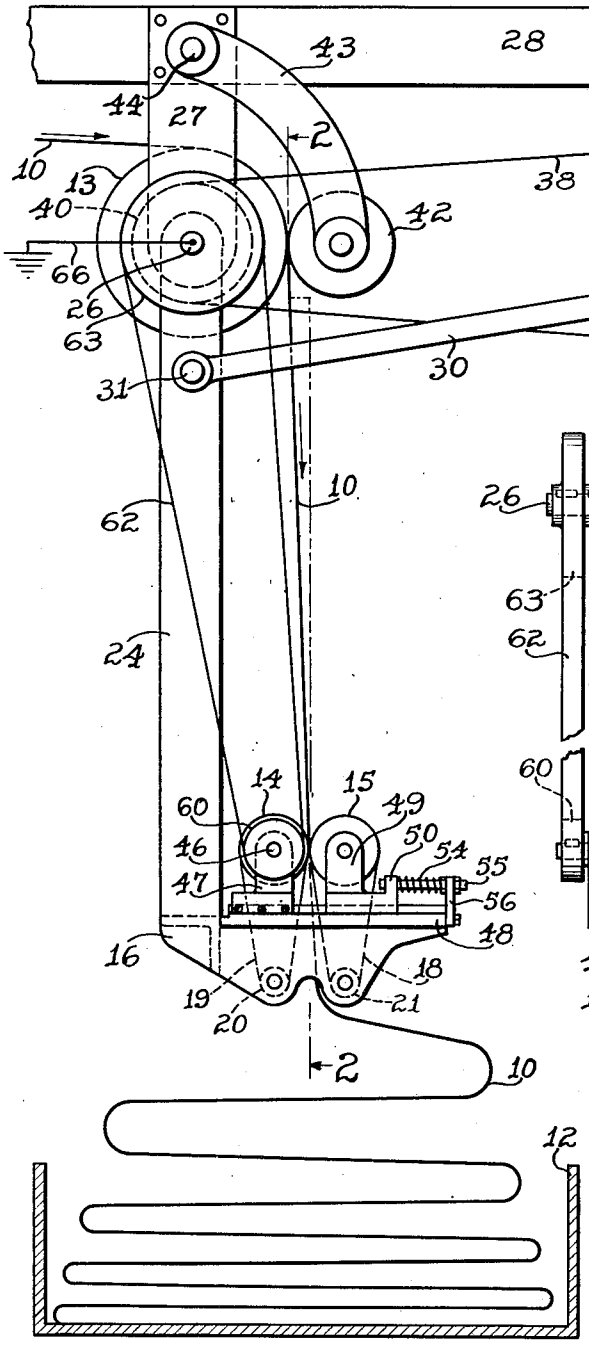



Fig. 1.

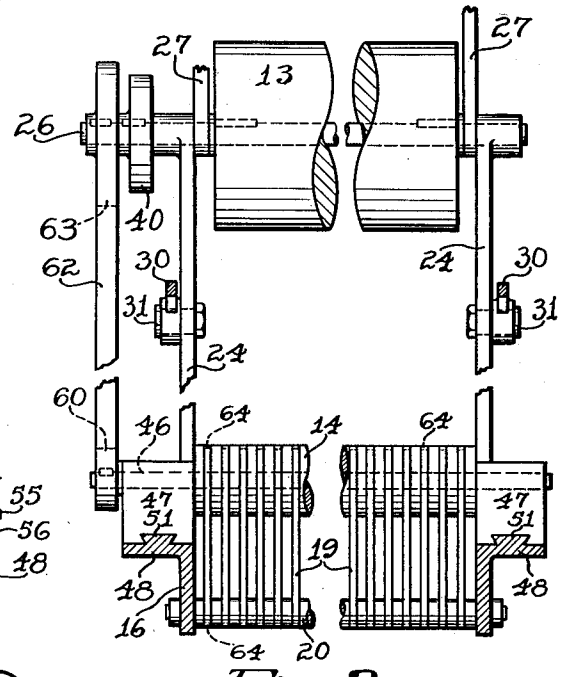



Fig. 2.

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## DEVICE FOR FOLDING STRIPS OF CLOTH

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5 Claims. (Cl. 270—79)

This invention relates to a device for folding a strip of cloth and more particularly to a device for drawing a moving strip of cloth from a textile printer or other type of apparatus and delivering it to a receptacle in a folded condition.

It is required that the cloth issue from the printing machine and be deposited in a large basket in a somewhat folded condition. To this end, it has been customary to provide a swinging frame carrying at its lower end two power driven rollers arranged one above the other which feed the cloth downwardly to the basket. The swinging motion of the frame throws the cloth back and forth in such a way as to deposit it in folds. A new type of printing machine has been provided which requires that the cloth be fed to this folding stage at several times its former rate, and speeding up the rate of swinging movement of the pendulum frame has presented various problems. One is that the higher rate of movement causes the cloth to billow back and forth widely under the air resistance and thus to be improperly folded in the receiving basket. Moreover, a problem has been found in static electricity which develops on the fast moving cloth and causes the cloth to cling to the rollers and not to fold properly. Any attempt at taking off the static from the swinging frame by means of a metal bar at the bottom of the frame is defeated by the fact that the billowing movement of the cloth due to the air currents keeps it out of contact with the bar for an appreciable length of time and causes the static to build up during these intervals.

The primary object of this invention is to overcome these problems and to provide a mechanism which will satisfactorily fold a moving strip of cloth, which may be used with a textile printer or other type of machine and will permit the machine to run at a rate far in excess of that heretofore attained.

A further object is to provide a mechanism which will remove the static from the cloth and prevent the cloth from clinging to the rollers of the swinging frame.

Another object is to provide positively acting guides at the lower end of the swinging frame which insure that the cloth will be moved positively and folded in loops of substantially the same shape for both directions of cloth movement. Other objects will be apparent in the following disclosure.

Referring to the drawing illustrating the preferred embodiment of this invention:

Fig. 1 is a side elevation of the folding apparatus; and

Fig. 2 is a fragmentary, transverse sectional view taken on the line 2—2 of Fig. 1.

In accordance with this invention, a strip of cloth 10 coming from a textile printing apparatus or other type of machine, such as a washing, ironing or coating machine, is passed to a suitable receptacle 12 and is folded smoothly and uniformly therein in loops which will substantially fill the receptacle rather than pile up in a disorderly manner. To this end, the cloth is passed over a metal roller 13 near the top of the device and then downwardly between two lower metal rollers 14 and 15 carried on a swinging frame 16. These rollers are preferably arranged with their axes parallel and lying in a substantially horizontal plane, so as to control the movement of the cloth as the frame swings in both directions. The passage of the cloth to the receptacle is preferably guided by two spaced guides below the rollers and arranged on opposite sides of the cloth in such positions as to strike and guide the cloth downwardly and prevent the cloth from billowing upwardly and entangling with the rollers. These guides are preferably arranged in a substantially horizontal plane; and when the guides are thus located, the axes of rollers 14 and 15 need not be in a horizontal plane but may be otherwise located. It is desired, however, that the lowermost members have this horizontal arrangement so as to contact with opposite sides of the cloth as it swings in both directions. In the preferred construction, we use both the rollers 14 and 15 and movable guides therebeneath. As illustrated, the guides comprise two sets of endless belts 18 and 19 which pass over the driven rolls 14 and 15 and thence around two rollers 20 and 21 respectively. The rollers 14 and 15 are power driven and arranged to grip the cloth and provide a desired degree of tension therein, while the endless belts 18 and 19 or equivalent guides are arranged to aid in folding the loops of cloth as the frame 16 oscillates.

The oscillating frame 16 comprises two spaced depending arms 24 which are pivotally mounted on a cross shaft 26 in such a manner that they may swing or oscillate freely on this pivot. The shaft 26 is in turn supported on brackets 27 suspended from the framework 28 of the machine. The arms 24 are oscillated at a predetermined rate by means of the cranks 30 pivotally secured to pins 31 on each of the arms. The opposite ends of the cranks 30 are secured to

pins 32 carried on the sides of pulleys 33 which are pivotally supported on a cross shaft 34 carried by brackets 35 mounted on the frame. The pulleys 33 and their associated crank arms are driven by means of the belt 38 passing over one of the pulleys and around a smaller pulley 40 keyed to the shaft 26 to which the roll 13 is keyed and which is suitably driven for feeding the cloth forward. The relative sizes of these pulleys may be varied so as to give a desired rate of oscillation for the swinging frame 16.

The cloth passes between the roll 13 and a weighted roll 42 pivotally mounted on the swinging arm 43 which is suitably mounted on pivots 44 carried by the framework. The pivotal axis 44 is so arranged, as illustrated, that the weighted roll 42 grips the cloth firmly and holds it properly positioned as the framework swings. The cloth 10 is drawn downwards under tension by the positively driven rolls 14 and 15 mounted on the lower end of the frame 16. The roll 14 is rotatably supported on a shaft 46 mounted on the support 47 which is suitably fixed on the platform 48 projecting laterally or substantially horizontally from the two arms 24 of the swinging frame. The other roll 15 is rotatably mounted on standards 49 mounted on the slide 50 which is slidably mounted on the slideway 51 on the platform. The support 47 may also be a slide mounted on the same slideway 51 and held in a fixed position thereon, as by means of cap screws. A spring 54 surrounding the pin 55 engages at one end the slide 50 and at its other end a bracket 56 secured on the end of the platform. This spring is under compression and serves to hold the roller 15 firmly against the cloth 10 passing between the two rollers.

The roller 14 is positively driven by means of a pulley 60 fixed on the end of the roller shaft 46. A belt 62 passes from this pulley to a further pulley 63 keyed to the shaft 26 at the upper part of the framework. The shaft 26 and roll 13 may be positively rotated by a further pulley (not shown) which is driven by the mechanism of the power driven machine. The pulley 63 is larger than the pulley 60 so that the roller 14 is driven at a higher rate of speed than the rate of downward movement of the cloth 10. Consequently the roller 14 frictionally slips against the cloth and holds it under tension as it is fed downward.

As the frame 16 is oscillated at a comparatively rapid rate, the cloth 10 is caused to billow back and forth and to be deposited in folds in the receptacle 12. The resistance of the air to this swinging cloth tends to prevent proper folding in the receptacle. Applicants, therefore, provide the two guides 20 and 21 beneath the rollers 14 and 15 in such locations that they strike the cloth in its swinging movement and cause it to be deposited properly. Two of these guides are required since if one only were used, the cloth would be left uncontrolled in one direction of movement of the swinging frame. These guides 14 and 15 may be stationary bars, or the frame may be so constructed as to provide merely a slot at the lower end through which the cloth issues. Applicants prefer, however, that these guides rotate so as not to hamper the cloth movement.

The preferred guiding device, as illustrated, comprises the two sets of bands 18 and 19 made of cloth or other suitable material which pass around the vertically aligned pairs of rollers 14 and 20 and rollers 15 and 21. These are driven in the direction of cloth movement and thus aid in controlling the downward passage of the cloth. The rolls 14, 15, 20 and 21 may have their surfaces provided with parallel grooves 64 (Fig. 2) of such a depth that the outside of each cloth band lies substantially flush with the peripheral surface of each roll. The bands are driven at a rate preferably faster than that of the moving cloth and thus have a frictional grip against the surfaces of the cloth as the latter sways back and forth which tends to hold it smooth and feed it downwardly properly. The rollers 20 and 21 may be suitably spaced to permit some freedom of motion of the cloth and yet guide and control it at the time of reversal of oscillation of the swinging frame.

The frame 16 and associated rollers contacting with the cloth are preferably made of metal, and this metal is grounded by a wire 66 suitably connected to the device and preferably the metal frame 24 or any suitable metallic part. Hence, any static which accumulates on the cloth is readily discharged through the rollers 20 and 21 as well as the other rollers and transmitted through the framework to the ground. The cloth contacts with metal for each direction of oscillation of the frame and thus static is not permitted to accumulate for any long period of time. This constant removal of static tends to prevent the cloth from clinging to the rollers and not folding properly in the basket.

The operation of the device will be apparent in view of the above disclosure. The cloth passes over the power driven roll 13 and downwardly between the frictional gripping rolls 14 and 15 which are rotating preferably faster than the cloth movement and thus hold the cloth tight. Thence the cloth passes downwardly between the endless belts 18 and 19 and as the frame 16 is oscillated at a suitable rate the cloth is caused to billow back and forth and to drop in folds in the receptacle.

It will now be appreciated that many modifications may be made in the above described construction, hence the above description is to be considered as illustrating the general principles of the invention and our preferred constructional embodiment thereof and not as limitations on the claims appended hereto.

We claim:

1. A device for folding a moving strip of cloth comprising an oscillating dependent frame, means for oscillating the frame, two rollers mounted on the lower portion of the frame with their axes parallel and in a substantially horizontal plane and between which the cloth passes, means including a positively driven roll at the top of the frame for delivering cloth to the rollers, means for rotating one of the rollers at a rate which puts the cloth under tension and spaced guides associated with and located beneath the rollers for guiding and contacting with opposite sides of the cloth passing therefrom to a receptacle beneath the oscillating frame, said guides being arranged to prevent the cloth from contacting again with the rollers.

2. A device for folding a moving strip of cloth comprising an oscillating dependent frame, means for oscillating the frame, means including a roll at the top of the frame for delivering cloth thereto, a positively driven pair of rollers arranged near the bottom of the frame with their axes parallel and in a substantially horizontal plane and two spaced guides beneath said rollers

which engage the cloth on its opposite sides as the frame oscillates in each direction and control the folding of the cloth, said guides being arranged to guide the cloth to a remote position where it cannot contact again with the rollers during the folding operation.

3. A device for folding a moving strip of cloth comprising an oscillating dependent frame, means for oscillating the frame, means including a roll adjacent to the top of the frame for delivering cloth thereto, two rollers mounted on the lower portion of the frame with their axes parallel and in a substantially horizontal plane, a roller beneath each of said lower rollers and endless bands passing over the pairs of rollers and engaging opposite sides of the cloth as it swings in each direction and controls the folding thereof.

4. A device for folding a moving strip of cloth comprising an oscillating dependent frame, means for oscillating the frame, means including a roll at the top of the frame for delivering cloth thereto, two pairs of vertically aligned rollers mounted on the lower portion of the frame, means causing the upper rollers of the pairs to grip the cloth, means for positively driving the upper rollers and drawing the cloth downward under tension, and endless bands passing around each upper roller and the associated roller therebeneath which form a guiding channel having traveling walls arranged to aid the movement of the cloth downwardly and control the folding thereof.

5. A device for folding a moving strip of cloth comprising a swinging frame, means including a roll adjacent the upper end of the frame for feeding cloth thereto, two metal rollers mounted at the lower end of the frame with their axes parallel and in a substantially horizontal plane, means for rotating the rollers and causing the cloth to be drawn positively downwardly, spaced guides located on opposite sides of the cloth beneath said pair of rollers which control the movement of the cloth as it swings in both directions and prevent it from contacting again with the rollers and means including metal parts and a ground connection for removing static electricity from the cloth as it leaves the swinging frame.

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