

[54] **MACHINE FOR WINDING TAPELIKE STRIP ONTO REELS**
 [72] Inventor: **Max Norbisrath, Solingen, Germany**
 [73] Assignee: **Spezial-papiermaschinenfabrik August Alfred Krupp, Hilden, near Duesseldorf, Germany**

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Primary Examiner—Stanley N. Gilreath
Assistant Examiner—Werner H. Schroeder
Attorney—Arthur O. Klein

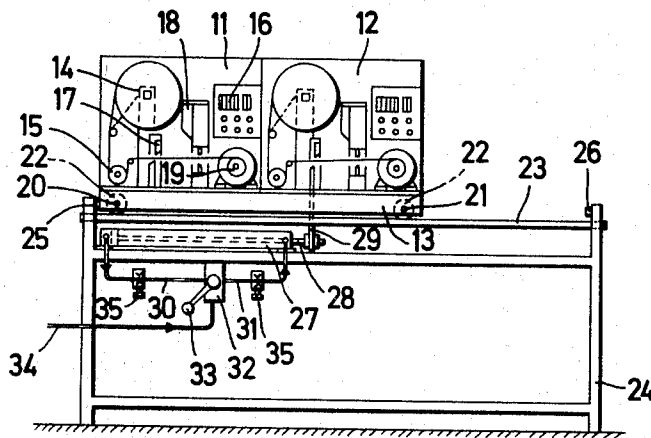
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[57] **ABSTRACT**
 A machine for winding tape or other narrow strip such as typewriter ribbon onto reels includes two separate winding units each of which is arranged to wind the strip from a storage reel onto another reel. The two winding units are mounted on a carriage which is movable to and fro by a driving mechanism along a rail track so that either one unit or the other can be brought alternately into a servicing position near the middle of the track where the unit is in front of an operator who is able to remove a wound reel and replace it with an empty reel during the time that the other unit is in operation winding the strip onto a reel.

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6 Claims, 4 Drawing Figures



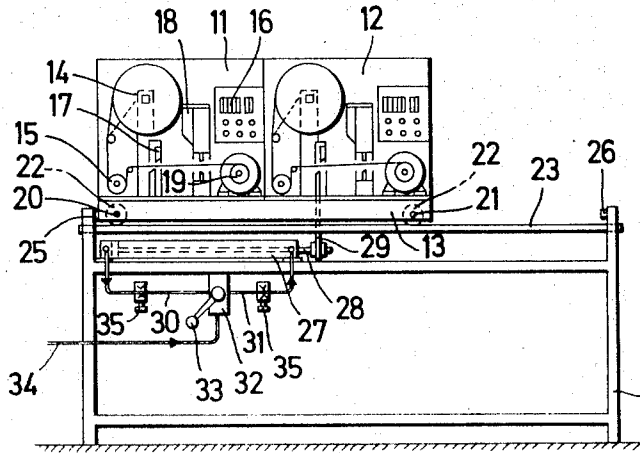


FIG. 1

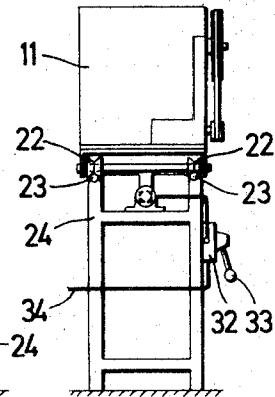


FIG. 2

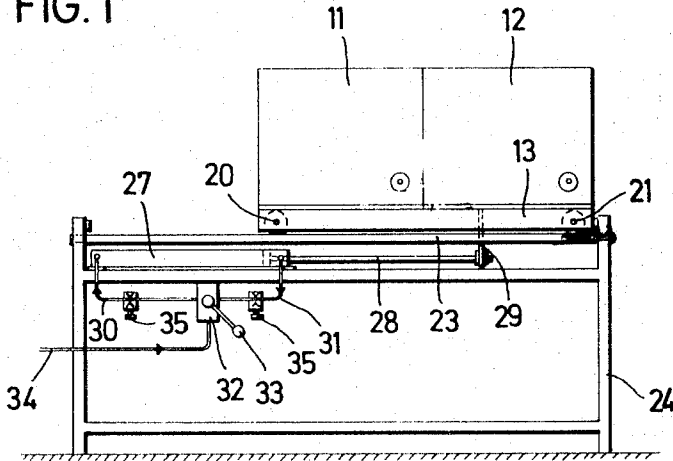


FIG. 3

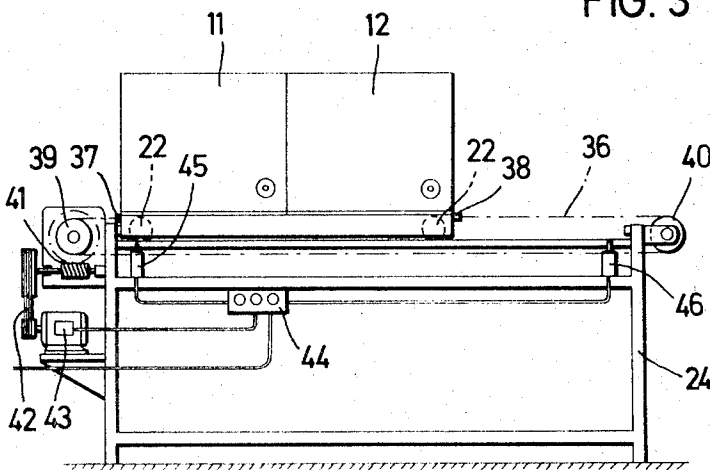


FIG. 4

INVENTOR:

BY: Max NORBISRATH

Arthur O. Klein
Attorney

MACHINE FOR WINDING TAPELIKE STRIP ONTO REELS

This invention relates to machines for winding tape or other narrow strip, for example typewriter ribbon, on to reels, the machine comprising at least two winding units which are operated alternately by an operator.

In winding machines of this kind the winding units are operated by the operator in such a way that while one of the winding units is winding strip on to a reel, the operator attends to the other winding unit which is at this time at a standstill. The operator may for example be mounting an empty reel on the winding spindle of the unit, attaching the strip to the empty reel, inserting into the strip switchover eyelets, cutting off the strip and doing whatever else is necessary. The fact that a single operator can attend to several winding units, located at different positions, helps to increase the output per operator, compared with what can be obtained using a machine which has only one winding unit. Nevertheless existing machines comprising several winding units have certain serious disadvantages, which give rise to difficulties when the operator is attending several separately located winding units.

A particular disadvantage found in practice in the operation of existing machines equipped with two winding units located in different positions, is that the operator finds the units somewhat inaccessible. A further difficulty arises in those cases where the tape or other strip is fed from the left to one winding unit, and from the right to the other unit. This still further increases the difficulty of manipulation. Separately located winding units and differently arranged strip feeds are found in particular in existing winding machines provided with one or two devices for inserting switchover eyelets. The resulting manipulative difficulties in attending the separately located units can seriously reduce output, particularly in view of the fact that the operator is usually unskilled and takes a long time to become dextrous. When a skilled operator is absent, due to illness or otherwise, the replacement operator runs into the same manipulative difficulties, which are characteristic of the existing winding machines.

The object of the present invention is to provide a machine of the kind described which is free from the disadvantages mentioned above and which allows the operator to operate the machine in a simpler and more convenient manner. To this end, according to this invention in a machine of the kind described, the winding units are moveably mounted and have a mechanism by which each in turn can be brought into a single servicing position.

This mobility of the winding units allows each unit, as soon as it has finished winding, to be brought rapidly within easy reach of the operator, allowing the operator to attend conveniently and rapidly to such matters as the mounting of a fresh reel, attaching the strip to the reel, and the like, while the other unit continues to wind its reel. By the time the operator has completed his preparatory tasks on the first unit, the second unit has wound its reel, whereupon the operator moves the second reeling unit into the servicing position so that the operator can now attend, conveniently and rapidly to the preparation of this second unit, while the first unit automatically winds strip on to its reel.

To make the moving of the reeling units as simple as possible they are preferably mounted on a travelling carriage, which preferably has wheels which run on rails mounted on a frame of the machine. The movements of the travelling carriage may then be limited by mechanical stops or by limit switches. The movements of the travelling carriage are controlled by the operator, allowing him to bring any unit easily into the position where he can most conveniently and rapidly attend to it.

The mechanism for moving the travelling carriage can be arranged in various ways. In practice it has been found particularly advantageous to provide a double-acting pneumatic or hydraulic ram which is fixed to the machine frame and has a piston with a piston rod connected to the carriage, the movements of the piston in the ram and hence the movements of

the carriage being controlled by a control valve. The speed of movement of the travelling carriage can preferably be adjusted by means of regulating valves in the pneumatic or hydraulic pipes between the control valve and the ram.

Alternatively the mechanism may include a chain or flexible cable which extends around tensioning wheels and the ends of which are attached to the carriage, one of the wheels being driven reversibly by an electric motor through a reduction gearing and the motor being controlled by a switch.

Two examples of machines constructed in accordance with the invention are illustrated in the accompanying drawings in which:

FIG. 1 is a front view of the first example showing a first winding unit in position for an operators attention;

FIG. 2 is a side view of the first example;

FIG. 3 is a front view of the first example, but in this case showing a second winding unit in position for the attention of the operator; and,

FIG. 4 is a front view of the second example.

The machine shown in FIGS. 1 to 3 has two similar winding units 11 and 12 mounted side-by-side. Each of the units 11 and 12 is in itself of conventional construction and including a storage reel 14, a measuring wheel 15 which cooperates with an electronic counter 16, a cutoff device 17, an eyelet inserting device 18 and a reel 19 on to which the strip is to be wound and detachably mounted directly on the shaft of a winding motor.

The two units 11 and 12 are mounted side-by-side on a travelling carriage 13 provided with pairs of rollers 22 rotating on axles 20 and 21 so that the carriage 13 can travel along rails 23 mounted on a machine frame 24. The movement of the carriage 13 is limited by mechanical stops 25 and 26 attached to the frame 24.

The carriage 13 is driven by a pneumatic or hydraulic ram 27 fixed to the machine frame 24 and containing a piston the piston rod 28 of which is attached by a driving bracket 29 to the carriage 13. The two chambers of the ram 27 which is double-acting are connected through pipes 30 and 31 to a control valve 32 mounted on the machine frame 24. The control valve 32 has a handle 33 which allows the operator to control the movements of the piston of the ram 27. Pneumatic or hydraulic fluid is fed to the control valve 32 through a supply pipe 34, as shown in FIGS. 1 and 2. In the pipes 30 and 31 between the control valve 32 and the double-acting ram 27 there are regulating valves 35 which allow the operator to control the rate of flow of the pneumatic or hydraulic fluid, and thus to control the speed of travel of the carriage 13.

As shown in FIG. 1 the piston of the ram 27 is fully retracted in the cylinder 27, and the carriage 13 is in its extreme left-hand position up against the mechanical stop 24. The right hand winding unit 12 is approximately in the middle of the machine frame 24, that is to say it is in the most convenient position for the attention of the operator, so that the operator can easily and rapidly perform the necessary preparatory operations on this unit. The other winding unit 11 is at the left-hand end of the machine frame 24, the wind-on reel 19 in the winding unit 11 being automatically loaded with strip from the reel 14. As soon as the operator has completed his preparatory operations on the unit 12, and as soon as the unit 11 has completely loaded its reel 19, the operator actuates the handle 33 thus bringing the pneumatic or hydraulic ram 27 into action. Pneumatic or hydraulic fluid under pressure is admitted from the pipe 34 into the ram 27, driving its piston outwards and so moving the carriage 13 towards the right, until the left-hand winding unit 11 reaches the middle of the machine frame 24, as shown in FIG. 3. The carriage 13 is brought to a stop by the right-hand mechanical stop 26. With the unit 11 in its most convenient position, near the middle of the machine frame 24, the operator removes the loaded reel 19 from the unit 11, mounts a fresh empty reel 19 on the spindle of the winding motor and performs all the other necessary preparatory tasks, so that the unit 11 can be set in operation, whereupon the operator actuates the handle 33 once more, bringing the other

unit 12 into position in front of him, near the middle of the machine frame 24 and then removes the loaded reel 19 from the unit.

The second example shown in FIG. 4 is of basically the same construction as that shown in FIGS. 1 to 3, except that the drive for the carriage 13 is different. In this case the drive is provided by a motor 43 which drives a chain 36, the ends of which are attached at 37 and 38 to the units 11 and 12. The chain 36 passes over tensioning rollers 39 and 40 which are rotatably mounted on the machine frame 24. The left-hand tensioning roller 39 is driven by a worm gear 41 which is itself driven through a belt 42 by the electric motor 43, which is controlled by a switch 44. Limit switches 45, 46, actuated by the rollers 22 of the carriage 13 limit the end positions of the units 11 and 12.

To bring a different winding unit into position in front of the operator, near the middle of the machine frame, the operator actuates the control switch 44. In this example also the operator tends the two winding units 11 and 12 alternately bringing each one in turn into position near the middle of the machine frame, where the operator can conveniently attend to the necessary preparatory operations.

The machines described are suitable not only for winding typewriter ribbon, but can be adapted for winding all kinds of tape or other narrow strip material, for example for winding tapes for automatic office calculators, tabulating machines and the like. The machines are also suitable for application in the winding of photographic film and magnetic tape.

I claim:

1. In a machine for winding tapelike strip onto reels, said machine including two winding units, the improvement comprising means movably mounting each of the two units for linear movement between a common service position and an

operative position disposed laterally of the common service position, the operative positions of the respective units being located on opposite sides of the common service position, driving mechanism for thus linearly moving said units, and means operatively connecting said driving mechanism to said units to move each of said units in turn into said servicing position.

2. A machine according to claim 1, comprising a table for supporting the winding units in the individual positions, and means for supporting the table including an undercarriage, and rollers, and guide-rails interposed between the undercarriage and table.

3. A machine according to claim 2, comprising limit stop means on the undercarriage for limiting the movement of the table with respect thereto.

4. A machine according to claim 3, comprising a double-acting reciprocable fluid motor mounted at the undercarriage for driving the table with respect thereto, the fluid motor having a piston rod which engages the movable table, and an actuating slide valve for reversing the direction of travel of the piston rod.

5. A machine according to claim 4, wherein the actuating slide valve is connected to the double-acting cylinder by control conduits having regulating valves interposed therein.

6. A machine according to claim 3, wherein the driving means for moving the table comprises a table pulling means connected to opposite ends of the table, a reversible driving motor, a transfer drive interposed between the motor and the table driving means, and a double throw motor reversing switch interposed in the drive for the motor and actuated by the reciprocation of the table.

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