Sept. 2, 1952

L. BASTIN

WINDING APPARATUS FOR THE WEB DIVIDER OF FINISHER CARDS

2,608,724

Filed Feb. 25, 1950

9 Sheets-Sheet 1

Fig. 1

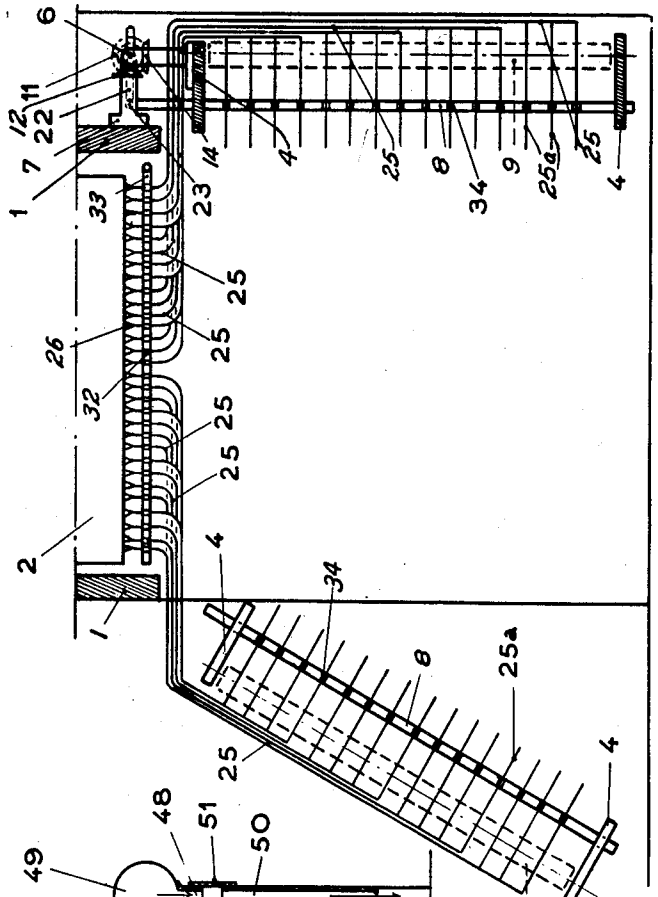
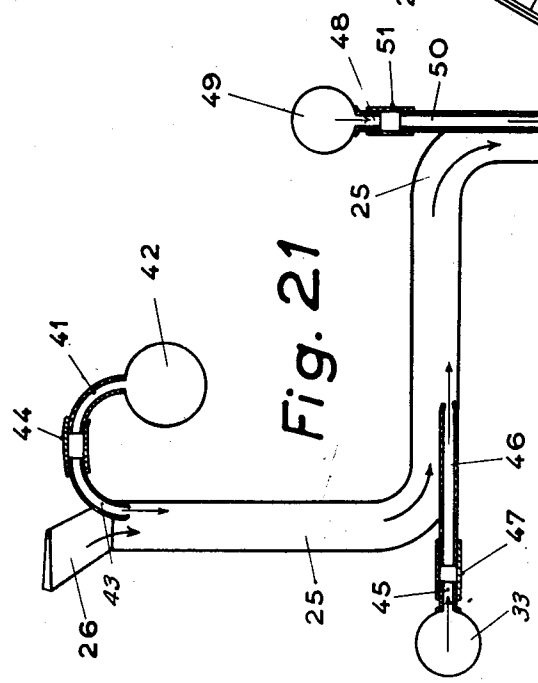


Fig. 21



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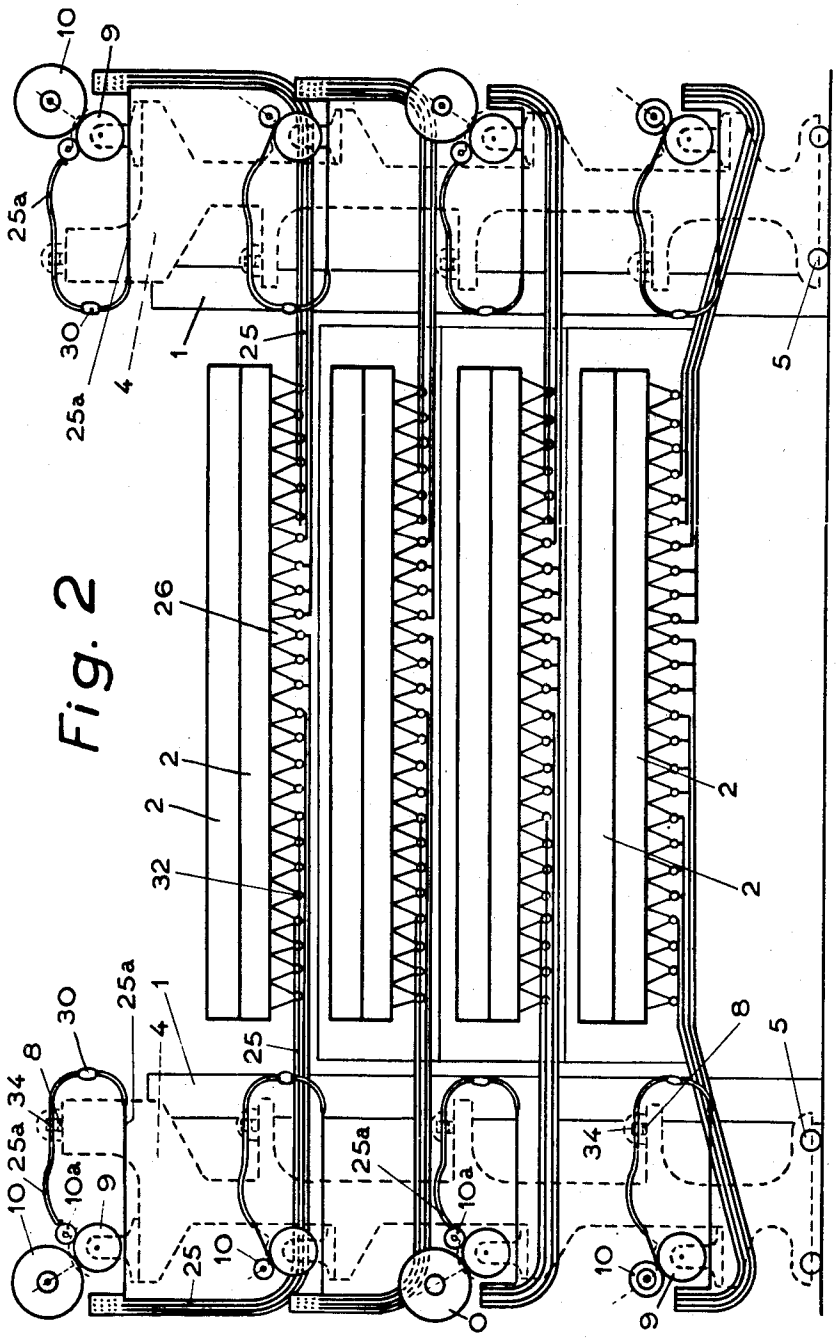


Fig. 2

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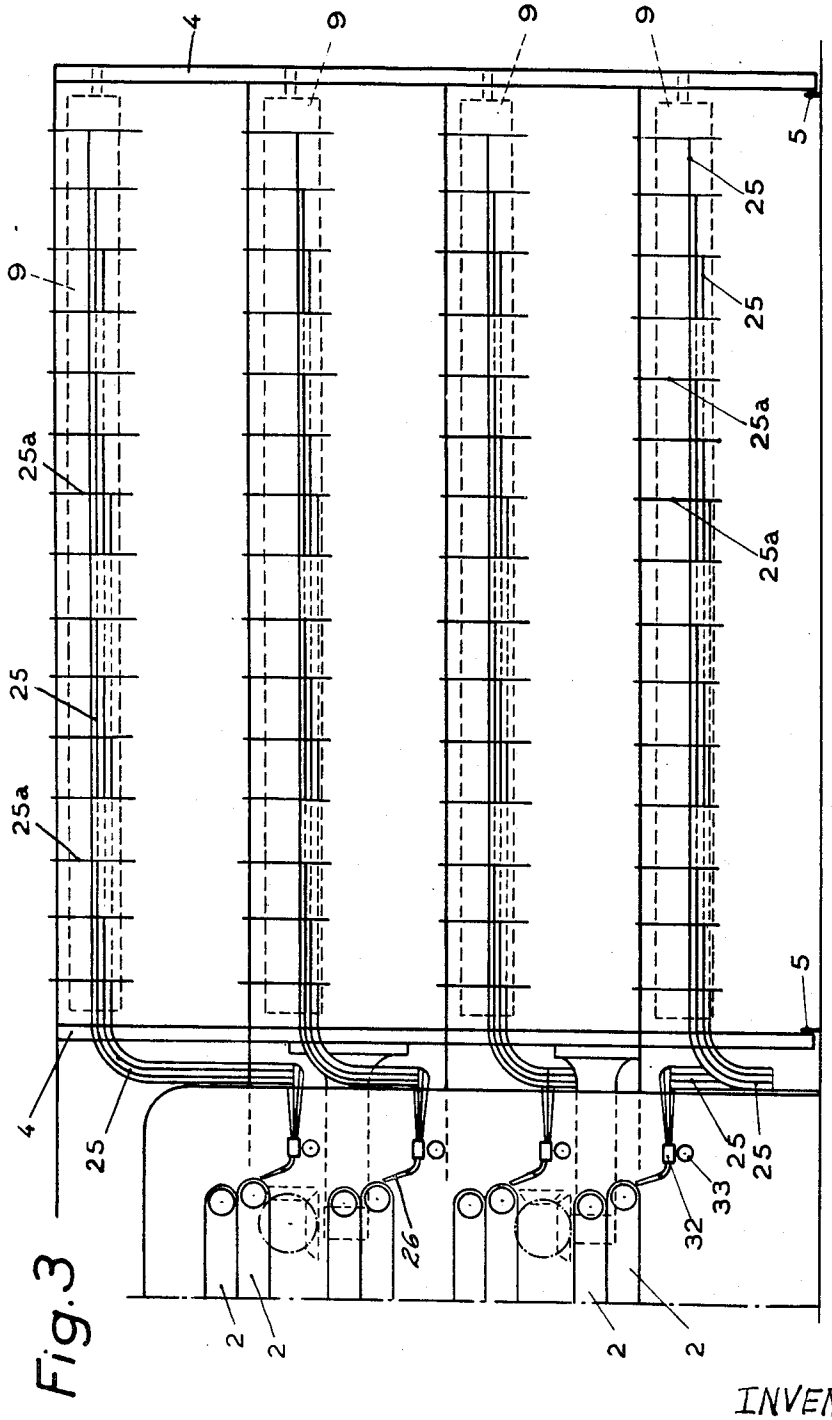


Fig. 3

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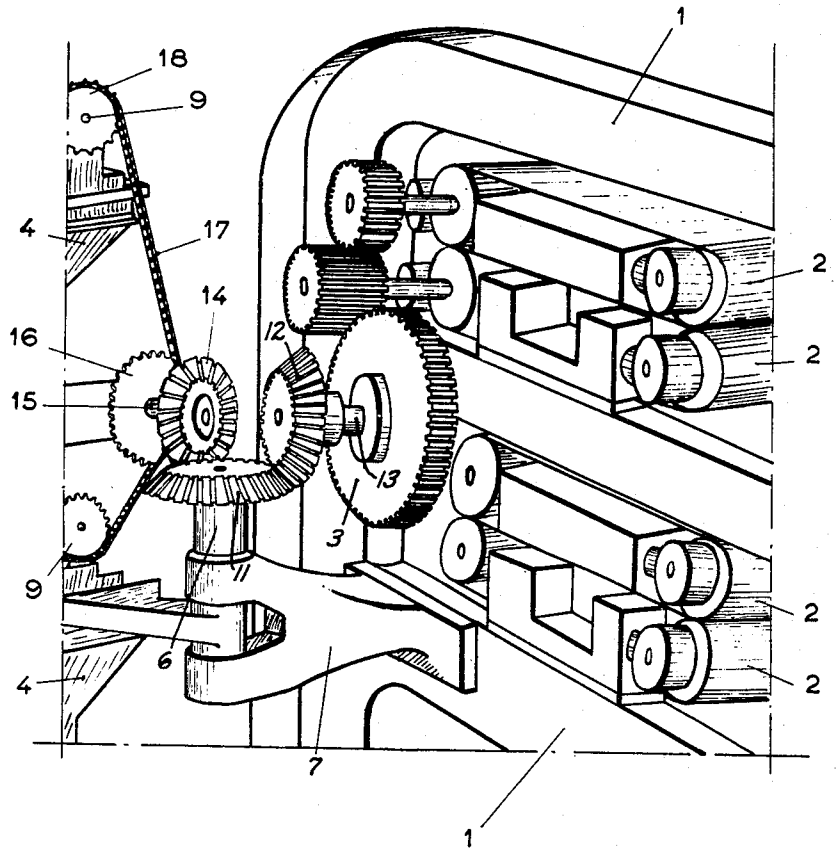
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Fig. 4



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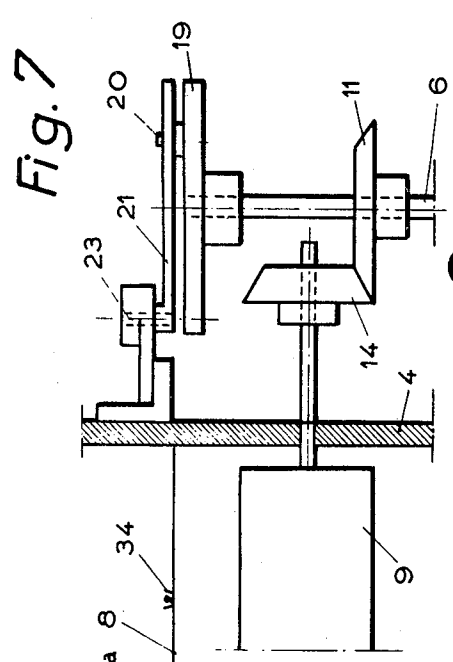


Fig. 7

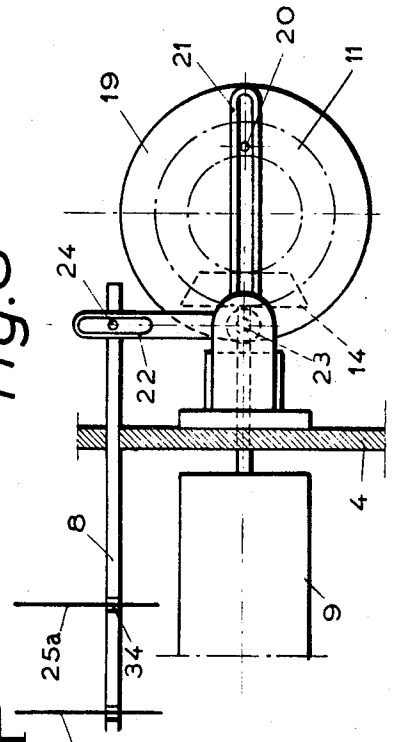


Fig. 8

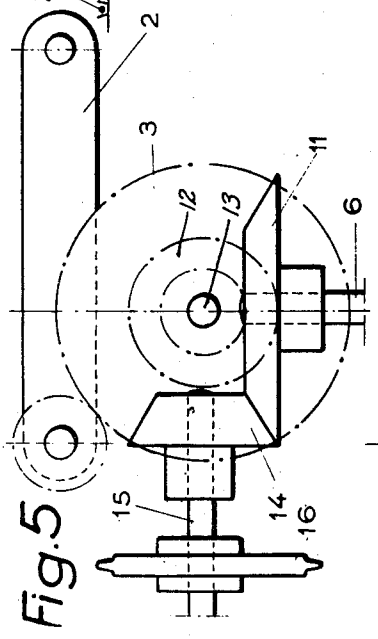


Fig. 5

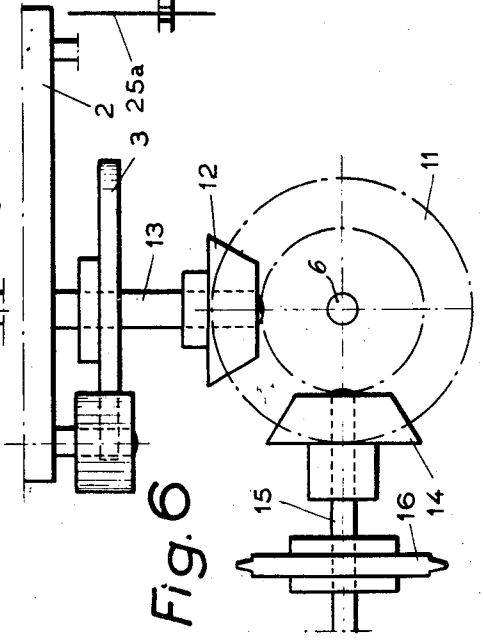


Fig. 6

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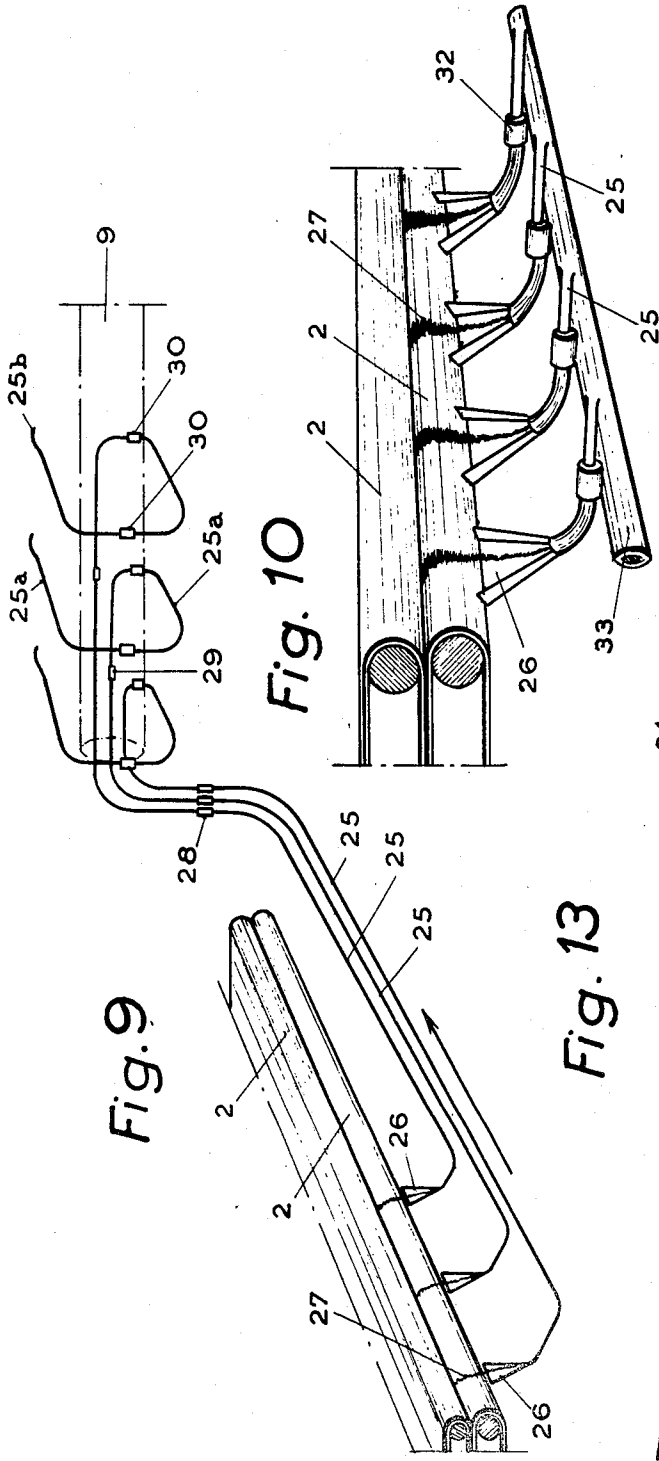


Fig. 9

Fig. 10

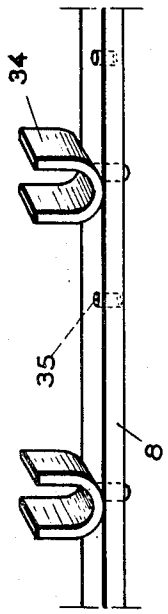


Fig. 13

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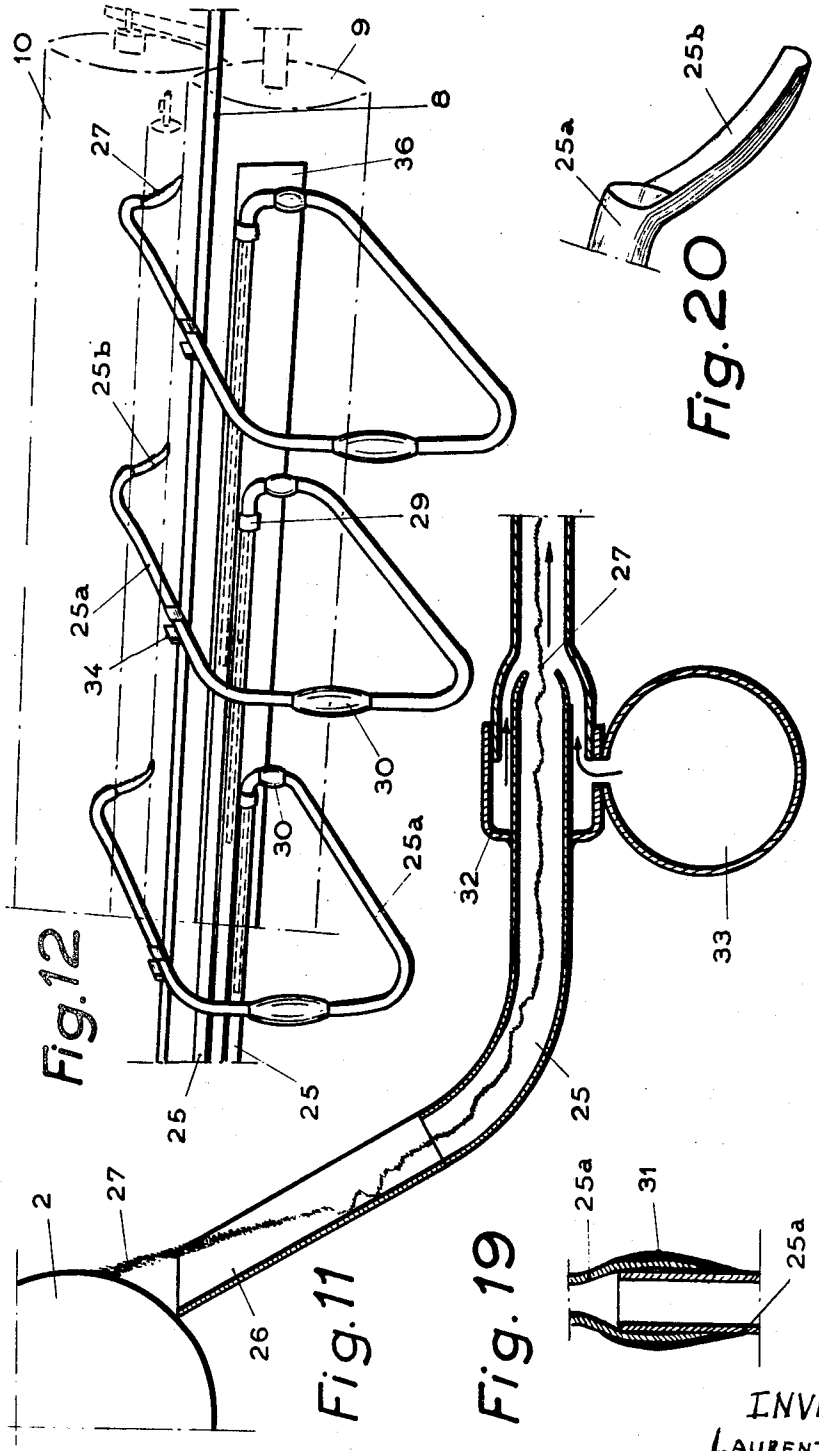
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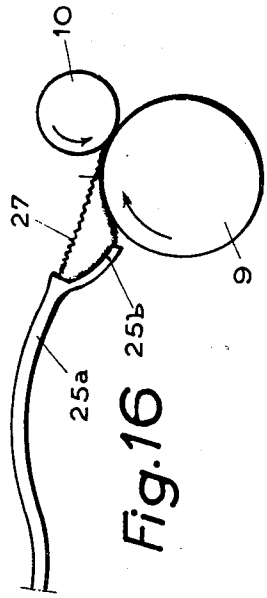


Fig. 16

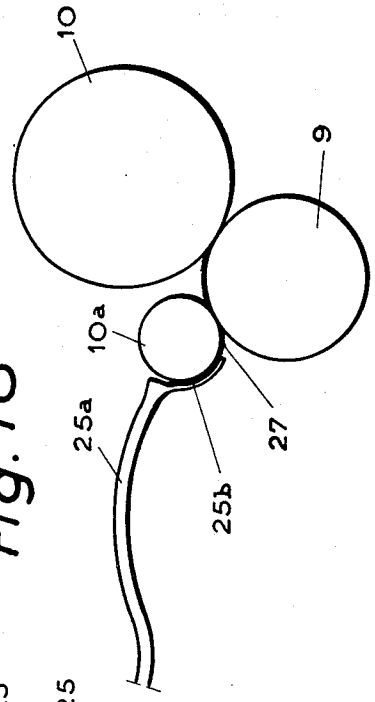


Fig. 18

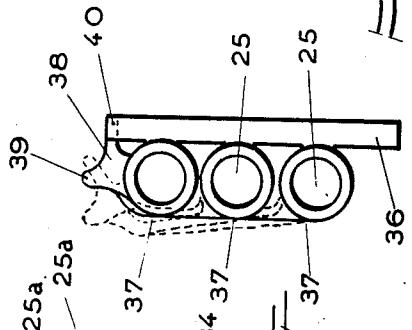


Fig. 15

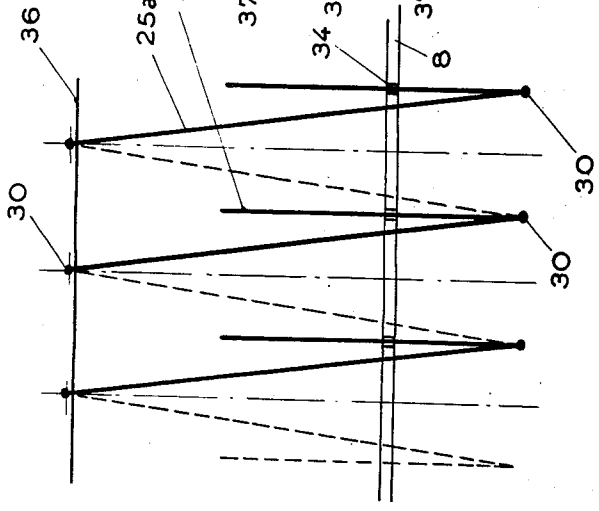


Fig. 14

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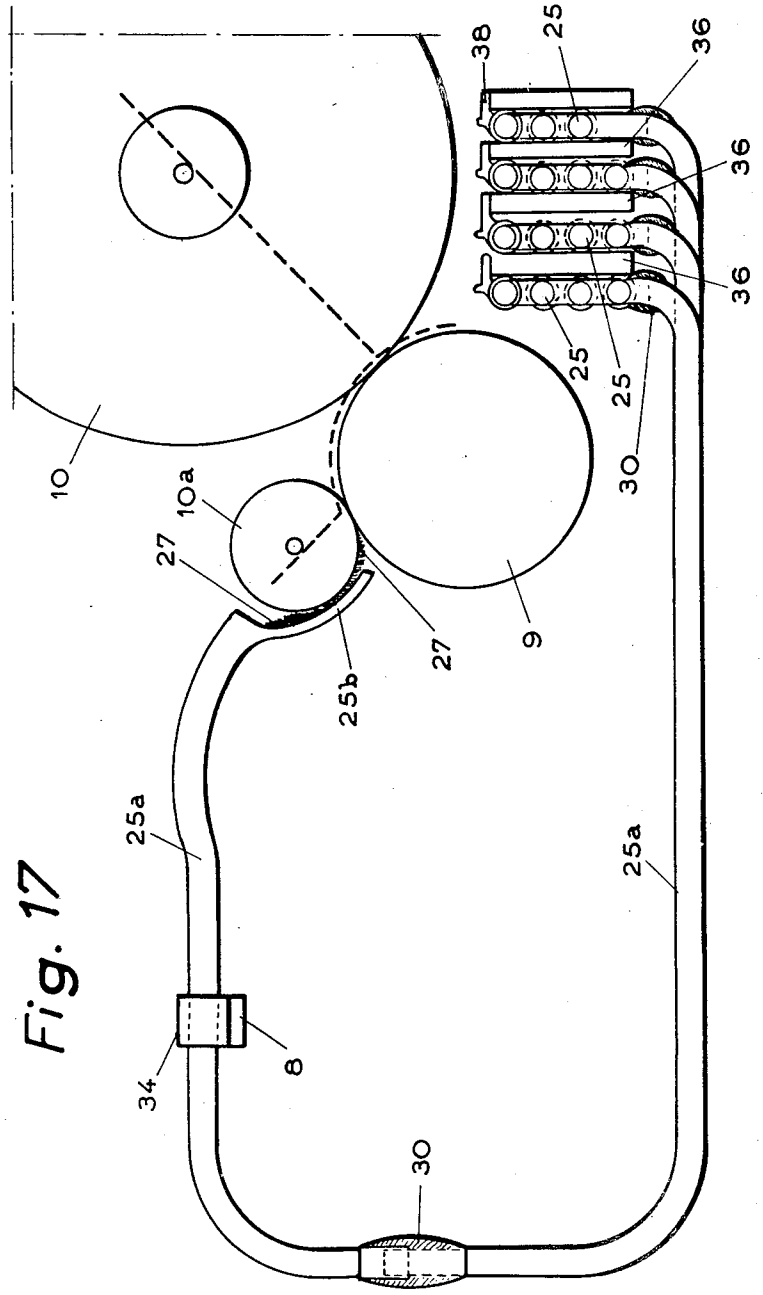


Fig. 17

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Patented Sept. 2, 1952 2,608,724

UNITED STATES PATENT OFFICE

2,608,724

WINDING APPARATUS FOR THE WEB DIVIDER OF FINISHER CARDS

Laurent Bastin, Roubaix, France

Application February 25, 1950, Serial No. 146,266
In France March 2, 1949

11 Claims. (Cl. 19—153)

1

The invention relates to finisher cards, also called condenser cards, which are followed at their outlet by a special apparatus called "web divider" or "condenser," the purpose of which is to split up the web delivered by the doffer into a series of strips or ribbons of equal widths, said strips of web then being rounded into the shape of ropings, condenser yarns or "slivers," in order to make them stronger, by passing them between rubber gears or rubbing aprons, said slivers or ropings being finally cross-wound on spools so as to form condenser bobbins or jack spools to facilitate the conveyance thereof to the spinning frames.

It is known that these condenser bobbins are driven by friction by operated drawing or attracting rollers and that the crosswinding of the slivers is obtained either by imparting to these traction rollers or tractor, and to the condenser-bobbins, in addition to their rotary movement, an axial reciprocating movement, while the sliver-guides which precede them and which receive the slivers at the outlet of the rubbers remain stationary, or by imparting to said sliver-guides a reciprocating movement, while the traction rollers and the condenser-bobbins only effect a rotary movement.

It is also known that to each "bank," and therefore to the outlet of each pair of rubbers, there corresponds such a system comprising sliver-guides, a spool and a tractor that draws the ropings in a continuous manner, said system being supported at its ends between the front uprights of the lateral frames or side-plates of the machine, the length of each system necessarily corresponding to the width of said condenser, all the vertically combined systems of which form in height the winding apparatus.

This type of winding apparatus has the drawback, in particular, of being unable to give to the cheeses widths and diameters which are variable according to the requirement of the spinning frames, the reason being the necessarily restricted length of the spools and also their spacing which is also restricted in height on the front face of the condenser, the diameter of the jack spools being furthermore limited by the requirements of visibility and access to the tapes and to the rubbing aprons.

In view of the fact that in order to overcome the above explained drawbacks, it appears to be practically impossible to increase the area of the front face of the dividing apparatus or condenser, the invention has for its object to provide a new type of winding apparatus for condenser cards, whereby it becomes henceforth possible to obtain inter alia and in particular:

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(a) A larger number of systems, comprising a sliver-guide, a traction roller and a spool, than the number of banks of the condenser, thereby enabling the ropings of a bank to be distributed over one, two or a larger number of systems.

(b) Lengths of spools which are variable and greater than the width of the front face of the condenser, and also vertical spacings between the systems, which are greater than the vertical spacings between the banks, thereby making it possible to give to the cheeses widths and diameters which are variable according to the requirement of the spinning frames.

(c) A greater facility for removing the full jack spools and also for automatically replacing them by bare wooden spools.

Having explained this, the novel type of winding apparatus according to the invention is characterized, in principle, in that the systems, comprising a ropings or slivers-guide, a tractor and a spool, are independent of the dividing apparatus and are located apart in front of the face of said apparatus, and in that, in combination with such systems thus located, means are provided for directly picking up the ropings as they come out of the rubbing aprons and conveying them to the systems and directly delivering them to the tractors of said systems.

This novel type of winding apparatus is furthermore characterized, according to the invention, by the following points, taken separately or in any combinations:

(a) The systems are mounted on stationary or movable racks located in front of the face and on either side of the condenser, it being possible for the height and the width of said racks to be greater than the height and the width of the front face of the dividing apparatus, and said racks may be arranged, either parallel to the medial vertical plane of the dividing machine, or angularly with respect to said plane.

(b) the number of systems mounted on the racks is at least equal to the number of banks, their length and their vertical spacing being at least equal to the width and to the height of the front face of the condenser.

(c) The racks may be secured to the side-plates of the frame of the condenser, be fixedly or pivotally mounted thereon, or be independent thereof, the drive of the traction drums for continuously drawing the ropings and the drive of the ropings-guides, being effected either by the usual members of the condenser, or in any other manner.

(d) The conveyance of the ropings, directly from the outlet of the rubbing-aprons to the tractors of the respective systems, is preferably

effected pneumatically, first by suction of the ropings as they issue from the rubbers, then by blowing them up to the tractor, by means of bundles or nests of tubes, one, two or a larger number of bundles serving the rubbing aprons of one and a same bank for feeding one or more systems.

(e) Means are provided for enabling the conveying tubes of each bundle to be lengthened or shortened according to requirements, and also for enabling them, at certain points of their path, to be shifted for adjusting their lengths and their spacings in order to vary the width of the cheeses and to enable said tubes to follow the movements of the racks and also the reciprocating movements of the ropings-guides.

In order to enable the invention to be more clearly understood and also by way of embodiments thereof, means are described hereinafter and diagrammatically illustrated in the accompanying drawings, for enabling a winding apparatus of the novel type according to the invention to be constructed, said winding apparatus being in the present case provided with pivotally mounted racks and being adapted to convey the ropings pneumatically.

Fig. 1 is an overall top plan view, showing the arrangement of the pivotally mounted racks with respect to the frame and to the front face of a dividing machine, the right-hand rack being shown in a position at right angles to the face, the left-hand rack being in an open oblique position.

Fig. 2 is an elevational view of the front face of the dividing machine, with both racks in the perpendicular position and seen from the end.

Fig. 3 is an elevational view of the inner face of the right-hand rack.

Fig. 4 is a detail perspective view of the pivotal mounting of one of the racks and of the actuation of its tractors by the drive of the rubbers of the condenser.

Fig. 5 is a view thereof in side elevation.

Fig. 6 being a corresponding top plan view thereof.

Fig. 7 is a detail view, in side elevation, of the operating of the reciprocating movement of the bars that replace the ropings-guides.

Fig. 8 being a corresponding top plan view.

Fig. 9 is a general arrangement diagram showing a bundle of tubes for the pneumatic conveyance of the ropings from one pair of rubbers to one tractor.

Fig. 10 is a detail perspective view, showing the uptake distributing ramp for sucking the ropings at the outlet of the rubbing-aprons.

Fig. 11 is a sectional view of a suction and forcing head of the distributing ramp for starting the ropings.

Fig. 12 is a detail view, showing the method of feeding a system with ropings, as they issue from a tubular bundle.

Fig. 13 is a detail of a bar that replaces the ropings-guide.

Fig. 14 is a view showing the reciprocating movement imparted by the bar that replaces the ropings-guides, to the outlet ends of the tubes of the bundles in order to effect the crossed winding of the ropings on a spool.

Fig. 15 is a cross-sectional view of a tube-carrier plate that enables the tubes to slide.

Figs. 16, 17 and 18 are views showing the various phases of the feed of the systems with the ropings respectively delivered by the tubular bundles; at the beginning, when the ropings are engaged, and then at the instant when a full jack spool is removed, and finally at the instant when, before the removal of a full jack spool, an empty wooden spool is placed in position.

Fig. 19 is a view in diametrical section of an articulated joint for the tubes which enables them to follow the reciprocating movement of the bar that replaces the ropings-guides.

Fig. 20 is a view of the end of a tube adapted to facilitate the gripping of the roping as it issues from the tube, and

Fig. 21 is a sectional view of a modified construction of a suction and blowing head at the inlet of a bundle of tubes, with additional blowing means.

According to these figures, 1 is the side plates of the frame of a condenser, 2 the rubber-aprons and 3 is a wheel for driving said rubbers.

4 is the uprights of the frames of the pivoting lateral racks that support the systems, each of said racks, mounted on wheels 5, being adapted to swing about a pivot 6 in clevis 7 secured to the side-plates 1 of the frame of the dividing machine.

Between the uprights 4 of the frames of the racks are located the corresponding systems, the number of which may be equal to or greater than that of the pairs of rubbers 2, and each of which said system comprises; a reciprocating bar 8 that replaces the ropings-guide, the traction roller 9 and the spool 10.

On the pivot 6 which forms the pivot of the rack, is loosely mounted an intermediate bevel pinion 11 that meshes with a bevel pinion 12 keyed on the end of the shaft 13 of the driving wheel 3 of the rubbers 2.

The pinion 11 in its turn meshes with a bevel pinion 14 keyed on a shaft 15 supported by the upright 4 of the rack; a sprocket 16 fixed on said shaft 15 drives an endless chain 17 which engages the sprockets 18 fixed on the end of the tractors 9 provided on the rack and which ensures the drive of said tractors in synchronism with that of the rubbers 2.

Owing to this arrangement, irrespective of the angle of opening of the pivoting racks, the tractors are constantly driven by the drive of the rubbers 2.

On the same pivot 6 are mounted in the vertical direction, for each system, crank-plates 19 provided with a crank-pin 20 that controls the oscillation of a cranked lever 21–22 provided with a slideway, said lever being pivoted at 23, and the arm 22 of which actuates, by means of its slideway, a pin 24 fixed at the end of the bar 8 that replaces the ropings-guide.

Likewise by means of this arrangement, the reciprocating movement of the bars 8 takes place regularly, irrespective of the angle of opening of the racks 4.

In order to effect the conveyance of the ropings, which are fragile owing to the fact that they have only received a slight compression and have not yet been subjected to any twisting, the racks and the systems are provided, in combination, with suitable conveying means for picking up the ropings at the actual outlet of the rubbing aprons, conveying them to the racks and delivering them to the traction rollers of the respective systems to which they pertain.

In the embodiment which it given by way of examples, the conveyance of said ropings is effected pneumatically, and the pneumatic device provided for this purpose has, inter alia and in particular, the following features:

For each bank, each of the ropings, at the outlet of the rubbers, is sucked into one of the tubes

of one or more bundles of tubes which then convey them by blowing, to the systems which correspond to each of the banks and which are arranged on the racks located on either side in front of the face of the condenser, each roping which is blown as it comes out of its tube, feeding the tractor of the system to which it is intended.

Each tube of the bundles is provided, near its inlet opening for the ropings, with a sucking and blowing device or head.

Each bundle of tubes ends to its respective creel, opposite the system which it has to feed.

In order to enable the bundles of tubes to follow the movements of the pivoting racks, each tube is articulated at a suitable point of its path, and similarly, in order to permit the variations of lengths due to the angular movement of said racks and in order to permit the variable adjustment of the mutual spacing between the outlet ends of the tubes, according to the width to be given to the cheeses on the spools, each tube, in the portion thereof that pertains to the rack, is provided for this purpose with a sliding section which enables it to be lengthened or shortened.

In addition, in order to enable the outlet ends of the tubes, or outlet tubes, that open onto the tractors, to follow the reciprocating movement of the bar which supports them and which replaces the ropings-guides, each of said outlet tubes is articulated.

According to the figures that relate more particularly to the pneumatic conveying device (in particular Fig. 9 that illustrates diagrammatically a bundle of tubes supplying a system), **25** are the tubes whose inlet ends are provided with spouts **26** for sucking the ropings **27** as they issue from the rubbers **2**.

28 are joints that enable the tubes to pivot according to the positions given to the racks, **29** joints for the sliding of the tube sections so that they can follow the movements of the racks and so that the adjustment of the spacing can be effected according to the width to be given to the cheeses, and **30** are joints for the articulation of the outlet tubes **25a**, said joints being provided with a rubber sleeve **31** (Fig. 19) that ensures the fluid-tightness of the joint.

For the suction and the blowing of the ropings **27**, each of the inlet ends of the tubes **25** of the bundle of tubes is provided with a sucking and blowing device or head **32** of any type (Fig. 11) connected to a compressed air distributing system **33**.

For the reciprocating movement of the outlet tubes **25a** which are articulated at **30**, the same rest in supports **34** fixed on the bar **8** that replaces the usual ropings-guides. Said supports **34** can be mounted at will along the bar **8** by engaging them in holes **35**, a suitable number of which are provided on said bar, thereby enabling the spacing between said outlet tubes to be adjusted according to the width to be given to the cheeses, said spacing being made possible by the slidable mounting of the tubes **25**, the joints **29** of which are fixed on a plate **36** of the racks **4**, opposite the tractor **9** of each system.

In order to retain the position of the tubes on the plate **36** after their length has been adjusted, and also to enable this adjustment to be effected, the tubes are held in position by tube-fasteners **37** provided with pivotally mounted latches **38** which have a heel **39** adapted, by merely rocking, to engage in or be disengaged from stop notches **40** provided at suitable intervals along the upper edge of said plate **36**.

Finally, the feed of the systems with ropings **27** is greatly facilitated by the channel shape **25b** given to the ends of the outlet tubes **25a** (Fig. 20).

When the machine is started, the ends of the ropings **27**, which are pneumatically conveyed from the rubbers **2** through the tubes **25** and are blown out of the outlet tubes **25a**, are projected into contact with the traction rollers or tractors **9**, and gripped between said tractors and the spools **10** onto which each of them is wound with a crossed winding, to form a cheese (Fig. 16).

When a jack spool **10** is full, an empty spool **10a** is placed so as to rest against the tractor **9**, and bear against the channels **25b**, so that after the ropings have been broken and said jack spool **10** removed, without its being necessary to engage each roping by hand, said ropings are automatically caught up by blowing and carried between the tractor **9** and said empty spool **10a**, which then takes the place of the jack spool **10** which has been removed (Figs. 17 and 18), thereby making it possible not to have to stop the dividing machine.

It is of course to be understood that without exceeding the scope of the invention, improvements, modifications or additions can be made, and also the use of equivalent means may be contemplated.

Thus for example, the suction and blowing head **32** may be replaced by a sucking and blowing device which is located at the inlet of a bundle of tubes and is combined with an additional blowing device which may be made necessary for causing the ropings to pass through the bent parts of the tubes during their conveyance through the tubes of said bundle.

According to this modification (Fig. 21), a blower **41** supplied by a distribution pipe **42** is provided with a nozzle **43** mounted at the end of an elastic joint **44**, which enables the nozzle to be inserted into one of the roping conveying tubes **25**, at will, in the case in which an additional blowing pressure is necessary, while the pipe **33** supplies a blowing and sucking device **45** also provided with a nozzle **46** mounted at the end of an elastic joint **47**.

Finally, another blowing and sucking device **48** which is supplied by a pipe **49** and the nozzle **50** of which is mounted at the end of an elastic joint **51**, enables an additional blowing to be obtained in the tubes **25** in order to make the ropings pass through the bends.

I claim:

1. In a winding apparatus for a condenser system having rubbing aprons to provide ropings, in which roping-guides, traction rollers and jack-spools are located apart with respect to the front of the condenser, the combination of a rack located respectively on each side of said condenser, said rack being angularly arranged with respect to the front of the condenser, traction rollers and jack spools for winding the bobbins mounted on said rack, driving means to actuate said traction rollers, and means to pneumatically convey and guide ropings in an unstressed state from the exit of said rubbing aprons to each of said traction rollers respectively.

2. In a winding apparatus for a condenser system having rubbing aprons to provide ropings, in which the roping-guides, traction rollers and jack-spools are located apart with respect to the front of the condenser, the combination of a rack secured respectively on each side of said condenser, said rack being angularly arranged with respect to the front of the condenser, traction rollers and jack spools for winding the bobbins

mounted on said rack, driving means to actuate said traction rollers, and means to pneumatically convey and guide said ropings in an unstressed state from the exit of said rubbing aprons to each of said traction rollers respectively.

3. In a winding apparatus for a condenser system having rubbing aprons to provide ropings in which the roping-guides, traction rollers and jack-spools are located apart with respect to the front of the condenser, the combination of a rack adjustably mounted respectively on each side of said condenser, said rack being angularly adjustably arranged with respect to the front of the condenser, traction rollers and jack spools for winding the bobbins mounted in said rack, driving means to actuate said traction rollers, and means to pneumatically convey and guide said ropings in an unstressed state from the exit of said rubbing aprons respectively to each traction roller.

4. An apparatus as claimed in claim 1 wherein said driving means comprise driving members adapted to be actuated by the condenser.

5. An apparatus as claimed in claim 1 wherein said driving means comprise each at least one sprocket wheel keyed on a traction roller, one sprocket wheel keyed on a shaft, a common chain meshing with both said sprocket wheels, and a gear system adapted to drive said shaft, said gear system being adapted to be actuated by the condenser.

6. In a winding apparatus, for a condenser system having rubbing aprons to provide ropings, in which said roping-guides, traction rollers and jack-spools are located apart with respect to the front of the condenser, the combination of a rack on respectively each side of said condenser, said rack being angularly arranged with respect to the front of the condenser, traction rollers and jack spools for winding the bobbins mounted on said rack, driving means to actuate said traction rollers, and a plurality of pneumatic means comprising each an inlet member located near one exit of said rubbing aprons to receive one roping, an outlet member arranged near one traction roller, in front of one jack spool, pipe means connecting both said inlet and outlet members and at least one source of pneumatic pressure connected to said pipe means to actuate said roping into the pipe means, the end portion of which adjacent to the outlet member being arranged and adapted to traverse said roping along said bobbin while being wound.

7. An apparatus as claimed in claim 6 wherein the end portion of the pipe means is provided with a plurality of curvatures and slidingly adjustable joints whereby the traverse motion of the

end portion is adjustable according to the width to be given to the bobbin.

8. An apparatus as claimed in claim 6 wherein the end portion is secured to a bar, said bar being adapted to receive a reciprocating movement whereby said roping is traversed along the corresponding bobbin through the motion of the end portion.

9. An apparatus as claimed in claim 6 wherein the inlet member is a spout adapted to draw in said roping and the outlet member has a shape designed to facilitate the gripping of the roping around the bobbin.

10. In a winding apparatus, for a condenser system having rubbing aprons to provide ropings, in which said roping-guides, traction rollers and jack-spools are located apart with respect to the front of the condenser, the combination of a rack respectively on each side of said condenser, said rack being angularly arranged with respect to the front of the condenser, traction rollers and jack spools for winding the bobbins mounted on said rack, driving means to actuate said traction rollers, and a plurality of pneumatic means each comprising an inlet member located near one exit of said rubbing aprons to receive one roping, an outlet member arranged near one traction roller, in front of one of said bobbins, a pipe connecting both said inlet and outlet members, at least one suction and blowing device inserted into said pipe to draw said roping into the pipe, and a source of pressure connected to said suction and blowing device, the end portion of said pipe adjacent to the outlet member being arranged and adapted to traverse said roping along said bobbin.

11. An apparatus as claimed in claim 6, which comprises a suction and blowing device connected to said source of pressure and inserted into said pipe, means to actuate the roping, and additional blowing devices arranged and adapted to make the roping pass easily through the bent portions of the pipe means.

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