

(No Model.)

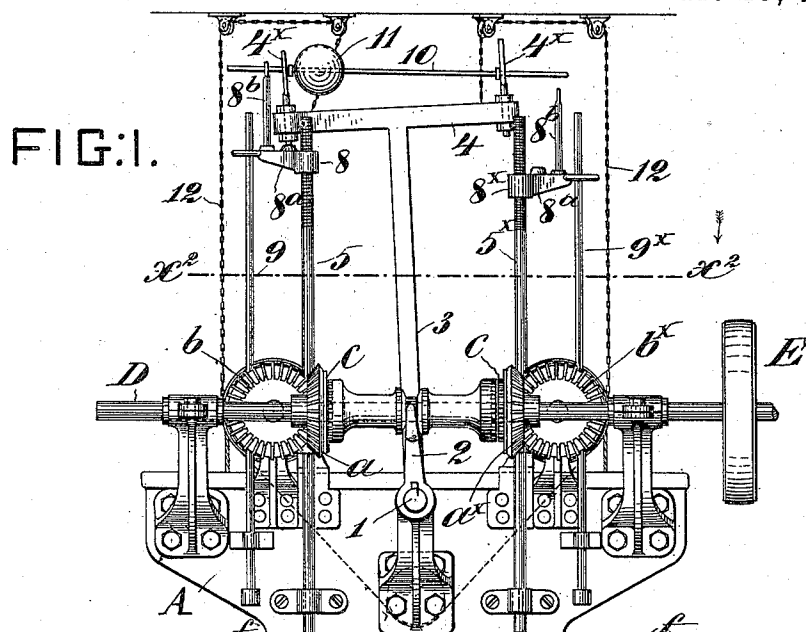
2 Sheets—Sheet 1

J. M. BOOTH.

REVERSING APPARATUS FOR DYE VATS.

No. 579,217.

Patented Mar. 23, 1897.



WITNESSES:

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FIG. 3.

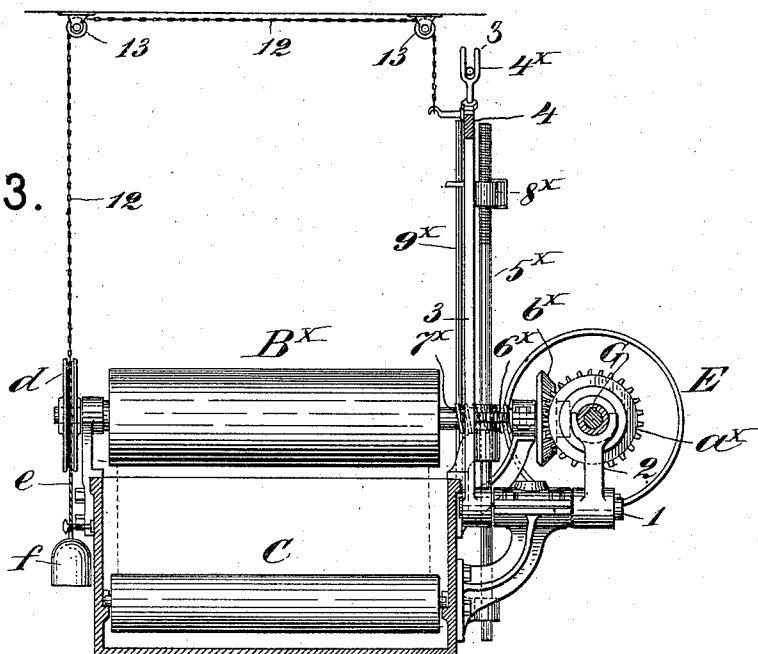


FIG. 5.

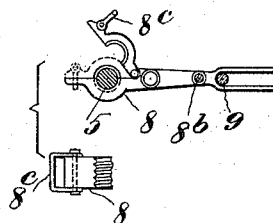
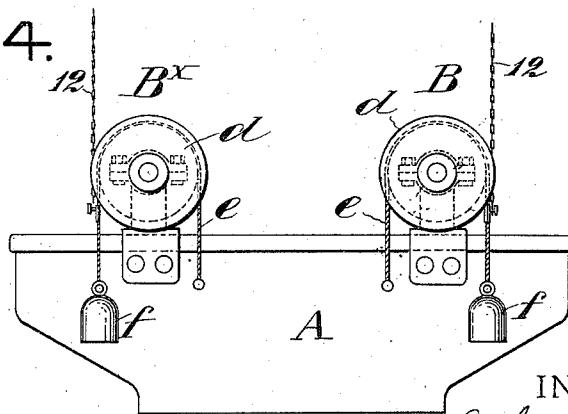


FIG. 4.



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JOHN M. BOOTH, OF ENGLEWOOD, NEW JERSEY.

REVERSING APPARATUS FOR DYE-VATS.

SPECIFICATION forming part of Letters Patent No. 579,217, dated March 23, 1897.

Application filed June 8, 1896. Serial No. 594,655. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. BOOTH, a citizen of the United States, residing at Englewood, Bergen county, New Jersey, have invented certain new and useful Improvements in Automatic Shifters, of which the following is a specification.

My invention relates to the class of devices commonly employed on "jiggers," so called, for shifting the rotating power from one winding-roll to the other, so that the cloth or material may be first wound up on one roll and then on the other, whereby the strip of material is made to pass back and forth through the dye in the vat or bath.

The object of my invention is in part to provide automatic means for shifting the applied power from one roll to the other when the strip of material shall have been wholly or nearly unwound from one roll, in part to provide means for regulating the tension on the rolls, and in part to provide means for regulating the shift to suit the length of the strip of material to be wound up and unwound.

The accompanying drawings illustrate an embodiment of my invention as applied to an apparatus for dyeing cloths or materials.

Figure 1 is an end elevation showing the end where the clutch is situated. Fig. 2 is a sectional plan, the plane being indicated by line x^2 in Fig. 1. Fig. 3 is a vertical mid-section in the plane indicated by line x^3 in Fig. 2. Fig. 4 is an elevation of the end of the apparatus opposite to that seen in Fig. 1. Fig. 5 is a detail view, on a larger scale than the principal figures, of the preferred form of traveling nut, which will be hereinafter described.

As before stated, my invention is herein shown as applied to an apparatus used in dyeing strips of cloth and the like, but it may of course be applied to other machines of the same general character where a strip is to be wound from one roll onto another and back again.

In the following description I have used letters to refer to the ordinary and well-known parts of the apparatus, which parts may be constructed according to any one of the well-known patterns or to any good pattern.

A represents the vat to contain the dye, B and B^x the winding-rolls, mounted rotatively in

brackets thereon, and C a guide-roll in the vat under and about which the strip of cloth X passes. There are sometimes several of these guide-rolls in the vat.

D is the driving-shaft, mounted in brackets on the vat and driven through the medium of a pulley E and belt F. Mounted loosely on the shaft D are two bevel gear-wheels a and a^x , which gear, respectively, with similar bevel-wheels b and b^x , fixed on the journals of the respective rolls B and B^x. The gear-wheels a and a^x have clutch-teeth c on their backs, and splined on the shaft D between said gear-wheels is a double clutch G, with teeth at both ends, adapted to be put into gear with either of said wheels a or a^x by sliding said clutch along the shaft in a well-known way.

It will be obvious that with the mechanism described either of the rolls B or B^x may be put in gear with the driving-shaft D for winding, the other roll being simultaneously put out of gear with the shaft.

In order to put a tension on the roll that is not in gear with the shaft, so as to keep a proper tension on the material being unwound therefrom, the device seen best in Fig. 4 is employed. This consists of a sheave d , fixed on the journal of the roll, a cord or strap e , fixed at one end to the vat and passed over the sheave, and a weight or spring f , fixed to the other end of the cord.

In the drawings, f is a weight.

It is necessary in the operation of an apparatus of this character to shift the clutch G when the strip of material X shall have been wholly unwound from one winding-roll, so that it may be rewound on said roll, and I will now describe my automatic shifter for this purpose, using numerals for reference.

In suitable bearings on the vat A is mounted a rock-shaft 1, which has fixed on it a shifting-fork 2, the forked end of which engages a circumferential groove in the clutch G, and fixed also on the shaft 1 is an upright shifting-lever 3, having on its upper end a T-piece or cross-bar 4. By rocking the lever 3 from side to side the clutch G will be shifted.

Mounted rotatively in bearings on the vat are two like upright screw-threaded shafts 5 and 5^x, on which are fixed, respectively, worm-wheels 6 and 6^x, which gear, respectively, with

worms or screws 7 and 7^x on the journals of the respective winding-rolls B and B^x. On the respective screw-threaded shafts 5 and 5^x are nuts 8 and 8^x, which are driven up or
 5 down by the rotation of the shafts, according to the direction of their rotation. Each of said nuts is provided with a guide-arm 8^a, which arms are forked at their outer ends and guided, respectively, on upright guide-rods 9
 10 and 9^x to keep the nut from rotating with the shaft.

On each arm 8^a is an upright fork 8^b, Figs. 1 and 5, which is adapted to take under the end of a rod 10, which rests in forked bearings 4^x on the cross-piece 4 and carries a sliding weight 11.

Before proceeding further with the description I will describe the operation of the shifter.

20 Suppose the shaft D to be rotating in the direction indicated by the arrow *z* in Fig. 2, the clutch G in gear with the wheel *a*, and the fabric or material X nearly all wound upon the roll B. The lever 3 is tilted over to
 25 the left in Fig. 1, the nut 8 is moving up on the shaft 5, and the nut 8^x is moving down on the shaft 5^x. As the nut 8 moves up the forked upright 8^b on its arm takes under the end of the rod 10 at that side and lifts it.
 30 The arm 8^a on nut 8 now takes under the end of the cross-piece 4 at that side and raises it, thus rocking the lever 3 and moving it to a vertical position, whereby the clutch-teeth of the clutch G are moved out of gear with
 35 the teeth *c* on the wheel *a*. The friction due to the engagement of said teeth being now removed and the rod 10 being so inclined that the weight 11 will slide down to the other end thereof, the said weight shifts and carries the
 40 arm over, (to the right in Fig. 1,) causing the teeth on the other end of the clutch to gear with the clutch-teeth *c* on the wheel *a*^x. This serves to gear the roll B^x with the driving-shaft and set said roll to winding up the fabric X. The nut 8 now descends and the nut
 45 8^x ascends, and when the roll B becomes empty the clutch is again shifted in the same manner as before described.

It will be understood that the function of
 50 the rod 10 and sliding weight 11 is to assist in effecting the shifting of the clutch after the upward movement of the nut shall have disengaged the clutch-teeth, the degree of inclination of the rod 10 and the friction of the
 55 weight 11 on said rod being regulated properly to produce this result.

The tension required on the winding-roll to prevent the material X from unwinding too rapidly therefrom is effected, as before stated,
 60 by the cord *e*, over the sheave *d* and the weight *f*, but, as the rolls B B^x become, alternately, winding and unwinding rolls, and the tension is not desired on the roll that is winding, I provide a means for relieving the tension on the operating winding-roll, which I
 65 will now describe.

Attached to the respective cords *e*, above

the weights *f*, are chains or cords 12, which extend up and over suitably-arranged guide-sheaves 13 and thence down to the respective
 70 ends of the cross-piece 4, to which they are secured. The effect of this construction is to cause the descending end of the cross-piece 4 to draw down on the chain 12 and through
 75 it to lift the weight *f*, which operates in connection with the winding-roll which is in gear with the driving-shaft, and thus relieve the tension on this roll. The object is to relieve the cord *e* from the whole or a part of the weight of the weight *f*.
 80

It will be obvious by inspection that the lapse of time between shifts of the clutch must be made to suit the length of the piece of material X being treated, and also that this period will be governed by the length of
 85 travel of the traveling nuts 8 and 8^x on their respective screw-shafts. Therefore in order to vary this period I set the said nuts lower down or higher up, as the case may be, on their shafts, and in order to effect this shifting of the nuts conveniently I prefer to construct them as seen in Fig. 5. That is to say, I make the nut in two halves or sections and hinge one half on the other, so that the two
 90 halves may be separated far enough to clear the screw-threads on the shaft. When the two halves or sections of the nut are closed, as seen in dotted lines, they may be secured together by any convenient device. In Fig. 5 I have shown a simple swinging bail 8^c for
 95 the purpose.

I do not limit myself to the specific construction herein shown, as this may be varied in some respects without departing from the invention. For example, any means may be
 105 employed to prevent the traveling nuts 8 and 8^x from rotating with their shafts, and the arm 8^a may be considered as an integral part of the nut. So long as the traveling nut effects the shifting of the clutch-operating lever it is not important just what devices intervene. Those described are simple and effective. The cord or chain 12 may be attached to the weight *f* of course, as well as to the cord *e*.
 115

Having thus described my invention, I claim—

1. The combination with the winding-rolls, the main driving-shaft, the gears intermediate said shaft and rolls, and the sliding clutch on
 120 said shaft adapted for gearing either roll with the shaft, of means for automatically shifting said clutch at predetermined intervals, said means comprising two screw-shafts, gearing intermediate said shafts and the journals of
 125 the respective winding-rolls, whereby each roll drives a shaft, traveling nuts, one on each shaft, means for preventing the rotation of said nuts with the respective screw-shafts, the clutch-shifting lever and fork and a cross-
 130 piece on the clutch-shifting lever, the ends of said cross-piece being in the path of some part of the respective nuts, whereby the nuts, in their travel, alternately act on the said

cross-piece to actuate the said lever and thus shift the clutch.

2. The combination with the two winding-rolls, the shaft for driving said rolls, the sliding clutch on said shaft, and the gearing intermediate said shaft and the winding-rolls, of the means for automatically shifting the clutch at predetermined intervals, said device comprising the upright screw-shafts, 5 and 5^x, the gearing intermediate these shafts and the journals of the respective winding-rolls, the traveling nuts 8 and 8^x on the respective screw-shafts, the lifting-forks, 8^b, carried by said nuts, the lever and fork for shifting said clutch, the cross-piece 4 on the clutch-shifting lever, adapted to be acted on by said nuts, the rod 10, mounted in supports on the cross-piece 4, adapted to be lifted by the forks 8^b, and the sliding weight 11 on said rod 10, all arranged and adapted to operate substantially as set forth.

3. The combination with the two winding-rolls, the shaft for driving said rolls, the sliding clutch on said shaft, and the gearing intermediate said shaft and the winding-rolls, of the means for automatically shifting the clutch at predetermined intervals, said device comprising the upright screw-shafts 5 and 5^x, the worm-wheels on said shafts, the

screws or worms, 7 and 7^x, on the journals of the winding-rolls, with which the said worm-wheels gear, respectively, the traveling nuts on the said screw-shafts, the lever and fork for shifting said clutch, and mechanism, intermediate said nuts and the clutch-shifting lever, whereby the said nuts, in their movements, in one direction, effect the shifting of the clutch through said lever, substantially as set forth.

4. The combination with the winding-rolls provided each with a sheave *d*, a tension cord or strap *e*, and a weight *f*, the driving-shaft, the clutch sliding thereon, the intermediate mechanism between the clutch and the respective winding-rolls, and the clutch-operating lever provided with a cross-piece 4, of the chains or cords 12, passing over guide-sheaves and connected at one end with the respective end of the cross-piece 4 and at the other ends to the cords *e* at the weights *f*, substantially as and for the purpose set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN M. BOOTH.

Witnesses:

HENRY CONNETT,
PETER A. ROSS.