

No. 772,458.

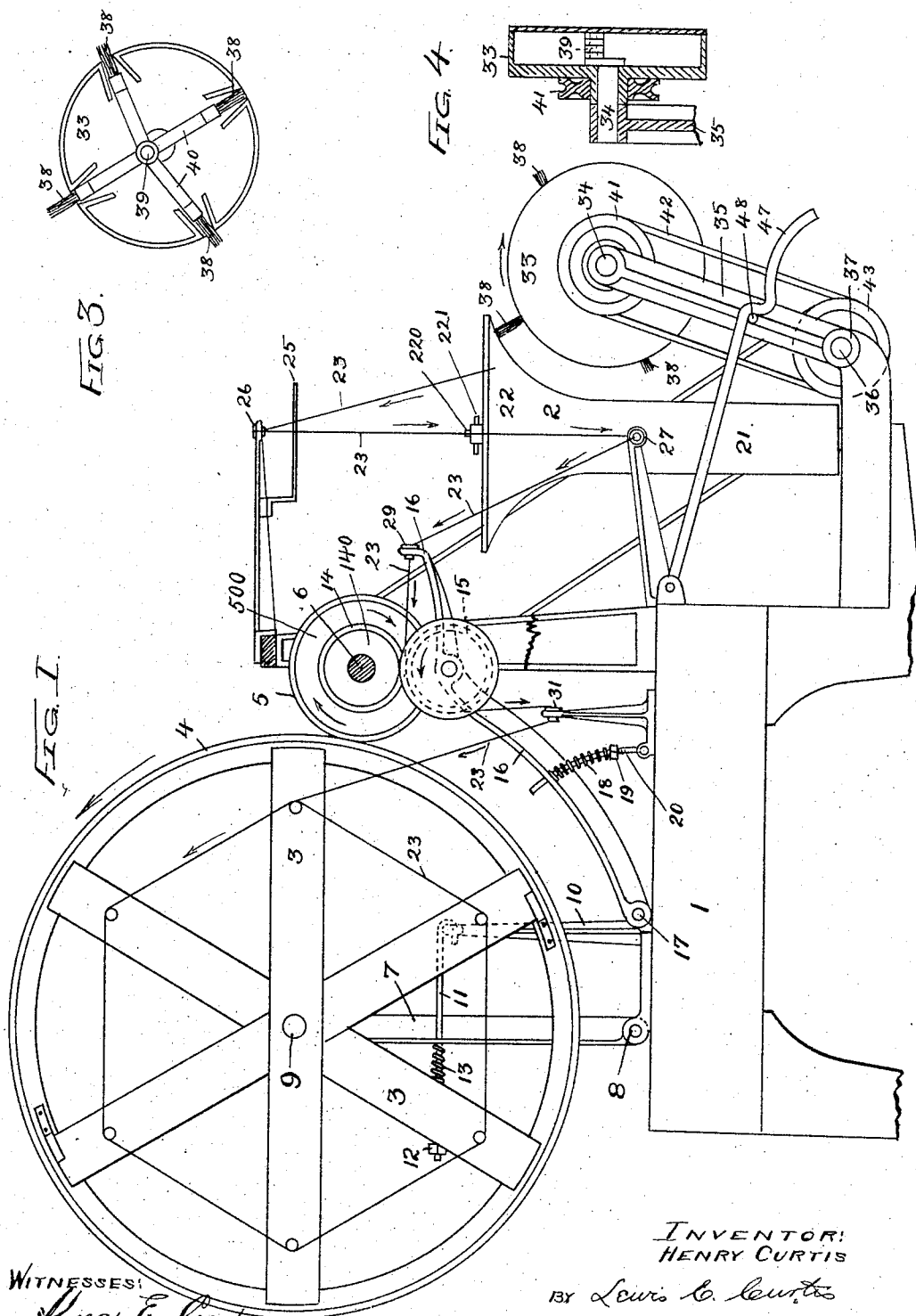
PATENTED OCT. 18, 1904.

H. CURTIS.
MACHINE FOR UNRAVELING KNITTED FABRIC.

APPLICATION FILED FEB. 16, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

Anna E. Curtis
Mary Nelson

INVENTOR:
HENRY CURTIS

BY *Lewis C. Lewis*

HIS ATTORNEY.

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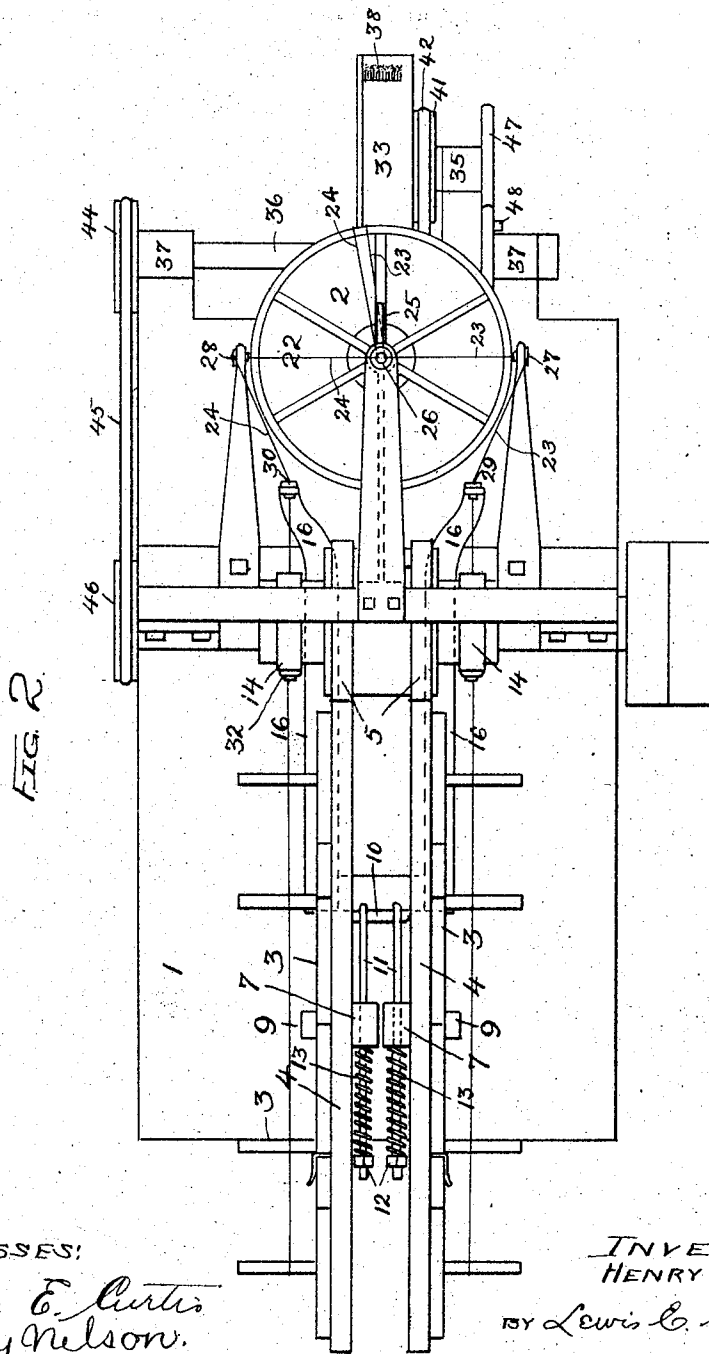
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UNITED STATES PATENT OFFICE.

HENRY CURTIS, OF KENOSHA, WISCONSIN.

MACHINE FOR UNRAVELING KNITTED FABRIC.

SPECIFICATION forming part of Letters Patent No. 772,458, dated October 18, 1904.

Application filed February 16, 1901. Serial No. 47,643. (No model.)

To all whom it may concern:

Be it known that I, HENRY CURTIS, a citizen of the United States, residing at Kenosha, in the county of Kenosha and State of Wisconsin, (and whose post-office address is No. 967 Prairie avenue, Kenosha, Wisconsin,) have invented a new and useful Improvement in Machines for Unraveling Knitted Fabric, of which the following is a specification.

This invention relates to machines for unraveling knitted fabrics.

The object of the invention is to produce a simple, durable, and efficient machine for quickly unraveling knitted fabrics and placing the yarn so unraveled upon reels in as good and valuable condition as it was before being knitted.

In nearly all knitting-mills where hosiery, underwear, and the like are made a great many articles are knit which upon examination are found to be defective. These defective articles have heretofore in order to save the material in them been reduced to what is known in the mills as "waste" by loosening up or pulling out the fabric by hand into a loose network, and after the fabric has been thus loosened it has been passed through the picking-machine, which reduces it to condition for the carding-machine, and by subsequent operations the material is again made into yarn of an inferior quality. In following this practice the manufacturer has been not only put to great trouble and expense, but also to a great loss, because the reproduced yarn is much inferior in quality to the yarn originally knitted into the fabric.

The machine described in this specification and shown in the accompanying drawings is adapted to unravel knitted fabric quickly and cheaply and put the yarn so unraveled upon reels in condition to be again knitted into fabric without the loss occasioned by reducing the defective fabric to waste and making said waste into inferior yarn.

The machine described is particularly designed to unravel hosiery known to the trade as the "triple-knee" variety, which has been knitted throughout its length with two yarns twisted together while being knitted and also having a third or reinforcing yarn knitted in

at the knee portion. This third yarn, however, is only a short yarn and extends only half-way around the stocking.

The machine may be constructed to unravel fabrics knitted of one, two, three, four, or more yarns knitted separately or twisted while being knitted; but for the purpose of this specification I have deemed it necessary to show and describe but one form of the apparatus.

The invention consists in the combination of a holder for the fabric, guides for the yarn, a winding-reel, and means for driving said reel by a slipping contact, said contact being adjustable and so constant to any given adjustment as not to be increased by the accumulating of the reeled yarn.

It also consists in combination with a holder for the fabric, guides for the yarn, a reel, means for driving said reel, a pair of auxiliary unraveling-rolls, and means for throwing said rolls out of action.

It also consists in the combination of parts and devices hereinafter specified, and more particularly pointed out in the claims.

The invention will be fully understood from the subjoined description, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of the machine; Fig. 2, a plan view with some of the parts omitted, and Figs. 3 and 4 are detail views of the device for removing the third yarn.

In the drawings, 1 is the frame of the machine; 2, the fabric-holder; 3, the reel for the unraveled yarn, said reel being carried by the wheel 4, receiving power from a collar 5, carried by a drum 500 upon the constantly-running drive-shaft 6. The collar 5, against which the wheel 4 bears and by which it is driven by a slipping friction, is preferably provided with a rubber tire. By employing a slipping friction for driving the wheel and its reel the reel is adapted to slip whenever there is an undue tension upon the yarn as it is unraveled, and thus avoid the breaking of said yarn. The friction between the wheel and collar may be regulated to any degree by mounting the wheel and reel in the following manner, which is the form I prefer to employ

Mounted in the upper end of a vertically-swinging arm 7, pivoted to the frame at 8, is a stud 9, upon which the wheel 4 revolves. The stud 9 is preferably located vertically over the pivot 8. Mounted on the frame is a bracket 10, provided at its upper end with a rod or bolt 11, which passes through an opening in the arm 7 and is provided with a nut 12, between which and the arm 7 a spring 13 is confined, which forces the wheel against the collar. By simply turning the nut greater or less friction is produced between the wheel 4 and collar 5. With this arrangement it will be seen that the friction is not altered by the weight of yarn upon the reel and that the reel will stop automatically whenever the tension upon the yarn reaches a predetermined amount. While I have found in practice that the reel alone will unravel successfully most fabrics, I have also found that for some particular fabrics auxiliary unraveling-rolls whose peripheral speed is constant are necessary, and, in fact, these auxiliary rolls are very valuable to the working of the machine whatever the character may be of the fabric to be unraveled, and in the drawings I have shown at 14 and 15 these auxiliary unraveling-rollers, the roller 14 being mounted upon drum 140, carried upon the drive-shaft 6, and the roller 15 mounted, preferably, immediately below the roller 14 upon a yielding arm 16, pivoted at 17 to the frame and forced upwardly with a yielding pressure by means of a spring 18, one end of which bears against the under side of said arm and the other end resting upon a nut 19, threaded upon a rod or bolt 20, fixed to the frame and extending through said spring. Pressure between the rolls may be varied by simply turning the nut 19 up or down upon the rod 20.

Devices such as those above described are employed for each of the main yarns embodied in the fabric, and I show in the drawings duplicate devices each caring for one of the yarns 23 or 24.

At 21 is shown the fabric-holder, which preferably consists of a small cylindrical portion upon which the fabric is placed and a flaring upper portion 22, upon which the fabric is drawn and expanded as it is being unraveled. The particular form of machine herein shown and described is adapted to unravel fabrics knitted by two yarns twisted together as they are knitted, and for this purpose the fabric-holder 21 22 is made stationary upon shaft 220 by means of pin 221, so that as the fabric is unraveled the yarn is caused to travel around said holder in the opposite direction from that in which it was knitted into the fabric, thereby taking out of the yarn the twist imparted to it while being knitted. The two yarns 23 24 of the fabric are led upward from the fabric, one upon each side of a separating-finger 25, through a guide 26, downward through separate guides

27 28, located one upon each side of the fabric-holder, thence upward through guides 29 30, one upon the end of each of the levers 16, thence between the unraveling-rollers 14 15, downward through guides 31 32, and upward to the reels 3. By causing the yarns to pass first upward to the unraveling-rolls and thence downward any unusual strain placed upon the yarn, assisted by the pull of the reels, will immediately and automatically throw the unraveling-rolls out of action by drawing the roll 15 downward and away from the roll 14. Thus it will be seen that the greatest strain put upon the yarn is only equal to that exerted by the reel, which is not sufficient to break the yarn. When the machine stops because of undue tension upon the yarn, the operator has only to remove the cause and the machine will again be set in operation.

In unraveling fabrics knitted of two or more yarns knitted by separate needles the yarn is not passed upward to the guide 26, but is passed directly through the guides 27 28, located one at each side of the fabric-holder, and from thence to the guides 29 30 and to the unraveling-rollers, and in this case the fabric-holder is allowed to revolve instead of being held stationary by the pin 221, which is removed. In fabrics of this class the yarns are frequently knit under different tensions, and in unraveling the yarn having the greatest tension will unravel quicker than the others and will overtake the other yarns and become locked, and were it not for the automatic stopping of its unraveling-rollers the yarn would be broken; but as the rollers are automatically thrown out of action by the tension upon the yarn this yarn will cease to unravel until the interfering yarn unravels ahead of it.

From the above it will be seen that the arrangement of the devices for the unraveling of the fabric are entirely automatic and that under no condition can a strain be placed upon the yarn sufficient to break it.

For unraveling fabrics having a short or reinforcing yarn knitted into them—as, for example, the triple-knee stocking—it is necessary that this short yarn should be removed whenever the unraveling reaches that portion of the fabric, so that the unraveling may continue without interruption. I have shown in the accompanying drawings one form of device for accomplishing this purpose; and it consists of a revolving drum 33, mounted upon a stud 34, supported in the end of a swinging arm 35, pivoted upon the shaft 36, which is supported in bearings 37 upon the frame of the machine. 38 38 are brushes, preferably four in number, which project through openings in the periphery of said drum, and they are projected from the drum automatically as the drum revolves by means of a pin 39 eccentric to the drum, to which the inner ends of the brush-supporting arms

40 are pivoted. This arrangement causes the brushes to project against and brush the fabric, catch up the short yarn, and remove it from the fabric, and as the drum revolves and carries the brushes to the opposite side away from the fabric the brushes are withdrawn within the drum and the short yarn discarded. The drum is caused to revolve by means of a pulley 41, mounted thereon, belt 42, and pulley 43, mounted upon the shaft 36. The shaft 36 carries another pulley, 44, receiving power through the belt 45 from pulley 46, mounted upon the constantly-running drive-shaft 6. The drum is held in proper position in relation to the fabric by means of a positioning-bar 47, engaging a pin 48 upon the swinging arm 35.

I claim—

1. In an unraveling-machine, in combination, a drive-shaft, a drum thereon, a reel placed at the side of and driven by the drum on said shaft, means for so adjusting the contact between said reel and the drum on said shaft that the yarn stops the reel whenever the tension upon the yarn approaches the breaking-point, said adjustable contact being constant to any given adjustment and not increased by the accumulating of the reeled yarn, a fabric-holder, and guides for the yarn, substantially as specified.

2. In an unraveling-machine, in combination, a drive-shaft, drums thereon, a plurality of reels, one for each yarn, placed at the side of and driven by the drum on said shaft, means for so adjusting the contact between the said reels and the respective drums on the said shaft that the yarn stops the reel whenever the tension upon the yarn approaches the breaking-point, said adjustable contact being constant to any given adjustment and not increased by the accumulating of the reeled yarn, a fabric-holder, and guides for the yarns, substantially as specified.

3. In an unraveling-machine, in combination, a drive-shaft, drums thereon, a plurality of reels, one for each yarn, placed at the side of and driven by the drum on said shaft, means for so adjusting the contact between the said reels and the respective drums on the said shaft that the yarn stops the reel whenever the tension upon the yarn approaches the breaking-point, said adjustable contact being constant to any given adjustment and not increased by the accumulating of the reeled yarn, a stationary fabric-holder, guides for the yarns, and a device for separating the yarns, substantially as specified.

4. In an unraveling-machine, the combination with a fabric-holder, guides for the yarn, a yarn-reel, means for driving said reel by a frictional contact, and mechanism for removing the short or reinforcing yarn, substantially as specified.

5. In an unraveling-machine, the combination with a fabric-holder, guides for the yarn,

a yarn-reel, means for driving said reel by a frictional contact, and mechanism for removing the short or reinforcing yarn consisting of a revolving brush, substantially as specified.

6. In an unraveling-machine, in combination, a fabric-holder, guides and a reel for the yarn, a device for exerting a pull upon the yarn, said device being located between the reel and the fabric-holder, and means for automatically throwing said device out of action whenever the tension upon the yarn approaches the breaking-point, said means being located in the path of the yarn, substantially as specified.

7. In an unraveling-machine, in combination, a fabric-holder, guides for the yarn, a reel for the yarn, and frictional driving mechanism for actuating the reel, said reel being mounted on the end of an upright pivoted arm in such manner that the contact between the reel and its said driving mechanism remains constant to any given adjustment and is not increased by the accumulating of the reeled yarn, substantially as specified.

8. In an unraveling-machine, in combination, a fabric-holder, guides for the yarn, a plurality of reels for the yarns, and frictional driving mechanism for actuating the reels, each of said reels being mounted on the end of an upright pivoted arm in such manner that the contact between such reel and its said driving mechanism remains constant to any given adjustment and is not increased by the accumulating of the reeled yarn, substantially as specified.

9. In an unraveling-machine, in combination, a fabric-holder, guides for the yarn, a plurality of reels, one for each yarn, devices for pulling upon the yarns, said devices being located between the reels and the fabric-holder, and means for automatically throwing any of said devices out of action whenever the tension upon its yarn approaches the breaking-point, said means being located in the paths of the yarns, substantially as specified.

10. In an unraveling-machine the combination of the fabric-holder, guides for the yarn and an unraveling device, with mechanism for driving the unraveling device, said driving mechanism being adapted to be thrown out of action whenever the tension upon the yarn approaches the breaking-point and mechanism adapted to remove short yarn from the fabric, substantially as specified.

11. In an unraveling-machine the combination of the fabric-holder, guides for the yarn and an unraveling device, with mechanism for driving the unraveling device, said driving mechanism being adapted to be thrown out of action whenever the tension upon the yarn approaches the breaking-point and a revolving brush adapted to remove short yarn from the fabric, substantially as specified.

12. In an unraveling-machine, in combination, a fabric-holder, guides and a reel for the

- yarn, a device for exerting a pull upon the yarn, said device being located between the reel and the fabric-holder, means for automatically throwing said device out of action
 5 whenever the tension upon the yarn approaches the breaking-point, said means being located in the path of the yarn, and mechanism for removing short yarn from the fabric, substantially as specified.
- 10 13. In an unraveling-machine the combination with a fabric-holder, guides for the yarn and an unraveling device of mechanism adapted to remove short yarn from the fabric while being unraveled, substantially as specified.
- 15 14. In an unraveling-machine a combination with a fabric-holder, guides for the yarn and two or more unraveling devices, one for each yarn, of mechanism adapted to remove short yarn from the fabric while being unraveled, substantially as specified.
 20
15. In an unraveling-machine the combination with a fabric-holder, guides for the yarn and an unraveling device of mechanism adapted to remove short yarn from the fabric while
 25 being unraveled, said mechanism consisting of a revolving brush, substantially as specified.
16. In an unraveling-machine a combination with a fabric-holder, guides for the yarn and two or more unraveling devices one for each yarn of mechanism adapted to remove short yarn from the fabric while being unraveled, said mechanism consisting of a revolving brush, substantially as specified.
 30
17. In an unraveling-machine the combination with the fabric-holder, guides for the yarn and an unraveling device of a revolving brush for removing the short yarn consisting of a revolving drum provided with brushes adapted to be projected from and withdrawn into said drum as it revolves, substantially as specified.
 35 40
18. In an unraveling-machine, in combination, a stationary fabric-holder, guides for the yarn, a plurality of reels, one for each yarn, said reels being driven by such an adjustable frictional contact that any of them may stop
 45 whenever the tension upon the yarn approaches the breaking-point, said adjustable contact being constant to any given adjustment and not increased by the accumulating of the reeled yarn, and a device for separating said yarns, substantially as specified.
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HENRY CURTIS.

Witnesses:

E. L. SHIPPEE,
 JOHN F. KITZROW.