(No Model.) 3 Sheets—Sheet 1.

C. L. TRAVIS.

MACHINE FOR REMOVING SUPERFLUOUS MATERIAL FROM THREAD.

No. 477,285. Patented June 21, 1892.

Fig. 1.

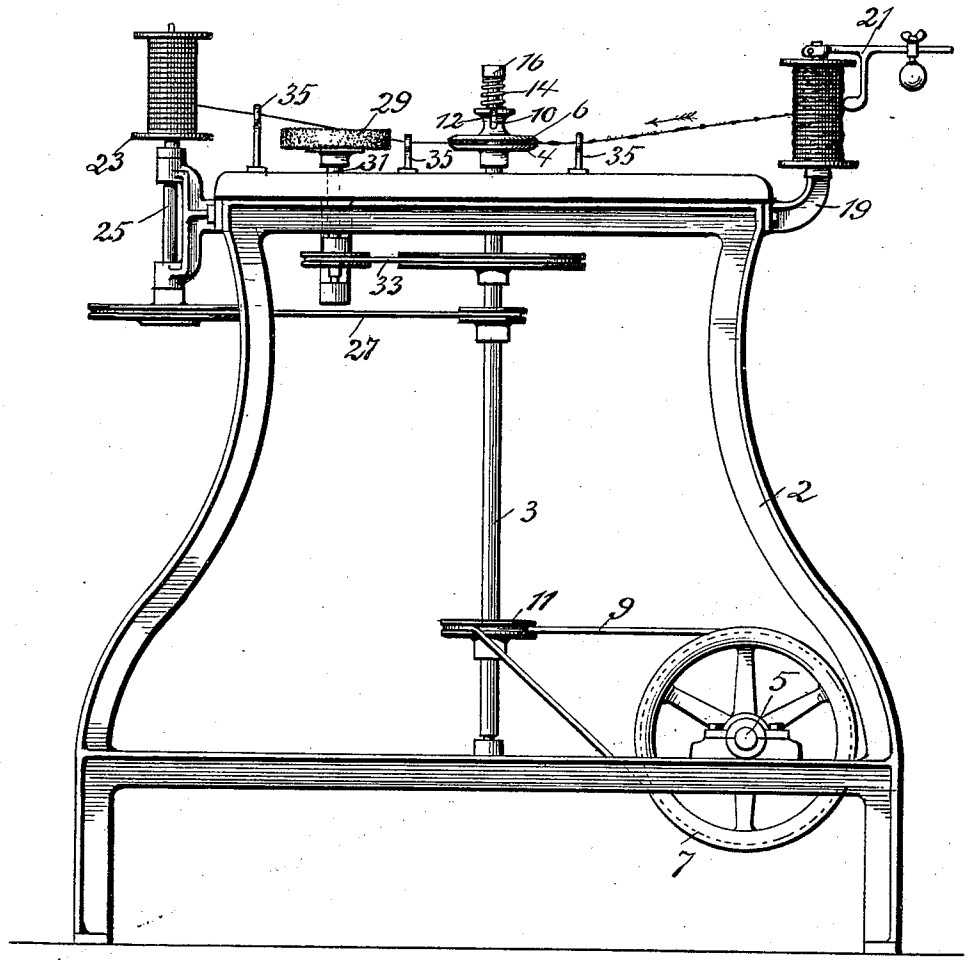


Fig. 3.

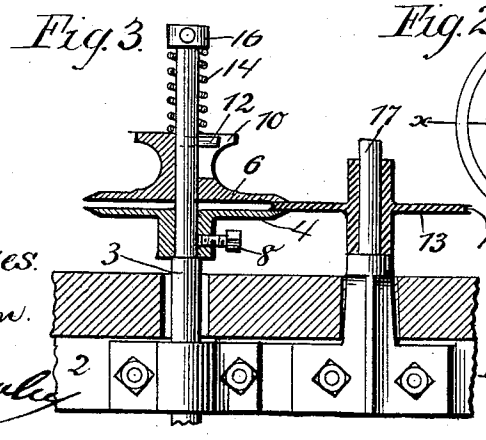
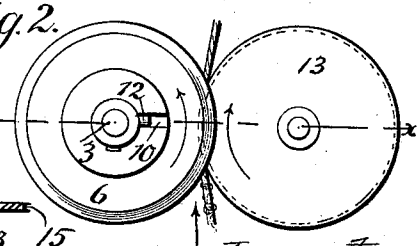


Fig. 2.



Witnesses.
J. Jessen.
A. E. Hurley

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(No Model.) 3 Sheets—Sheet 2.

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MACHINE FOR REMOVING SUPERFLUOUS MATERIAL FROM THREAD.

No. 477,285. Patented June 21, 1892.

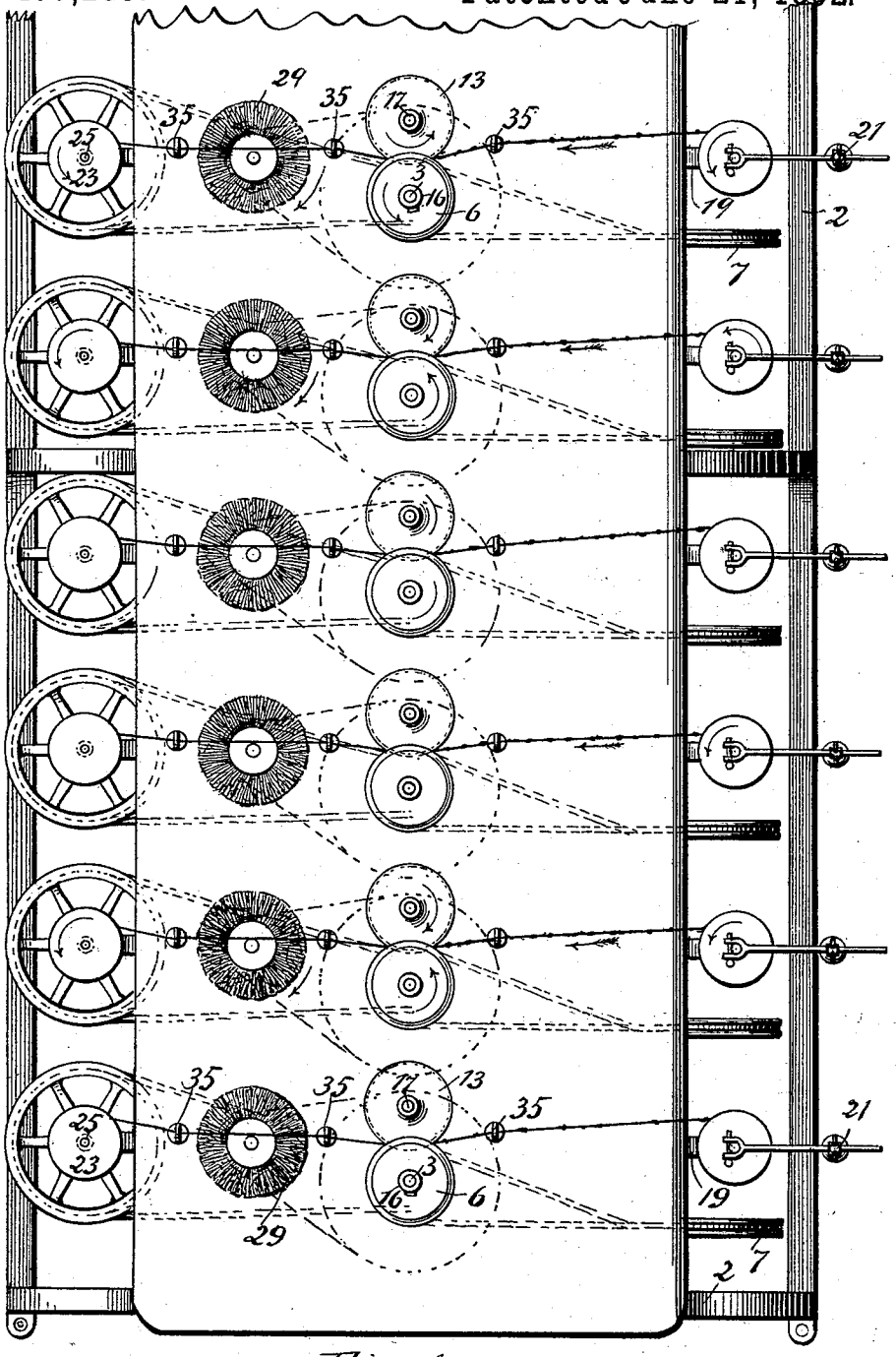

Fig. 4.

Witnesses.
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(No Model.) 3 Sheets—Sheet 3.

C. L. TRAVIS.

MACHINE FOR REMOVING SUPERFLUOUS MATERIAL FROM THREAD.

No. 477,285. Patented June 21, 1892.

Fig. 5.

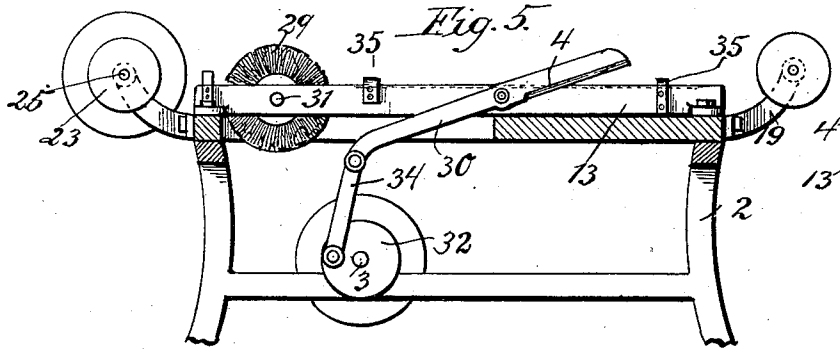


Fig. 6.

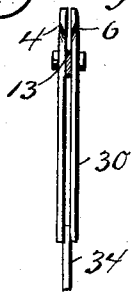


Fig. 8.

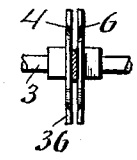


Fig. 7.

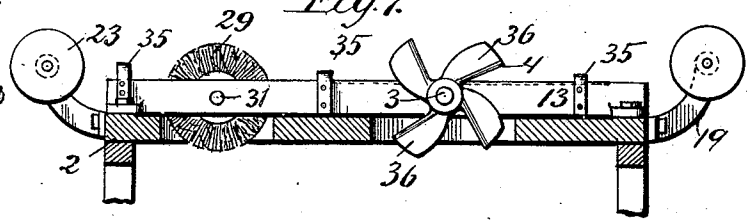


Fig. 9.

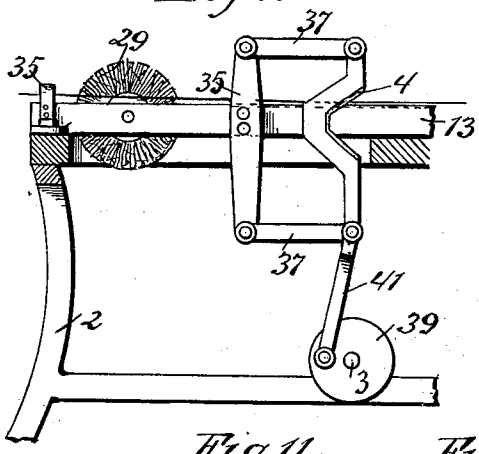


Fig. 10.

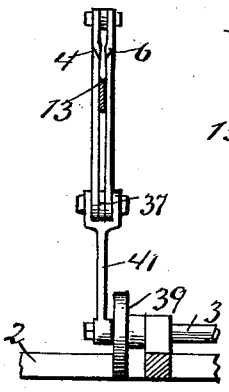


Fig. 13.

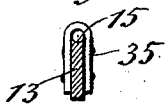


Fig. 11.

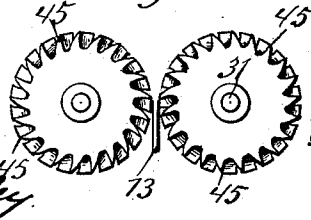
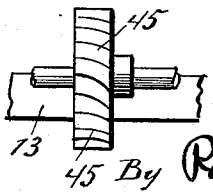


Fig. 12.



Witnesses.
J. Jerren.
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UNITED STATES PATENT OFFICE.

CHARLES LESLIE TRAVIS, OF MINNEAPOLIS, MINNESOTA.

MACHINE FOR REMOVING SUPERFLUOUS MATERIAL FROM THREAD.

SPECIFICATION forming part of Letters Patent No. 477,285, dated June 21, 1892.

Application filed July 6, 1891. Serial No. 398,488. (No model.)

To all whom it may concern:

Be it known that I, CHARLES LESLIE TRAVIS, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain Improvements in Machines for Removing Superfluous Material from Thread, of which the following is a specification.

In the manufacture of crash and twine it is customary to use thread that is spun from what is generally known as "tow" stock. This stock contains more or less "shive" or woody fiber, considerable portions of which are inevitably spun into the thread. There are also on the thread lumps of short fiber forming bunches thereon, and many of these lumps are in the form of rings extending around the thread and forming what are known as "spins." Preparatory to using this thread for the manufacture of crash or twine or for other purposes it has heretofore been customary to subject it to a brushing action, which is designed to remove the adhering lumps or bunches and the shive or woody fiber, and afterward to starch the thread for the purpose of starching down any of such lumps that may remain and causing them to be closely compacted against the body of the thread. This process does not, however, remove any of the spins or lumps and but a small portion of the shives or woody fiber, and many of the adhering lumps and portions of the shives or woody fiber are not compacted closely enough against the body of the thread to cause them to pass through the harness and reeds of the loom in weaving. When one of these lumps on the thread catches in passing through the loom, it often causes the thread to break, necessitating the stoppage of the loom and the tying of a knot in the thread. If the lump on the thread and the projecting portions of shive or woody fiber pass through the loom without causing a breakage in the thread, they are still plainly to be seen in the finished fabric when calendered, causing it to be of an inferior quality. If the thread is used for the manufacture of twine, which usually consists of several threads twisted together, the lumps and projecting shives or woody fiber are equally objectionable, especially as it often occurs that several lumps in the different threads will come opposite each other at the same place, thus forming a large lump in the twine. The brushing process fails to remove all of the shives or woody fiber, and practically does not remove any of the spins or lumps that are formed in the shape of rings extending around the thread, as these rings when the thread is subjected to a brushing process will simply slide along on the thread without being removed therefrom. It also frequently occurs in spinning thread from this stock that the feed-rolls will at times feed through too much stock. This will make a place in thread of larger diameter than the main body of the thread, and when this occurs the parts of the thread for a short distance on each side of these portions of larger diameter will be twisted harder or more closely than the main portions of the thread, while these larger portions will not be twisted as closely as the main portions of the thread. This leaves places in the thread that are of larger diameter than the average and of a looser twist. These larger and more loosely twisted parts of the thread are apparent in the woven fabric, forming what are termed "swells" and causing the fabric to have an uneven and defective appearance.

One object of the invention is to remove these lumps of fiber and also the shives or woody fiber from the thread, thus leaving the thread fiber perfectly clean and smooth, capable of being passed through the loom without catching, and forming a fabric when woven that is entirely free from lumps and bunches and from shives or woody fiber.

Another object of my invention is to trim or dress down the larger and more-loosely-twisted portions of the thread. I find by actual experience that when these more-loosely-twisted parts of the thread are reduced to the same diameter as the other parts of the thread the twists in the more-closely-twisted portions on each side of these loosely-twisted portions will distribute themselves across the loosely-twisted places, thus making the parts that were before twisted closer than the average and those that were twisted less closely than the average all of the average twist.

To these ends my invention consists in subjecting the thread to the action of knives or cutters that cut longitudinally of the thread, thereby splitting or opening the spins on

the outside of the thread fiber and also removing any material that adheres to the outside of the thread and the projecting shives or woody fiber without injuring the body of the thread or cutting any of the fibers forming the thread and also reducing the larger and loosely-twisted portions, so as to make them of the same size as the main portions of the thread, brushing the thread after it is subjected to the cutters for the purpose of removing the shives and portions of fiber that have been cut loose by the cutters, but which may still be clinging to the thread.

My invention further consists in giving to the thread a rolling motion while it is being subjected to the action of the brushes, thereby causing the loose material to be brushed off from the thread instead of being brushed along on the thread.

My invention further consists in the construction and combination hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is an end elevation of one form of mechanism that I have designed for carrying out my improved process. Fig. 2 is a detail plan of the cutters shown in Fig. 1. Fig. 3 is a transverse vertical section on line *x x* of Fig. 2. Fig. 4 is a plan of a portion of a machine shown in Fig. 1. Fig. 5 is a detail end elevation, and Fig. 6 is a detail section, of another mechanism for carrying out the same process. Fig. 7 is a detail end elevation, and Fig. 8 is a detail section, showing a modified arrangement of the cutters and modified construction of cutters. Figs. 9 and 10 are details showing another construction and arrangement of cutters. Figs. 11 and 12 are details of another form of cutters.

In the drawings, 2 represents the frame of the machine, which may be of any suitable form and construction.

In the form of apparatus shown in Figs. 1 and 4 I have shown a pair of rotating cutters arranged to act on each thread. These cutters are mounted on a shaft 3, that is mounted in suitable bearings in the frame of the machine and is driven by any suitable means. I preferably arrange a series of pairs of cutters in each in a chain and drive all of the shafts 3 before a common counter-shaft 5, that is mounted in the frame 2 and provided with a series of pulleys 7, from which belts or bands 9 extend to pulleys 11 on the shafts 3. The cutters 4 and 6 are mounted on the shaft 3. The cutter 4 is preferably fixed on the shaft by any suitable means, as the set-screw 8, while the cutter 6 is fixed to turn with the shaft, but is free to slide thereon. This cutter is preferably provided with a groove 10, and a pin 12 on the shaft projects into this groove. A spring 14 engages a fixed collar 16 on the shaft and bears on the top of the cutter 6 and presses it toward the cutter 4. A guide and gage plate or disk 13 is arranged to project for a short distance between the cutters. This plate is preferably made in the shape of a disk having a groove 15 in its edge and may be mounted loosely on a stud 17, as shown in Figs. 2 and 3, so as to be capable of turning freely thereon. This plate may, however, be stationary and the groove be formed only in the edge of the portion that projects between the cutters.

The machine may be provided with any suitable means for holding the spools of thread and moving the thread past the cutters. I have shown the machine provided with spool-supports 19, upon which the spools of thread to be treated are placed. A suitable friction device 21 prevents the spool from turning too fast. After the thread passes the cutters it is wound upon a suitable spool 23, and this spool may be the means of drawing the thread from the other spool and causing it to travel past the cutters. As here shown, the spool 23 is mounted on a shaft 25, that is driven by a belt 27 from the shaft 3. Any suitable device may be used to properly distribute the thread over the spools. A brush 29 is preferably mounted on a shaft 31 and located in the path of the thread after it passes the cutters. The brush is driven by any suitable means. I have here shown it driven by a belt 33 from the shaft 3. Suitable guides 35 are also arranged so as to properly guide the thread to the cutters and to the brush. The thread is preferably guided so as to pass at an angle across the edge of the brush, as shown in Fig. 1, thereby giving to the thread a rolling or twisting motion while it is being subjected to the action of the brush.

Instead of using the disk-shaped cutters, I may use cutters of other forms. In Figs. 5 and 6 I have shown vibrating cutters 4 and 6, secured upon a lever 30 and arranged to be operated by an eccentric 32 and link 34. In Figs. 7 and 8 I have shown rotating cutters 4 and 6, each provided with a series of radial cutting-blades 36. In Figs. 9 and 10 I have shown reciprocating cutters 4 and 6, having their ends connected to links 37 and operated by an eccentric 39 and connecting-rod 41. In Figs. 11 and 12 I have shown rotary cutters having inclined cutting-teeth 45 on their edges. In connection with the cutters shown in Figs. 5 to 12 I prefer to use a stationary guide-plate 13, having a groove 15 in its upper edge along which the thread passes. While I have shown these various forms of cutters, I do not wish to be understood as limiting myself to the use of the forms shown, as it will be obvious that many other forms of cutters may be used to secure the same result. In all instances the cutters are preferably beveled on the outside, so that their cutting-edges are close to the sides of the guide and gage plate, and they therefore cut close to this plate on each side.

In carrying out my invention I pass the

thread over the guide 13, which, as before stated, is preferably grooved and between the cutters. As the thread advances the cutters shear close to the gage-plate and open all the spins or rings of fiber surrounding the thread. They also cut off all the projecting shives or pieces of woody fiber, and they reduce the thread to a uniform diameter. In case the main portion of any lump or projection is in a position where it would naturally pass between the cutters, it is found that there will always be some small projecting fibers that will come into the plane of one or the other of the cutters and the thread will invariably turn toward this cutter, thereby bringing the entire lump into position to be sheared off by the cutter. Most of the lumps on the thread, however, are in the form of rings of fiber extending around the thread, and it is only necessary to cut open these rings for them to be afterward completely removed. The cutters also reduce the swells or loosely-twisted and larger portions of the thread to uniform diameter with the other portions, and as these loosely-twisted portions usually alternate with portions that are twisted more closely than the average as soon as they are reduced by the cutters to the average diameter of the thread the twists distribute themselves across the loosely-twisted portions, making both parts of the average twist. After the thread leaves the cutters it is brought, preferably, in an inclined direction across one edge of the brush. This brush thus strikes the thread at an angle and gives it a slight rolling motion, thus enabling the brush to completely remove any of the particles of material that have been loosened by the cutters.

While I have described my invention as particularly applicable to linen thread made from tow stock, it will be understood that it may be used to advantage where there is occasion for the removal of superfluous material from any kind of thread.

It will be seen that the cutter 6, as shown in Fig. 1, may be readily removed, and where it is desired to operate upon a thread of different size it is only necessary to remove one of the cutters and replace the guide disk or plate 13 by a similar plate of different thickness. Then the removable cutter, being put back in place, will automatically adjust itself to the plate and the machine be again in condition for operation.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the grooved guide and gage plate, of the cutters arranged upon opposite sides thereof and means for moving the thread or fiber along said grooved plate and between said cutters.

2. The combination, with means for moving the thread, of the gage and guide plate and the cutters arranged to cut close to said guide-plate on opposite sides thereof.

3. The combination, with means for moving the thread, of the circular cutters and the grooved plate projecting between said cutters.

4. The combination, with means for moving the thread, of the circular cutters, means for rotating said cutters, and the grooved disk projecting between said cutters.

5. The combination, with the gage and guide plate, of the cutters and a spring-tension device for holding one of said cutters, substantially as described.

6. The combination, with the removable gage and guide plate 13, of the cutter 4, the removable cutter 6, said cutters being arranged on opposite sides of said guide-plate, and a tension device for holding said cutter 6 in contact with said guide-plate, substantially as described.

7. The combination, with the guide and gage plate, of the cutters arranged on opposite sides thereof, means for moving the thread or fiber over said guide and between said cutters, and means for giving a rolling or turning motion to said thread or fiber.

8. The combination, with the guide and gage plate, of the cutters arranged on opposite sides thereof, means for moving the thread or fiber over said guide and between said cutters, and the brush for engaging said thread after it leaves said cutters.

9. The combination, with the guide and gage plate, of the cutters arranged on opposite sides thereof, means for moving the thread or fiber over said guide and between said cutters, a rotating brush, and means for bringing the thread or fiber after it leaves the cutters in an inclined direction across the edge of said brush.

In testimony whereof I have hereunto set my hand this 1st day of July, 1891.

CHARLES LESLIE TRAVIS.

In presence of—
A. C. PAUL,
FRED S. LYON.