

(No Model.)

2 Sheets—Sheet 1.

W. H. AVIS.
TWINE FINISHING MACHINE.

No. 503,936.

Patented Aug. 29, 1893.

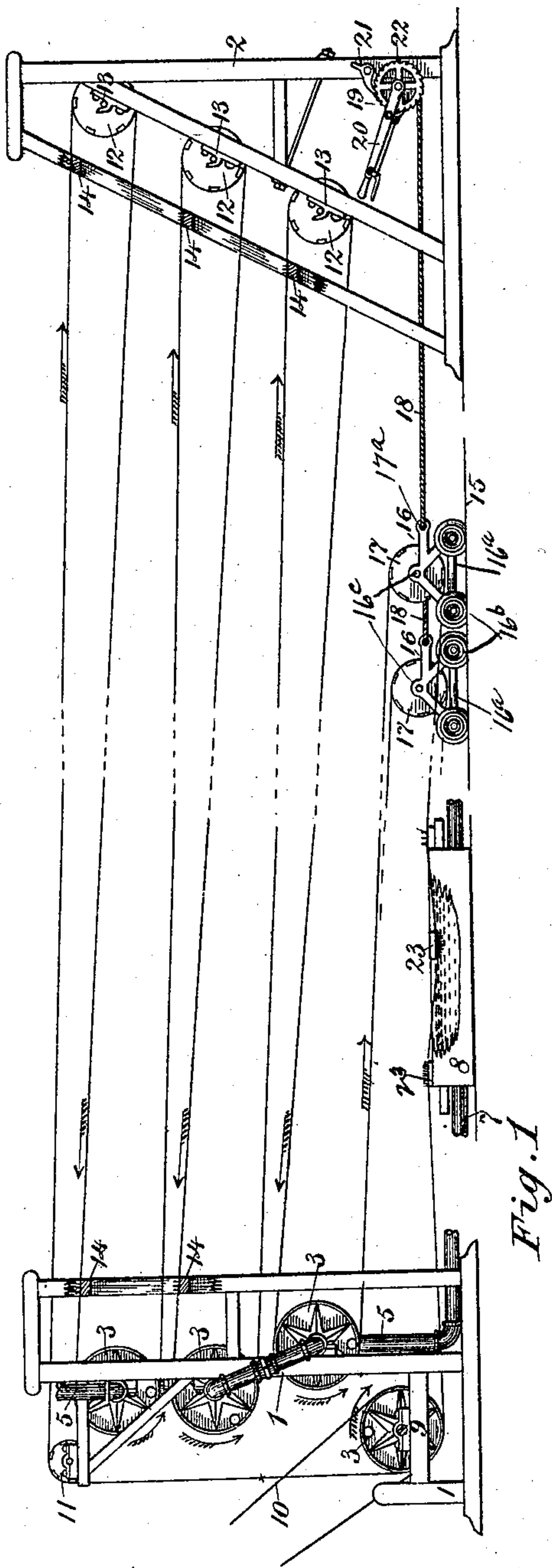


Fig. 1

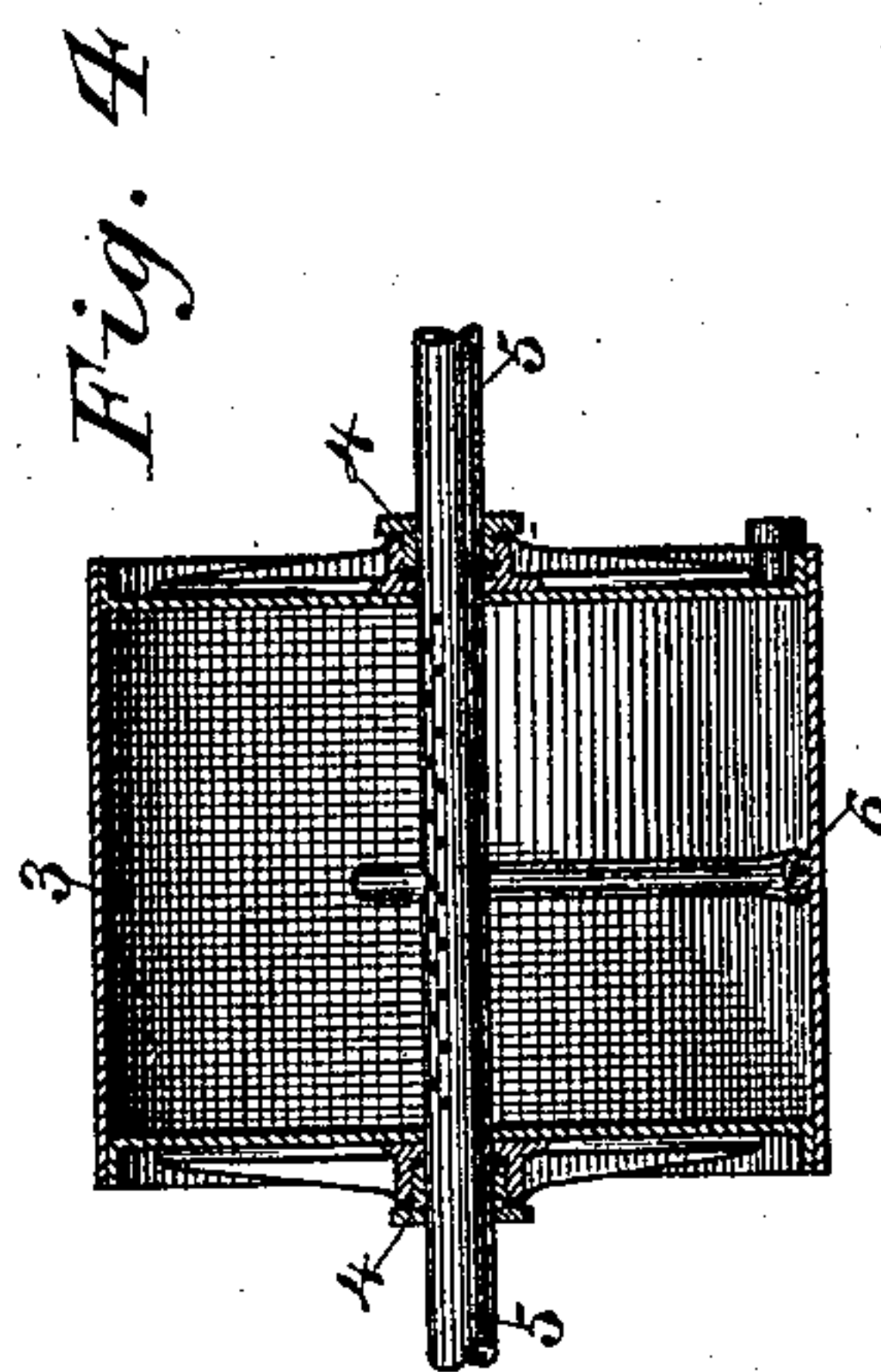


Fig. 4

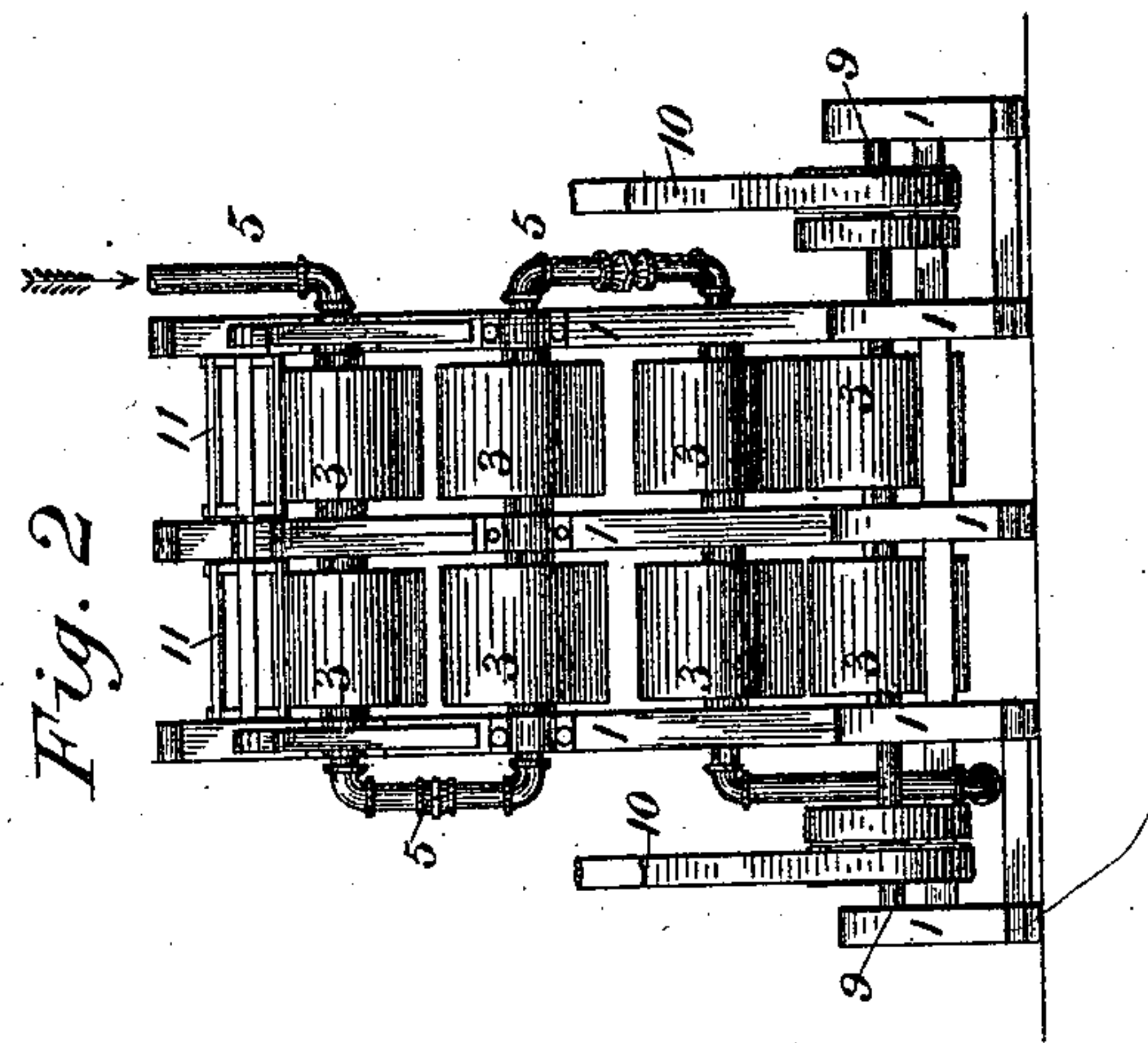


Fig. 2

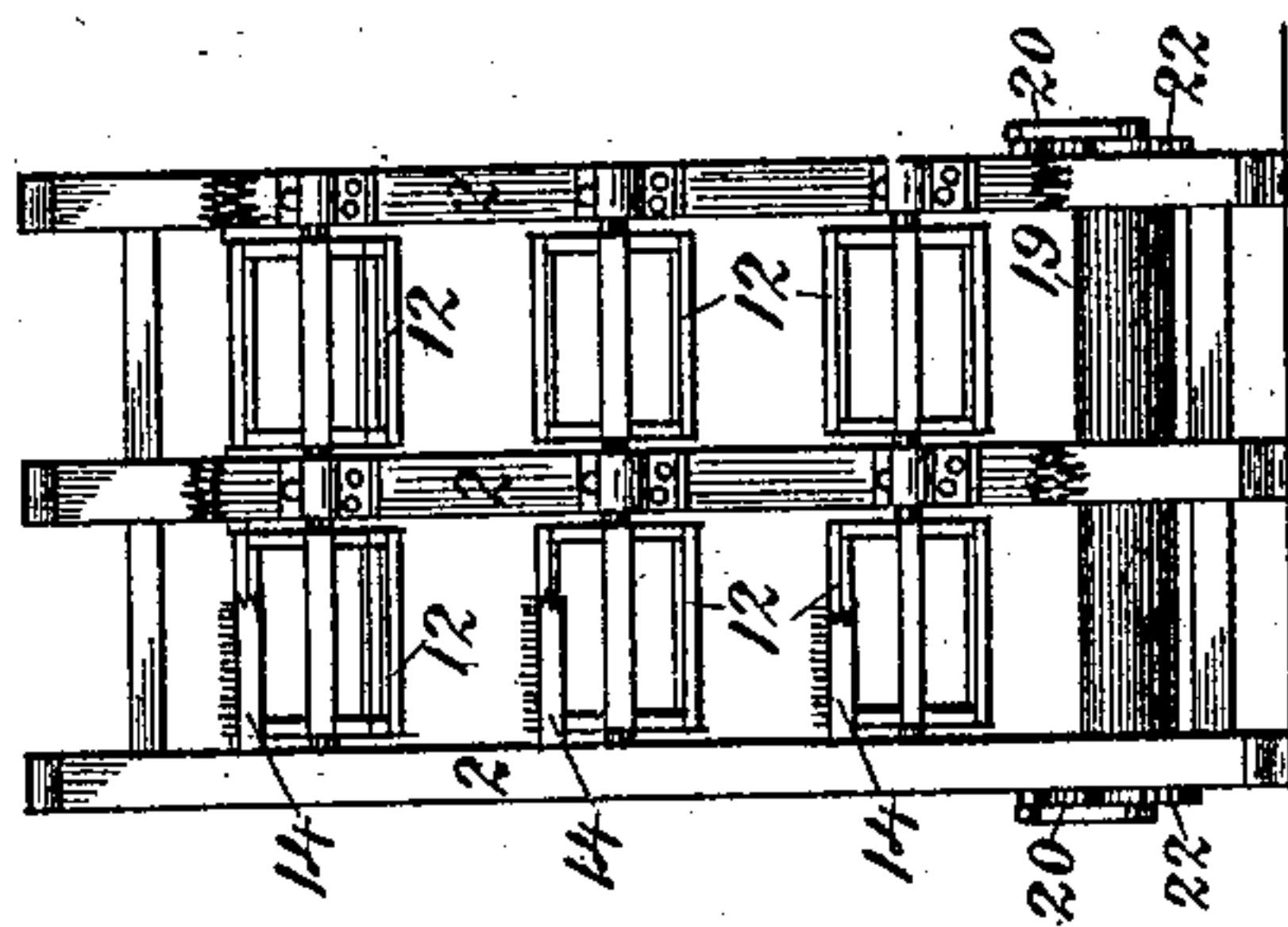


Fig. 3

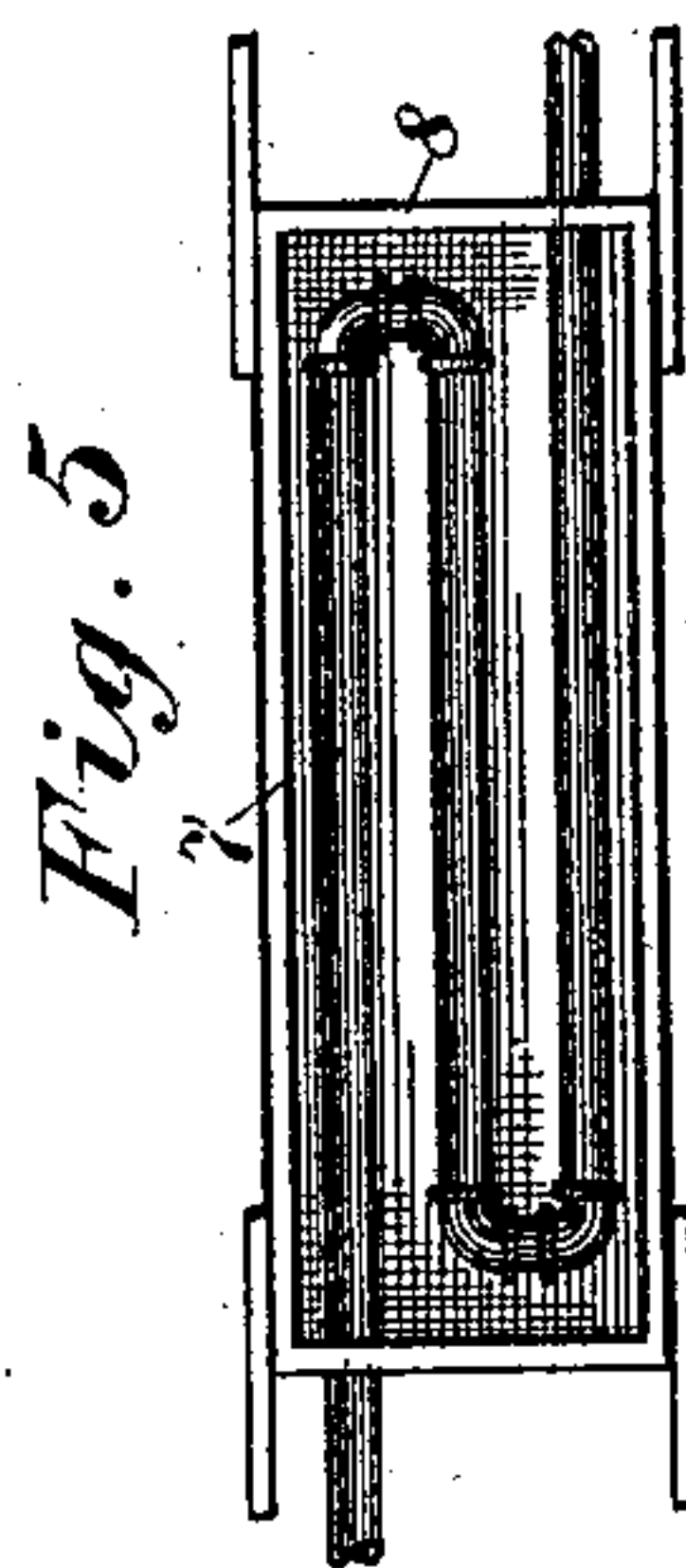


Fig. 5

Witnesses

J. M. Coen
James Bell

Inventor

Walter H. Avis
per *W. J. Graham*.
Atty.

(No Model.)

2 Sheets—Sheet 2.

W. H. AVIS.
TWINE FINISHING MACHINE.

No. 503,936.

Patented Aug. 29, 1893.

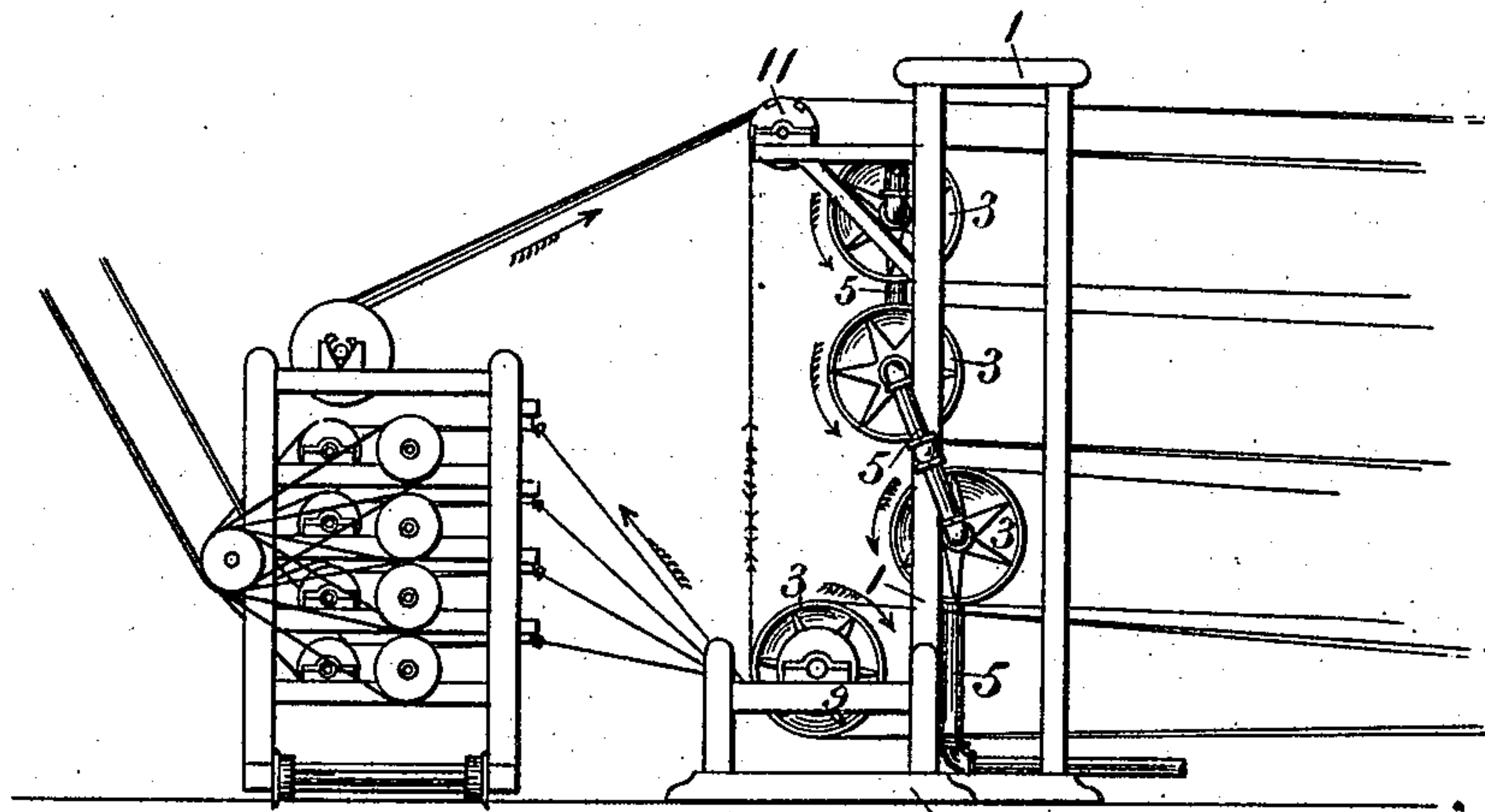


Fig. 6

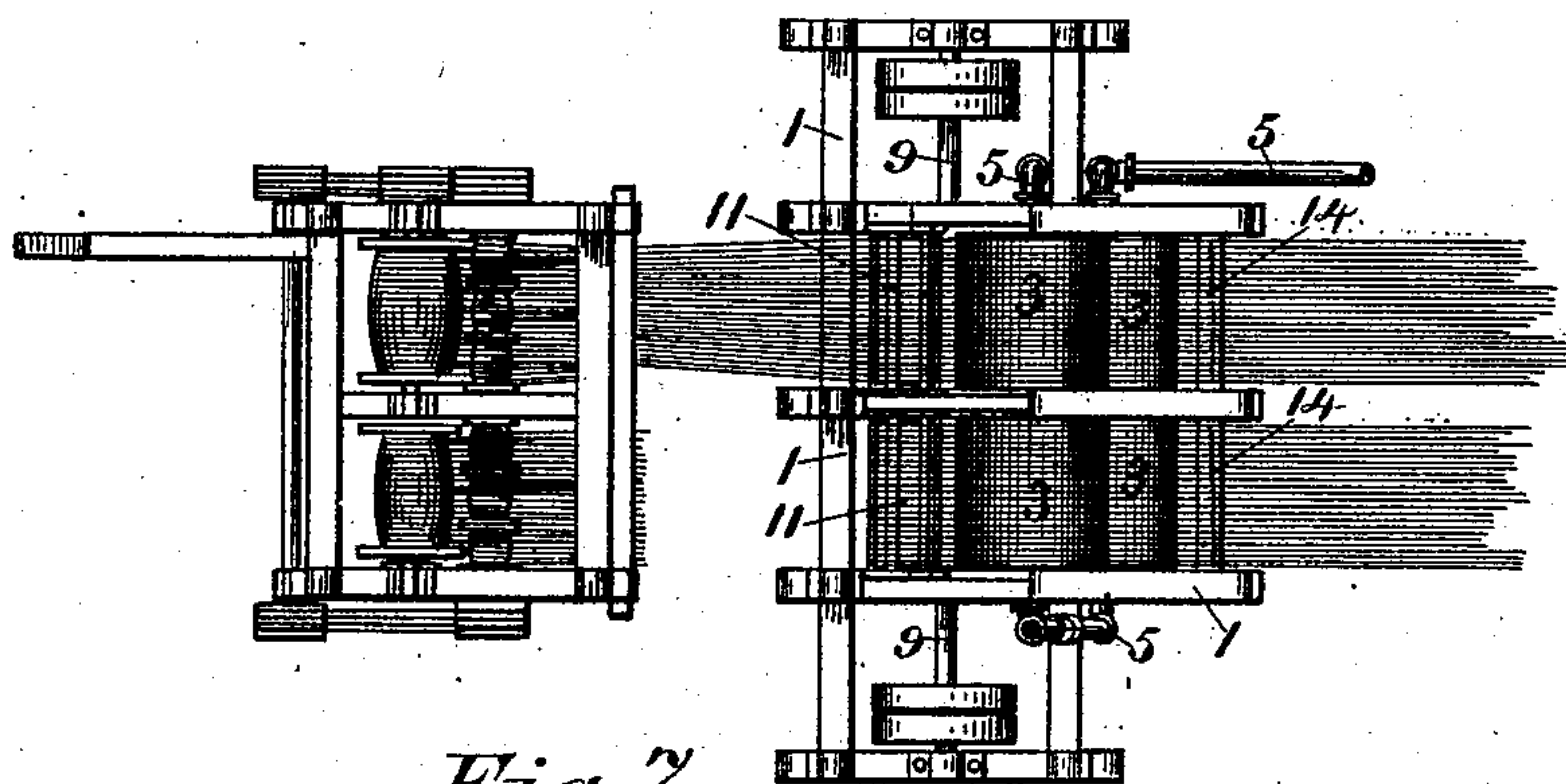


Fig. 7

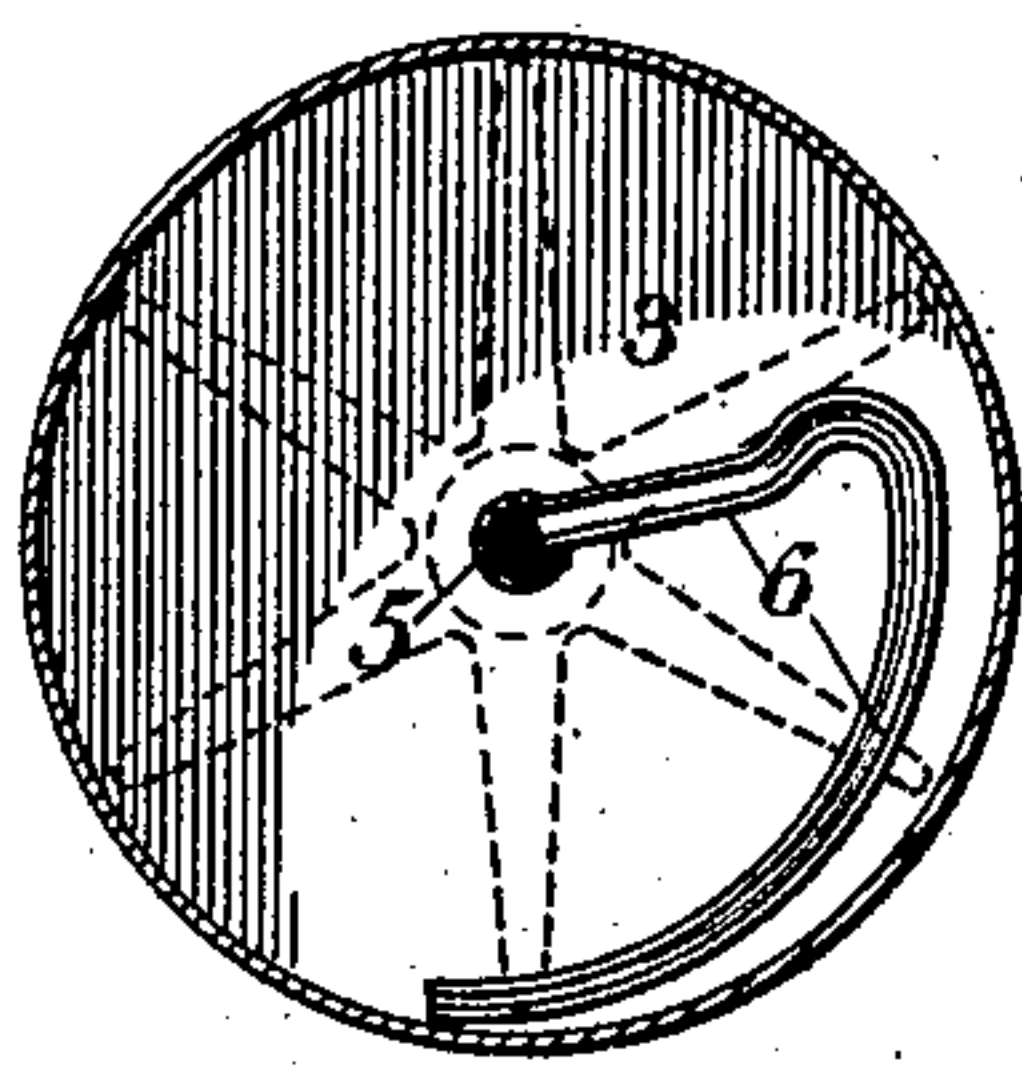


Fig. 8

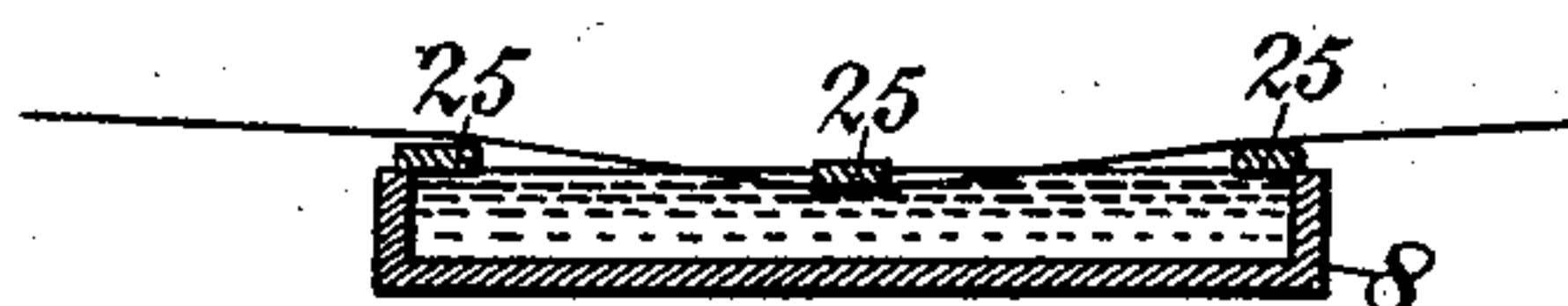


Fig. 9



Fig. 10

Witnesses

Hubblov
A. G. Ronen

Inventor

Walter H. Avis

per R. J. Graham
att'y.

UNITED STATES PATENT OFFICE.

WALTER H. AVIS, OF TORONTO, CANADA.

TWINE-FINISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 503,936, dated August 29, 1893.

Application filed February 11, 1891. Serial No. 381,081. (No model.)

To all whom it may concern:

Be it known that I, WALTER HERBERT AVIS, twine manufacturer, a subject of the Queen of Great Britain, residing at the city of Toronto, in the county of York and Province of Ontario, Canada, have invented a new and useful Twine-Finishing Machine, of which the following is a specification.

My invention relates to an improved twine finishing machine having for its principal object the finishing of wrapping and other twines by the combined use of steam drums, frictional rubbers and the atmosphere so as to produce a highly finished, glossy and uniform twine, which I accomplish by means of running the twine in my machine, in the form of a series of manifold endless belts, passing over steam drums at one end and corresponding trundle rollers at the other end of the machine, and medially applying water washing, size, starch, paste and suitable kinds of rubbers in the order hereinafter specified. I attain the above object by means of the mechanism illustrated in the accompanying drawings in which similar numbers of reference refer to similar parts throughout.

Figure 1 represents a side elevation of my improved twine finishing machine the length of the same being broken and shortened so as to show the machine in the available space. Fig. 2 represents a front elevation of the head frame of the same, exhibiting the arrangement of the steam pipe and drums in a double machine. Fig. 3 represents a front elevation of the tail frame, exhibiting the trundle wheels and the spacing bars in front of said wheels. Fig. 4 represents by a vertical longitudinal section, a detail of one of the steam drums, and Fig. 5 represents a plan of the tank and the steam coil by which the same is heated. Fig. 6 represents a side elevation of the head frame accompanied by a bobbin winding device to exhibit the means of reeling out the finished and in the unfinished twine. Fig. 7 represents a plan of the foregoing figure to more fully illustrate the same. Fig. 8 represents a cross section of one of the steam drums over which the twine is passed in the finishing operations. Fig. 9 represents a longitudinal section of a tray as used in the operation of sizing the twine. Fig. 10 represents a rubber in detail to fully illustrate the same.

For a single machine the frame 1 is essentially a pair of vertically parallel posts suitably supported by sills and spaced a suitable distance apart to have arranged and supported between them a row of steam drums, arranged in order above one another at suitable heights. For a double machine three parallel vertical posts are necessary and provide support for two columns of steam drums as shown, and is the kind of machine I prefer to employ as the most advantageous. The steam drums, 3, are cylinders of metal of sufficient strength to contain the steam pressure employed to heat them, and have the ends strengthened by radial arms suitably strengthened by ribs, and at the center is provided a hub and suitable packing gland, 4, around the steam pipe, 5, upon which the drums, 3, are supported. The pipe, 5, is perforated along the top and provided with a dipper, 6, which consists of a piece of, preferably iron pipe attached to the pipe 5, about its center within the drums 3 and extending slightly upward from said pipe 5 and then it curves downward to its termination close to the lower side of said drum 3 so as to receive any condensed steam or water at the lower side. The mouth of the dipper 6 is flattened so as to become elliptic as shown in Fig. 4. By the rapid revolution of the said drums 3 in the reverse direction to the curvature of the said dipper 6 the water will be taken up and delivered into the pipe 5, which is secured suitably to the posts of the frame, 1, and is continuous to or from the coil, 7, in the tank, 8, hereinafter particularly described. The steam employed may be taken from the exhaust of an engine and passed down through the pipe, 5, as shown in Fig. 2, by the arrow, or it may be circulated in the reverse direction by being first passed through the coil, 7, in the tank, 8, thence upward through the drums, 3, and thence exhausted conveniently. The lowest of the drums, 3, in the frame, 1, is not a steam drum but is secured rigid on its axle or shaft, 9, on which are also provided pulleys driven by a belt, 10, from suitable power to operate the machine. It will be understood that shaft, 9, is in two halves of its length so that each half and its drum can be driven separately as shown best in Fig. 2. Supported similarly as shown in Figs. 1 and

2 are two trundle rollers, 11, mounted in front of and above the drums, 3, over which the twine passes from the lowest of the drums, 3, thence it passes as shown in Fig. 1 to the tail frame, 2, of the machine, which is essentially as shown a suitable framework to contain and support a number of trundle rollers, 12, corresponding to the steam drums, 3, which rollers 12 act as returns to the said steam drums, 3, in the head frame, 1. The trundle rollers, 12, are as shown, composed of two disks—preferably wood—connected by parallel bars of similar material at intervals round the circumference and running longitudinally with the axle thereof, which is at its ends supported in open bearings, 13, secured to a suitably inclined post. In rear of the drums, 3, in the head frame, 1, and in front of the trundle rollers, 12, in the tail frame, 2, are provided spacing bars, 14, in which are fixed in regular rows or order longitudinally and transversely, a number of pins by which the strands of twine are spaced and guided over the drums, 3, and rollers, 12. At a convenient distance in front of the tail frame, 2, and mounted on a suitable form of track, 15, is provided a take-up, 16, which consists essentially of a frame 16^a mounted on roller wheels 16^b and supporting a trundle roller, 17, secured to revolve in journal bearings 16^c. To an eye 17^a on the rear of the truck is secured a rope, 18, or other suitable flexible connection whereby the said take-up, 16, can be drawn back to cause a tension on the strands of twine by means of a windlass, 19, around the roller of which the rope, 18, can be wound as tightly as desired by means of a ratchet lever, 20, and secured by the pawl, 21, engaging a ratchet wheel, 22, on the end of the roller of said windlass, 19, as shown supported by the tail frame, 2.

The tank, 8, situated as shown relatively to the head and tail frames, 1 and 2, respectively, of the machine, is a rectangular shaped tank in plan and is intended to contain water and paste or starch, &c., usually employed by finishing machines. As already mentioned the tank, 8, has a coil, 7, constructed of metal pipe either curved or screwed together in elbows as shown and laid close together so as to give advantageous distribution of heat from the steam passing through said coil 7.

The drums, 3, hereinbefore described may be employed in the summer or warm weather, or even in a heated building without any steam circulating through them, the steam circulating through them being merely to dry the twine more rapidly than in cool or damp weather, or surroundings would do. The process of finishing the twine by means of my machine may be divided into five operations, exclusive of reeling which is merely that of cutting the strands which pass back and forth over the drums, 3, and rollers, 11, alternately (after the take-up, 16, has been passed) and securing the upper ends of the strands to a

corresponding number of new twines, then reeling out that finished by attaching the ends to bobbins and winding out the finished twine thereby causing the unfinished twine to be passed over the drums and rollers, replacing that withdrawn. When the complete relay has been accomplished and the ends tied and the slack taken up by the means provided for that purpose, the machine is then put in motion and the first operation is that of dry carding which is accomplished by placing two cards 23 on the top of the tank 8 so that the brush surfaces of the one is upward and the other downward and on top of the twine, and both brush surfaces in contact with the twine. The machine is driven until the free ends of the fibers of the twine are removed. The next operation is that of water washing, and may be accomplished by re-arranging the cards 23 so that both are alike on the ends of the tank 8 and turned brush surfaces upward and by placing a piece of wood or any other suitable material between said cards 23 and on top of the twine so as to deflect it through water with which the tank 8 is filled. After running the twine through the water and in contact with the brush surfaces of the cards 23 till it appears smooth and free from imperfections it is next buffed off by replacing the cards 23 with rubbers 25 formed of suitable wooden bars wound with coir or horsehair rope, but arranged so that the twine does not pass through the water in the tank 8. When the twine has been well rubbed and fairly dry by the last operation and its passage over the steam drums 3, it is ready for sizing. After liberating it from the rubbers 25, of the last operation, the twine is deflected into a second tank containing the size by a bar of wood or any such means placed on it and arranged to cause the twine to pass through the size similar to passing it through the water of the second operation. The twine having been well sized is next rubbed by being run in contact with worn out rubbers 25 or other suitable material and like the third operation—rubbing dry—is run in the air and clear of the size in the tank. When dry after the rubbing, succeeding the sizing operation, a gloss or finish may be imparted to the twine by an operator taking a cloth or other suitable fabric freely greased and holding it in contact with the running twine which has previously been liberated from contact with all rubbers, cards, tanks or other means employed in the earlier stages of the finishing process.

Having now described my twine-finishing machine, what I claim, and desire to secure by Letters Patent, is—

1. In a twine finishing machine, the combination of the head frame, the circulating steam pipe supported therein as described, the steam drums adapted to revolve on said steam pipe as specified, the trundle rollers carried in the tail frame and corresponding to the steam drums in said head frame, and

the spacing bars in front of said steam drums and trundle rollers, to direct the twine, substantially as shown and described.

2. In a twine finishing machine, the combination of the head frame, the circulating steam pipe supported therein as described, the steam drums adapted to revolve on said steam pipe as specified, the trundle rollers carried in the tail frame and corresponding to the steam drums in said head frame, the spacing bars in front of said steam drums

and trundle rollers, to direct the twine, and the take-up car having a trundle roller therein, said car adapted to operate along a track between said head and tail frames to take up the slack in the bands of twine over said steam drums and trundle rollers, substantially as shown and described.

WALTER H. AVIS.

Witnesses:

T. J. McEWEN,
JAMES BELL.