No. 808,978. PATENTED JAN. 2, 1906.

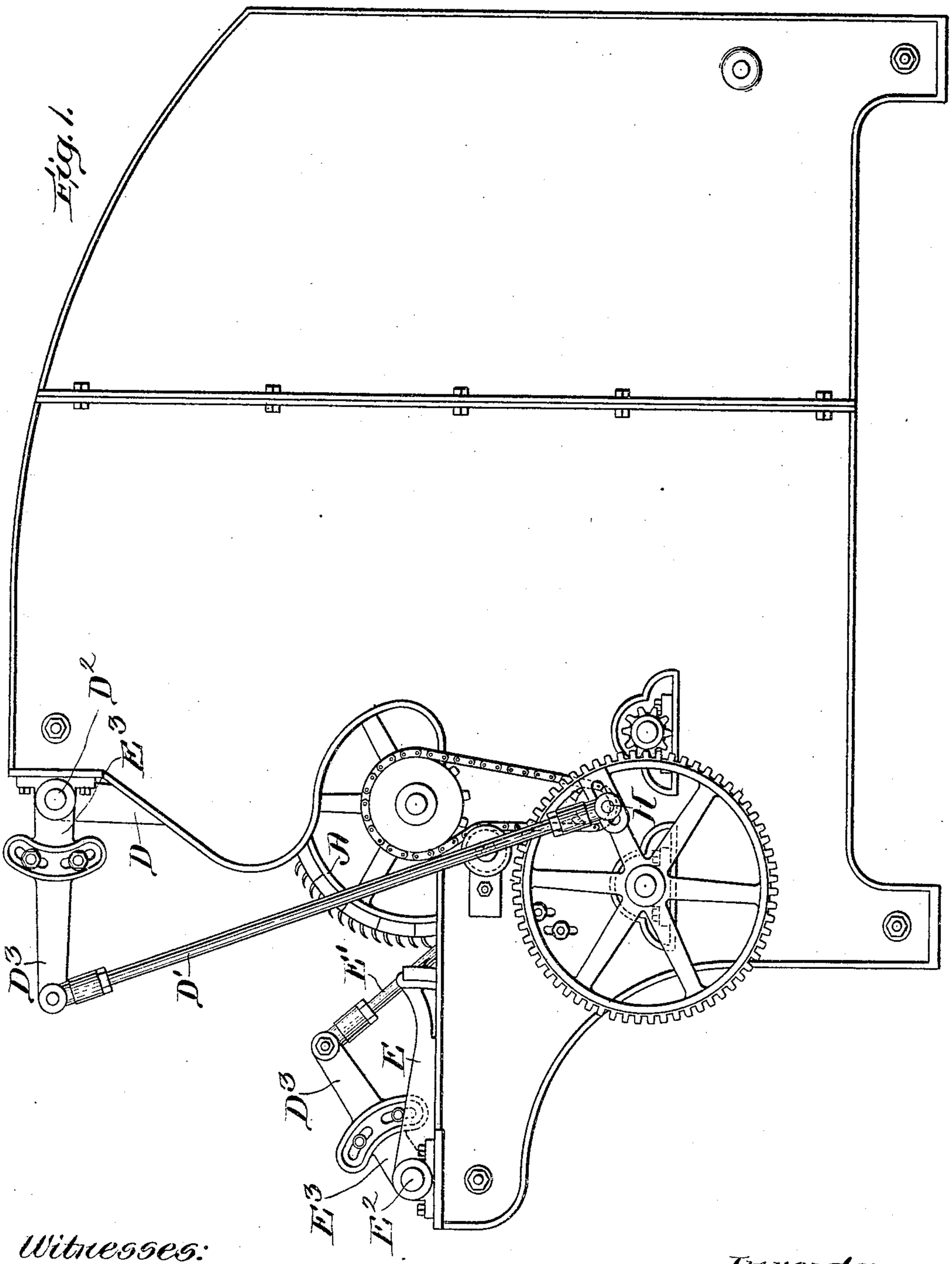
D. C. FISHER.

MACHINE FOR DISENTANGLING FIBERS.

APPLICATION FILED AUG. 13, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



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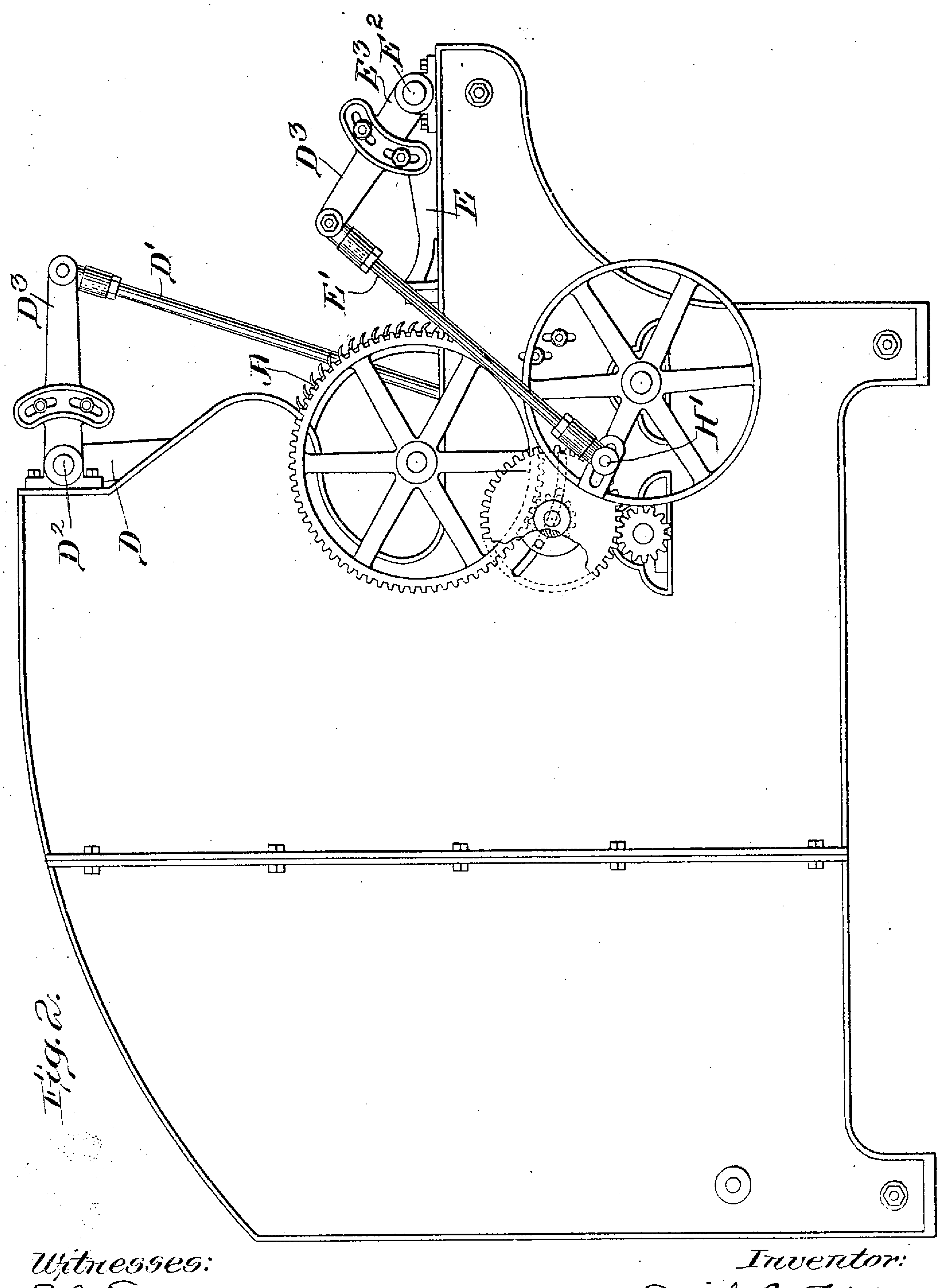

Fig. 2.

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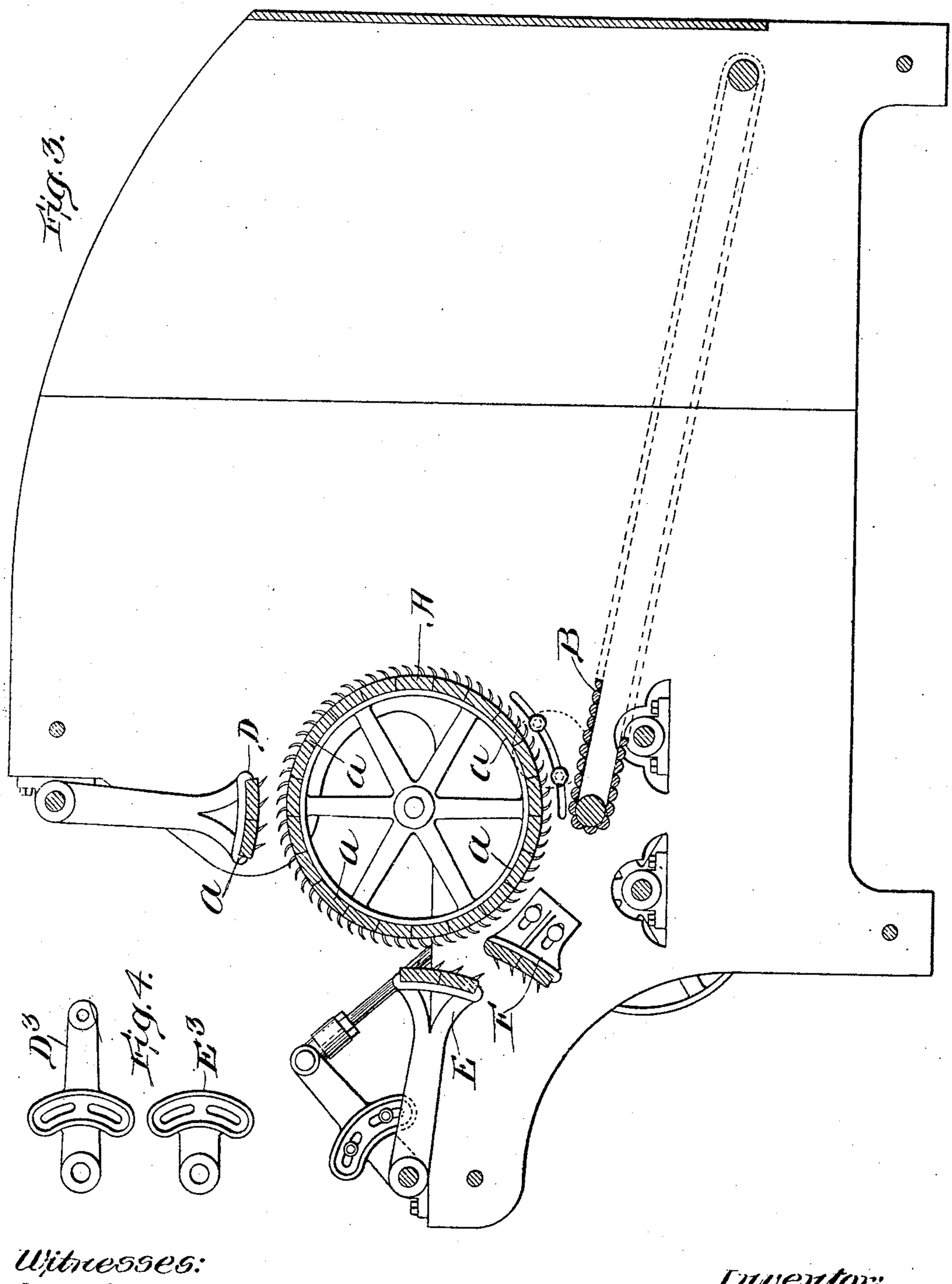
3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

DANIEL C. FISHER, OF BOSTON, MASSACHUSETTS.

MACHINE FOR DISENTANGLING FIBERS.

No. 808,978. Specification of Letters Patent. Patented Jan. 2, 1906.

Application filed August 13, 1904. Serial No. 220,688.

To all whom it may concern:

Be it known that I, DANIEL C. FISHER, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Machine for Disentangling Fibers, of which the following is a specification, reference being had to the drawings making a part hereof.

My invention is a machine which takes the fibers in a more or less tangled, cotted, or matted condition, as wool in the fleece or in balls, or mohair, or other fibers, as raw material, and brings each fleece (including not only wool, but all other like masses of tangled fibers, as above indicated) to a cylinder with hooked teeth on its surface which will carry the fleece or other mass of tangled fibers to the action of a vibrating segment of a cylinder with like teeth, but oppositely hooked, in such wise that the teeth of the vibrating segment will draw out many of the fibers from the tangled mass, while the mass is held by the teeth of the carrying-cylinder, each row of teeth in the segment acting on the forward stroke of the segment to draw out fibers to a different distance from the holding-teeth on the cylinder and on the back stroke of the segment to free its teeth from the fibers so drawn out and lay them back on the fleece from which they were thus drawn out, the carrying-cylinder and the vibrating segment being so arranged that the teeth of the segment act upon that portion of the fleece then brought to it by the carrying-cylinder on the forward stroke to loosen up the fibers then held by the teeth of the carrying-cylinder and on the back stroke to lay those fibers back on the fleece, and the vibrations of the segment being so timed in relation to the travel of the fleece that when the carrying-cylinder has carried the fleece clear of the action of the vibrating segment the fibers in the outer portion of the fleece shall be by the repeated action of the vibrating segment loosened up and drawn out from the fibers in the inner portion of fleece held by the carrying-cylinder, but the fleece still be carried forward to means for removing the whole fleece with its fibers thus loosened up from the carrying-cylinder, thus making the operation continuous. In short, the tangled mass of fibers is fed to the carrying-cylinder and carried by the carrying-cylinder past the teeth of the vibrating segment, the teeth of which act repeatedly upon the outer portion of the tangled mass, while the inner portion is held by the teeth of the carrying-cylinder until the tangled mass is brought to its new condition, in which the fibers are largely disentangled and each laid substantially parallel with the others, in which condition the fibers are carried forward by the carrying-cylinder until the discharging means takes them from that cylinder, a new fleece having been in the meantime taken up by the teeth of the carrying-cylinder as soon as the rear of the first fleece is carried past the action of the vibrating segment, and so on.

Means for removing a layer of free wool or like fiber from a carrying-cylinder have long been familiar to all skilled in the art of wool-working; but I have discovered that if a secondary segment be used, operating not only to remove the fleece from the carrying-cylinder after it has been carried past the primary segment just described, but also to act in opposition to the primary segment, the fibers of the fleece will be still farther drawn apart and the fleece will be much better prepared for subsequent treatment, for this opposed action of the primary and secondary segments while each is performing its function with relation to the carrying-cylinder acts to complete the drawing out of the fibers of the fleece and gives a finish to the disentangling process, which is wholly new with me, as is also the primary drawing out effected by the joint action of the primary segment and the carrying-cylinder above explained, the latter being the first feature of my invention and the former being the second feature, and while the first feature may be used independently of the second it is obvious that the second cannot be used independently of the first and also that my invention in its best form embodies both features. It is owing to this that while it might seem at first glance that the first feature would be better embodied by giving the carrying-cylinder an intermittent motion—that is, a dwell during each forward and back stroke of the primary segment and a forward motion only while the teeth of the primary segment were clear of the fleece—yet it is preferable in practice to give a uniform surface speed to the carrying-cylinder, especially when both features of the invention are embodied in my machine. Practically, however, the advantage of this intermittent motion of the carrying-cylinder is slight, even with respect to the primary segment, and it is a slight disadvantage with respect to the

secondary segment, so that in practice I find it better both as a matter of construction and also of mode of operation to omit it, especially when both features of my invention are embodied in one machine.

In the drawings, Figure 1 is an elevation of one side of my machine. Fig. 2 is an elevation of the other side. Fig. 3 is a vertical longitudinal section, and Fig. 4 is a detail described below.

My machine as constructed in practice has a carrying-cylinder A supplied with lags *a*, of wood or metal, in which are secured teeth, and these lags are readily removed and replaced, so that the number and arrangement of the teeth can be readily accommodated to the varying conditions of the fiber to be treated. This cylinder A receives the fiber from the creeper-apron B, as the apron conveys the fleeces gradually to the cylinder A, and the teeth of the cylinder engage with fleece after fleece, presenting the fleeces singly to the action of the segment D, as above described. The teeth on each lag hold the fleece and present it properly to the action of the primary segment D. The use of teeth mounted on lags *a* allows for the ready adjustment of these teeth to suit different conditions of the tangled fiber, and by using the proper set of lags the operator can readily determine after short practice the lags desirable for doing the best work with any particular kind of stock. The main segment D has similar lags *a*, whose teeth are hooked to oppose those of the cylinder and are arranged to alternate with the teeth of the cylinder.

As a usual and ordinary adjustment the teeth of the cylinder will stand about three inches apart along any row, each row alternating with the next and each row about one and a half inches from the next row. The lags on the primary segment D have the like arrangement of teeth, and those teeth are adjusted for the best results by using the proper set of lags, as before described of the main cylinder. This adjustment of teeth is also true of the secondary segment E and of the stationary segment F, and, indeed, it is practically necessary to remove and replace the lags of each of the segments whenever the lags of the main cylinder are removed and replaced in order that the teeth of the segment D shall oppose those of the cylinder A and also those of segments E and F, and those of segment E shall run in opposition to those of segment D, but in harmony with those of the cylinder and of segment F, as will be clear. The mechanism for driving all these parts will be clear from the drawings and forms in itself no part of my invention.

The best adjustment of the primary segment D is such that it will operate as above described to draw the fibers parallel and then return them to the main cylinder, while the best adjustment of the secondary segment E is such that it will clear the fibers from the main cylinder and complete the operation of drawing the fibers parallel; but all this will be plain to all skilled in the art, and I have therefore indicated mainly the usual methods of adjusting the segments in their relations with the other parts; but I have found that it is of very considerable importance in machines having vibrating teeth, one set acting in opposition and another set in harmony with the teeth of a main cylinder, to vibrate one set by means which are adjustable independently of the means for vibrating the other set—as, for example, by two connecting-rods D′ and E′, one driven by crank H, the other by crank H′, as shown, the point being that the adjustment of the throw of connecting-rod D′ can be affected without affecting the throw of connecting-rod E′. This is essential for the best results from the use of my machine shown in the drawings and is also important in many other machines, which, while wholly unsuited for preparing fibers while in a tangled or matted condition, as above described, are yet characterized by the use of a toothed cylinder in combination with two combs, each of which needs close adjustment, but which hitherto have both derived motion from one and the same crank-wheel in such wise that the adjustment of either necessarily affected the adjustment of the other, while in this, the third feature of my invention, it will be clear that each is independently adjustable and that the adjustment of either does not affect the other in any way. Thus the connecting-rods D′ and E′ must each be separately adjusted in order that the rock-shafts D^2 and E^2 may be rocked through the arc required for each, and for a still finer adjustment the longer arm D^3 may be loose on its rock-shaft until made fast to the shorter arm E^3, as clearly shown in Fig. 4, where the two arms are shown detached, and it is made clear that they must be bolted together and the shorter one keyed to its rock-shaft to become operative to impart the motion of the crank through the connecting-rod to the rock-shaft.

What I claim as my invention is—

1. A machine for disentangling fibers comprising a carrying-cylinder with teeth to carry the fleece past a vibrating segment; that vibrating segment with like teeth arranged in ranks but opposed to the teeth of the carrying-cylinder; and means to remove the fleece after it has been carried by the carrying-cylinder past the action of the vibrating segment, all combined to operate substantially as set forth.

2. A machine for disentangling fibers comprising a carrying-cylinder with teeth to carry the fleece past a primary vibrating segment; that primary vibrating segment with like teeth arranged in ranks but opposed to

the teeth of the carrying-cylinder; and a secondary vibrating segment with like teeth but opposed to the teeth of the primary segment, all combined to operate substantially as set forth.

3. In combination a toothed carrying-cylinder; a primary segment; a secondary segment; and means to adjust the stroke of each segment independently of the other, all substantially as described.

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