

(No Model.)

3 Sheets—Sheet 1.

W. DEARBORN.

MACHINE FOR CLEANING COTTON AND WOOL WASTE.

No. 360,566.

Patented Apr. 5, 1887.

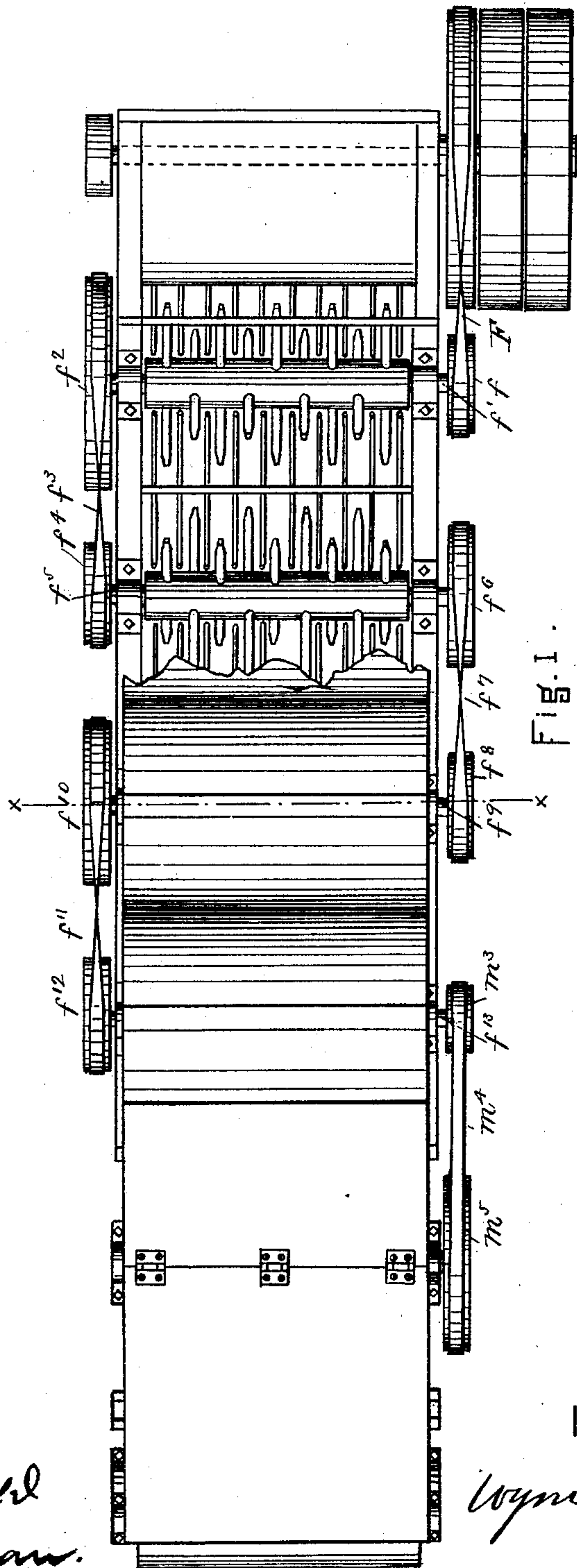


Fig. 1.

WITNESSES.

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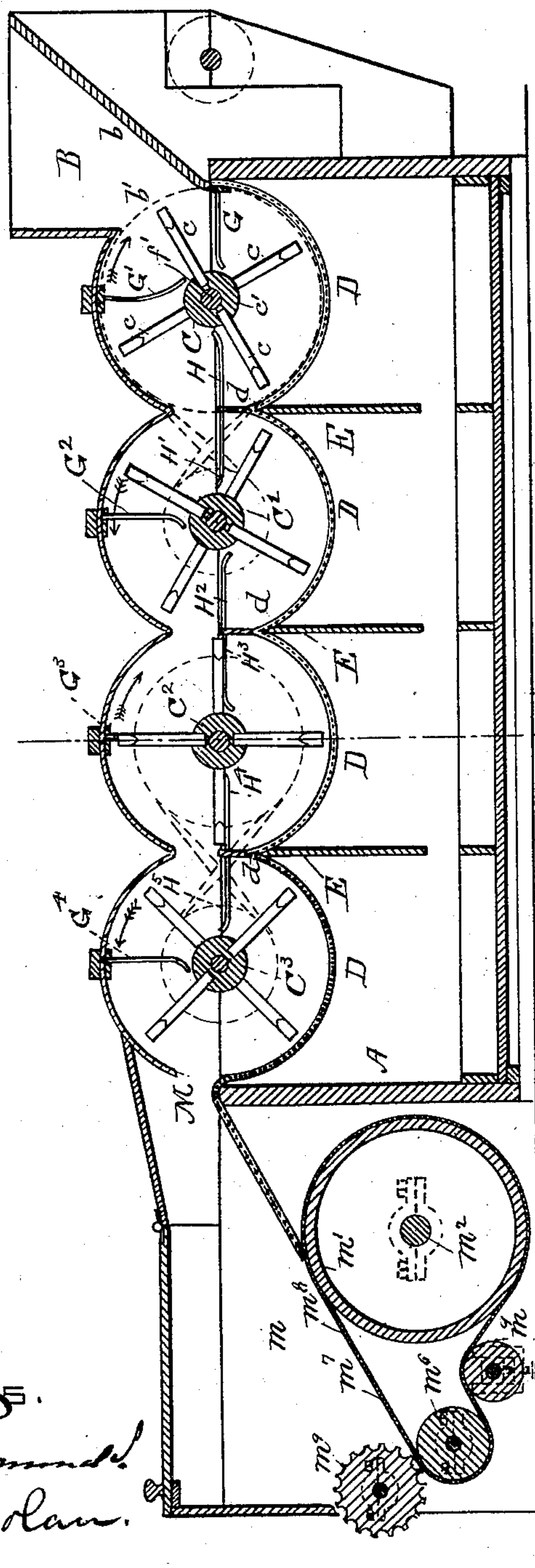


Fig. 2.

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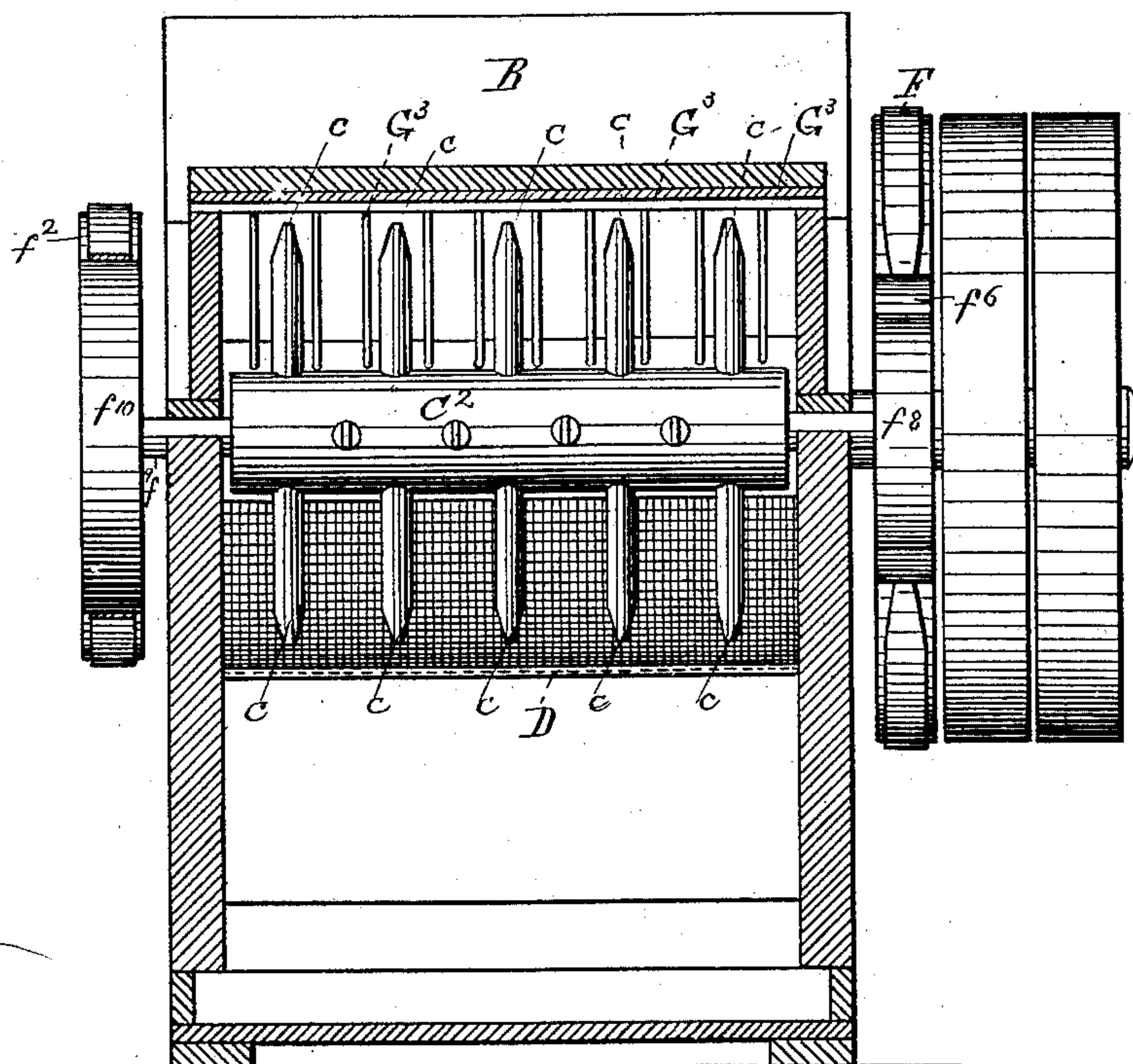


Fig. 3.

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UNITED STATES PATENT OFFICE.

WYMAN DEARBORN, OF BOSTON, ASSIGNOR TO F. ROCKWOOD HALL, OF
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MACHINE FOR CLEANING COTTON AND WOOL WASTE.

SPECIFICATION forming part of Letters Patent No. 360,566, dated April 5, 1887.

Application filed May 1, 1886. Serial No. 200,856. (No model.)

To all whom it may concern:

Be it known that I, WYMAN DEARBORN, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Machines for Cleaning Cotton and Wool Waste, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The object of the invention is to cleanse or free from dirt and render to a very considerable extent usable for the manufacture of cloths waste or refuse cotton or wool; and it comprises, essentially, the arrangement within a suitable case of a hopper, a series of rolls armed with spurs or teeth and arranged to be revolved at different speeds, and a series of stationary teeth arranged in relation to the rolls so that the teeth or spurs of the rolls shall pass between them, a screen of peculiar shape, and partitions between the lower sections or parts of the rolls beneath or between the sections of the screen, all arranged so that the waste is taken from the hopper, is beaten by being thrown and drawn against the stationary teeth, and by the meshing of the revolving teeth is torn apart, its direction of movement changed from movement in one arc to reverse movement in a tangential or nearly tangential arc, to loosen it and to allow the dirt and foreign matter to drop therefrom through the screen, and finally to be expelled from the machine substantially free from dirt and deleterious substances.

Referring to the drawings, Figure 1 is a plan view of a machine having the features of my invention, the casing being removed at the front end to show the construction of the mechanism beneath. Fig. 2 is a longitudinal vertical central section of the machine. Fig. 3 is a vertical section upon the line $x x$ of Fig. 1, showing, also, in elevation the parts beyond said line.

A represents the case or frame-work of the machine.

B is the hopper, which, preferably, is arranged at one end of the case or frame-work and has the inclined surface b and the outlet or aperture b' , through which the cotton or

wool waste is drawn by the teeth c of the first roll, C, of the series. I prefer to use a set of four rolls arranged one beyond the other upon the same level, and to revolve the second roll, C', of the series somewhat faster than the first, C, the third, C², faster than the second, and the fourth, C³, the fastest. The rolls are substantially alike—that is, they each comprise a cylindrical section or drum, c' , of sufficient size to bear or support the teeth c , which extend radially therefrom in lines and at uniform distances apart. Below each roll is a screen, D. This, preferably, is made from one piece of wire-gauze of suitable mesh bent to the shape represented in Fig. 2—that is, so that there shall be an upward-extending section, d , between the first and second rolls, between the second and third rolls, and between the third and fourth rolls. Beneath the screen at each of these upwardly-extending parts there is a partition-plate, E, of wood or other material, which prevents the dirt and sediment being thrown by the action of the rolls from one section of the screen to the next in order.

Any suitable means may be used to provide the rolls with the differential speed indicated, and I have represented the first roll, C, as turned by a belt, F, running to the pulley f on its shaft f' . This shaft has also at its other end a large pulley, f^2 , which is connected by the belt f^3 with the pulley f^4 of the shaft f^5 of the second roll. This shaft has at its other end a large pulley, f^6 , which is connected by the belt f^7 with the small pulley f^8 on the shaft f^9 of the third roll, and this shaft has a large pulley, f^{10} , smaller, however, than the pulley of the second roll, which, by means of a belt, f^{11} , communicates movement to the pulley f^{12} on the shaft f^{13} of the fourth roll. The belts $f^3 f^7 f^{11}$ are cross-belts.

It will be seen that the first roll, C, revolves in a direction opposite that of the second roll, C'; that the second roll, C', revolves in an opposite direction from that of the third, C², and that the third revolves in an opposite direction from that of the fourth, C³. The stationary teeth which I have spoken of preferably are arranged in relation to the teeth of the rolls as follows: The first set, G, extend inward from the lower edge of the hopper to

ward the first roll, and their points or ends are bent downward to a position somewhat below the center thereof. These teeth are arranged so that the teeth *c* of the first roll shall pass between them. The second set, *G'*, of stationary teeth I prefer to arrange, as indicated in Fig. 2, so as to extend from the support *g* downward very nearly to the body of the roll *C*, but ending a little to the front of the center thereof; and this remark is also true of the lines *G*², *G*³, and *G*⁴ of teeth used in connection with the second, third, and fourth rolls, respectively, with the exception, however, that the ends of the teeth are bent or curved in the direction of the rotation of the drums. I have arranged, also, between the second and third rolls the lines *H H'* of stationary teeth, which extend horizontally from a supporting bar or rod, *h*, and between the second and third rolls and third and fourth rolls I have also arranged similar lines, *H*² *H*³ and *H*⁴ *H*⁵, of teeth, and these teeth act in conjunction with the teeth of the rolls substantially as the other stationary teeth act.

There is arranged at the end of the frame or case a discharge-opening, *M*, through which the cleansed cotton or wool is expelled. The dust and dirt removed from the cotton or wool fall through the meshes of the screens *D* into the lower part of the frame or case, preferably into a receptacle or receptacles, such as drawers or boxes placed between the partitions *E* to receive it.

Arranged beyond the discharge-opening *M* is a receptacle, *m*, which receives the cotton or wool waste as it is discharged or delivered by the beaters, and I have arranged therein a mechanism for collecting the cleansed wool or cotton waste and delivering it in the form of a bat. This mechanism comprises a drum, *m'*, mounted upon a shaft, *m*², which is revolved from the pulley *m*³ on the shaft *f*¹³ by means of the straight belt *m*⁴, which runs to the pulley *m*⁵ on the drum-shaft *m*². This drum carries in connection with the roll *m*⁶ a revolving screen-belt, *m*⁷, which is made, preferably, of wire-gauze in the form of a belt, and which is kept taut on its upper surface, *m*⁸, by means of an idler, *m*⁹.

There is arranged over the roll *m*⁶ the pressure-roll *m*⁹, which bears upon the belt *m*⁷ and serves to consolidate and press the waste into the form of a bat as it is moved by the belt out of the machine. This roll *m*⁹ may have grooves extending its length; or, instead of grooving the roll, the same effect may be produced by fastening rubber ribs to it a short distance apart, and if these are used, only their leading edges need be fastened to the roll.

In operation the waste or refuse cotton or wool is placed in the hopper, and it is taken or drawn therefrom by the teeth of the first roll, and is passed onward rapidly by the teeth of the other rolls, is torn, shaken, drawn, and beaten apart in such manner as to free the dirt

and heavy matter, which fall through the screen, while the cotton or wool, being light and fluffy, is moved onward until expelled.

It is necessary that the mesh of the screen should be sufficiently large to allow the dirt and foreign substances to leave it freely, but not so large as to permit the cotton or wool fiber to escape therethrough. It is also desirable that the teeth should not be set too closely together.

The waste or refuse cotton and wool which this machine is especially adapted to cleanse and render usable is the refuse from the various machines and processes used in the manufacture of the goods and the preparation of the material therefor—such, in the manufacture of cotton, for instance, as the waste or refuse from the breakers and finishers, gin-falls, and motes, the waste from the cards, &c. For the cleansing of waste or refuse cotton it will be desirable to rotate the beating-rolls substantially as above indicated, but for cleaning wool waste, or refuse from the manufacture of woolen goods, a change in the relative speed of the rolls may be made—such, for instance, as causing the second roll to revolve at a greater speed than the first roll, the third at a less speed than the first or second, and the fourth at a greater or less rate than the third. In fact, the relative rotation or speed of each roll may be varied according to the material which the machine is to work upon; or the beating-rolls may all be run at the same rate of rotation without departing from the spirit of the invention.

The rolls may be geared instead of belted, and may be run from external shafts or counter-shafts instead of from each other; but the directions of rotation of the picking-cylinders herein described must be preserved whatever connection with the power is made.

This apparatus differs from the apparatus of the Page patent, No. 60,235, among other things, in the fact that the varying velocity of the picker-teeth when they act on the fiber is obtained by increased velocity of rotation of the shaft which carries the teeth, and not by varying the length of teeth and having the velocity of rotation of the shaft the same, and that the picker-cylinders of Page are all revolved in one direction instead of in alternate opposite directions, as I have described. This last fact obtains, also, in the patented contrivance of Jillean and Palmer, No. 110,368, in which the picker-teeth of adjacent shafts move at the same speed. It will also be noticed that the stationary teeth of the devices of the patents to Mason, July 8, 1834, and to Mumford, March 28, 1844, are quite differently shaped from mine, and my observation and experience lead me to believe that these differences affect the efficiency of the mechanism to its advantage.

It will be noticed that the stationary teeth *G'* *G*² *G*³ *G*⁴ are at the top of each picker-chamber, are sharply bent near their ends in the direc-

tion of revolution of the rotating teeth, and reach nearly to the picker-shafts. The partitions E between the picker-chambers reach nearly to a level with the axis of revolution of the picker-shafts, and these partitions carry stationary teeth, like teeth G^2 , &c., in form and direction of points, (marked H H' H^2 H^3 H^4 H^5), on both sides, and similar stationary teeth, G , are at the entrance of the first picker-chamber, while the exit from the last picker-chamber has no adjacent teeth nearer than a quadrant of arc. Teeth G' are more curved in the direction of revolution than the others, in order that the fiber caught thereon may be drawn down to the shaft and thrown out again with more force against the grating D, and thus more efficiently shaken and dusted.

A patent was granted in 1838 to J. Idler, No. 1,050, in which the revolving picker-teeth interlocked, and hence the shells of their chambers were only about a third of a cylinder, instead of a half; and in this patent short stationary teeth were shown, some leaning toward the direction of revolution of the revolving pickers and some from it; but I show here improvements in the shape and relations of the stationary teeth with the revolving teeth.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a machine for cleansing cotton, wool, and other waste and refuse, the combination and arrangement of a series of beating-rolls, arranged in relation to each other substan-

tially as specified, and means whereby the same are rotated in alternately-opposite directions, at different speeds, substantially as described.

2. The combination of the hopper B, the rolls C C' C^2 C^3 , each having the beating teeth or arms c , and means for operating the same, whereby the beating-roll C' is rotated in a direction opposite that of the roll C and at a greater speed, and the roll C^3 is rotated in a direction opposite that of the roll C^2 and at a greater speed than it, and both at a greater speed than the roll C' , substantially as described.

3. The combination of the casing A, the hopper B, the rolls C C' C^2 C^3 , belted together, as described, the screens D, and partitions E, substantially as set forth.

4. The combination of the casing A, the beating-rolls C C' C^2 C^3 , the hopper B, the screens D, the partitions E, and the lines of stationary teeth G G' G^2 G^3 G^4 H H' H^2 H^3 H^4 H^5 , substantially as described.

5. The combination of the casing A, the beating-rolls C C' C^2 C^3 , the screens D, and partitions E, the stationary teeth, the chamber m , open to the picker-chambers through escape opening M, the movable belt m' and its rolls m' m^6 , and roll m^9 , substantially as described.

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Witnesses:

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