(No Model.) 2 Sheets—Sheet 1.

J. DEMPSTER & H. HOLCROFT.

CARDING ENGINE.

No. 250,896. Patented Dec. 13, 1881.

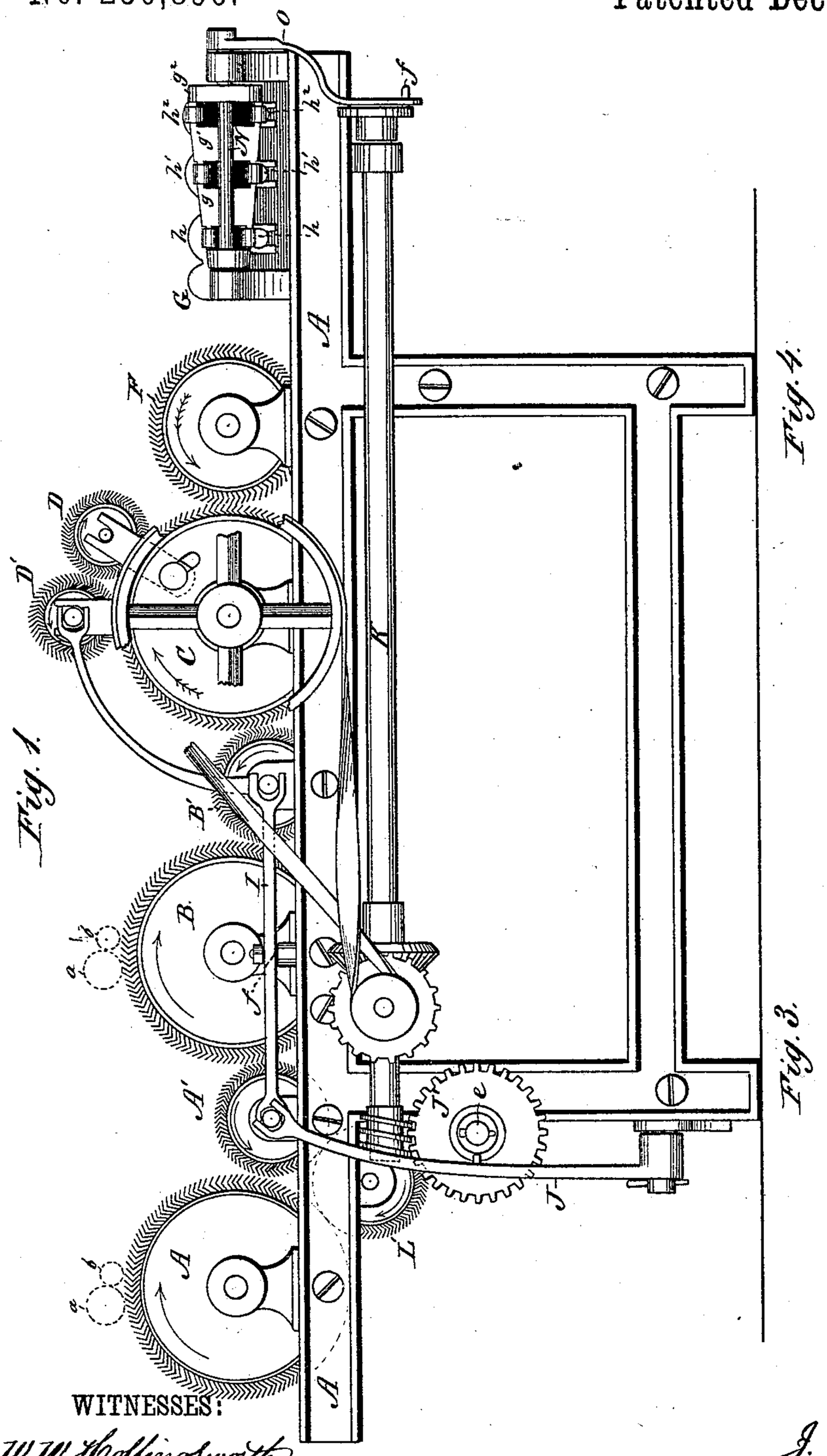

Fig. 1.

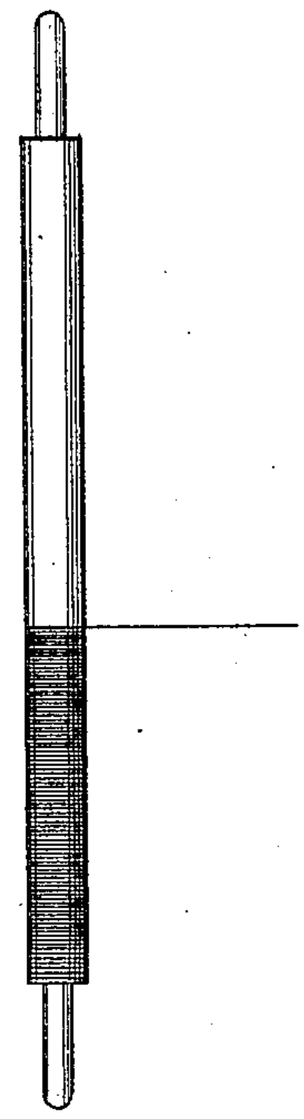

Fig. 4.

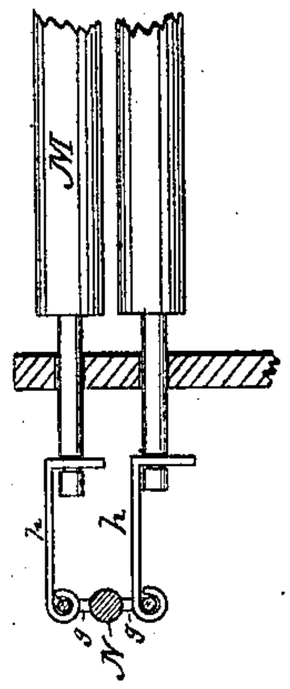

Fig. 3.

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J. DEMPSTER & H. HOLCROFT.

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Fig. 1.

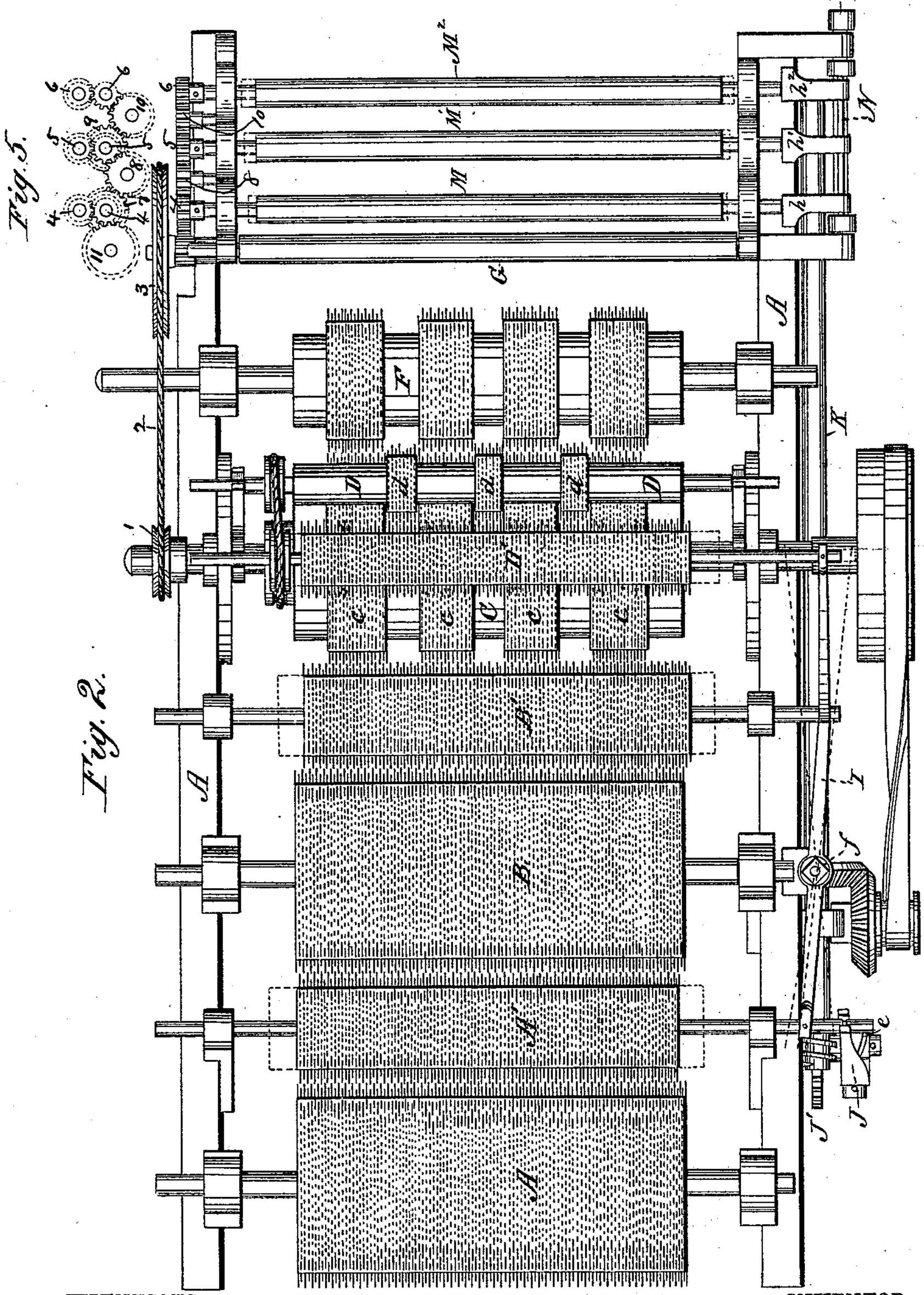

Fig. 2.

WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES DEMPSTER AND HENRY HOLCROFT, OF MEDIA, PENNSYLVANIA.

CARDING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 250,896, dated December 13, 1881.

Application filed June 9, 1880. (No model.)

To all whom it may concern:

Be it known that we, JAMES DEMPSTER and HENRY HOLCROFT, of Media, in the county of Delaware and State of Pennsylvania, have invented a new and Improved Carding-Engine; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation; Fig. 2, a plan view; Fig. 3, a detail of the means for oscillating the rolls; Fig. 4, a detail showing the clothing of the rolls with twine. Fig. 5 is a detail side view of the gears for imparting a constantly-accelerated rotation to each succeeding set of the rolls M M′ M², the teeth of these gears being made wide enough to permit endwise reciprocation of the rolls without disengagement of the gears.

In some forms of carding-engines the carded fleece is taken from the last cylinder by two doffers or cylinders clothed with parallel strips of card-cloth, one of which doffers takes from the cylinder one series of strips or sliver of the fleece, and the other of which doffers has its rings of card-cloth arranged alternately with those of the first doffer, and takes from said cylinders the strips of fleece which the first doffer does not remove. The slivers from these respective doffers are then passed through rubbers or drawing-rolls having an endwise motion, and are thereby slightly rolled or twisted. An objection to this plan is that, in consequence of the difficulty of getting the same or an exactly corresponding adjustment for the two sets of rollers, the slivers which pass through the two rollers are not rolled or twisted with the same degree of compactness, and have to be spun upon different mules.

One object of our invention is to dispense with the use of two doffers; and to this end it consists in combining with the carding-cylinder a cylinder having a set of rings of card-cloth and one or more strippers which have a longitudinally-reciprocating movement between the carding-cylinder and ringed cylinder, together with mechanism for actuating this stripper-cylinder, whereby all of the fleece of the carding-cylinder is transferred to a single cylinder having rings of card-cloth, by the lateral distribution of the fleece as effected by the endwise movement of said stripper.

Our invention also consists in other details subsidiary to this feature just described.

It also further consists in means for imparting to the rubbers or rolls which roll or twist the slivers a differential endwise movement in proportion to their increased rates of speed, as hereinafter fully described.

In the drawings, A represents the framework of the machine, which may be made in any approved shape. Upon this frame are journaled three carding-cylinders, A B C, each revolving in the direction of their respective arrows, and of which A and B are provided with workers and strippers *a b*, as usual. To the first cylinder, A, the stock is fed; thence it is taken by a stripper, A′, revolving at a higher rate of speed and delivered to carding-cylinder B, revolving at a still higher speed; and thence it is taken by a stripper, B′, of a still higher speed, and is transferred to C. This cylinder, which revolves faster than those preceding it, is clothed, not with a continuous sheet of card-cloth, like the others, but with rings or strips *c c* of the same.

Now, to effect the removal and division of the fleece from the carding-cylinder by a single cylinder having a series of rings of card-cloth, we arrange strippers A′ B′ between the cylinders A B C, which strippers revolve in the opposite direction to the cylinders A B C, and whose teeth are arranged to strip the cylinder in front and deliver to the cylinder in the rear. To these strippers A′ B′ we give a longitudinal movement as they rotate, as shown in dotted lines in Fig. 2, the object of which is explained as follows: If a single cylinder having rings of card were allowed to take the fleece from the cylinder bearing the continuous and unbroken fleece, the latter cylinder would be robbed of its fleece only in the planes of the strips of card-cloth, and hence the necessity of two such ringed cylinders or doffers for dividing and removing the fleece, as heretofore used. Now, by giving to these strippers A′ B′ a longitudinal movement they distribute the fleece over the cylinder B by a lateral transfer, and thus eventually bring the whole of the stock into range of the rings of card-cloth of the single cylinder. After the

fleece has been transferred to the rings of card-cloth on the cylinder C, we find that the fibers will be drawn more or less across from one ring of the cylinder to the next, and in passing through the rubbers this would cause them to be twisted together. To obviate this we mount a cylinder, D, above the cylinder C, which cylinder D is clothed with rings of card-cloth *d*, which correspond to the spaces between the rings *c* of the cylinder C and enter the same. This cylinder D revolves in the direction shown by its arrow, and its rings pass between the rings of cylinder C and take away the fiber which partially connects the slivers on C. Then near this cylinder D, and in contact with it, and also with the cylinder C, we mount a stripper, D′, having a continuous surface of card-cloth, and revolving, as shown by its arrow. This stripper, like A′ and B′, is given a longitudinal movement, and it strips the fiber from cylinder D (taken by D from the spaces on cylinder C) and transfers it to the cylinder C, the endwise movement of the stripper D′ serving to distribute this fiber upon the rings *c* of said cylinder. The slivers are then taken from the card-cloth rings of C by a doffing-cylinder, F, having rings of card-cloth coinciding with those on C, and which doffing-cylinder moves in the direction of its arrow, with a slower motion than C, and with its card-teeth arranged to catch the sliver from C and transfer it to the stripper-roll G at the beginning of the series of rubbing-rollers, which stripper G is usually covered with corduroy.

For imparting the necessary longitudinally-reciprocating movement to the strippers A′ B′ D′, any ordinary or equivalent mechanism may be employed. As shown, however, their journals are loosely connected to a lever, I, fulcrumed at *f* upon an offset from the frame, which lever is oscillated by a rocking bar, J, through a cam, *e*, on the hub of a slowly-moving toothed wheel, J′, rotated by a worm on shaft K.

In stripping the fiber from one main carding-cylinder preparatory to delivering it to the next, as accomplished by the stripper A′ between the cylinders A and B, some parts of the stock will not be removed by the stripper from the preceding cylinder, and this stock, in being subjected to repeated workings, has its staple broken and its value impaired. To obviate this we arrange below the cylinder A, and in contact with the same, and also with the stripper A′, a supplemental stripper, L, having a slow movement. This supplemental stripper revolves in the direction of its arrow, and has its teeth of card-cloth arranged to catch into the teeth of the cylinder, so as to remove the remnants of fiber which are already raised to the tops of the teeth of cylinder A by the action of the main stripper, but not detached from said cylinder. As soon as this supplemental stripper L takes off the fiber the main stripper A′, which revolves in contact with L, takes the fiber from the latter and delivers it to the carding-cylinder in the rear. It will thus be seen that the fiber, instead of adhering to the first cylinder in tufts, and having its staple broken by being worked over and over again, is taken off and transferred to the next carding-cylinder. After the slivers have been taken from the carding-cylinders they pass to the rubbing-rolls M M′ M², which are arranged in pairs, one above the other. The function of these rubbing-rolls is to squeeze the sliver, and also to roll or twist it into a rounded form, and for this purpose the two rolls of each pair are usually made to reciprocate longitudinally over each other. They have also a differential rotary movement—*i. e.*, the first pair, M, has a certain rate of speed, the second pair a faster rate of speed, the third pair a still faster rate, and so on. For imparting these movements to the rolls M M′ M², a pulley, 1, on the shaft of cylinder C, is connected, through a belt, 2, with a pulley, 3, on the lower one of the stripper-rolls, G. This stripper-roll has a gear-wheel, 11, that meshes with the lower of the two pinions 4 4 of the first pair of rolls, M. On the lower shaft of the rolls M is a gear-wheel, 7, of larger diameter than 4, from which gear-wheel an accelerated motion is transmitted to the pair of pinions 5 5 of the second pair of rolls, M′, through the intermediate gear-wheel, 8, while upon the lower shaft of rolls M′ is another gear-wheel, 9, of larger diameter than 5, from which an accelerated movement is transmitted by intermediate gear, 10, to the pair of pinions 6 6 of the last pair of rolls, M². The object of this increased speed is to cause the fibers of the rolled slivers to be drawn out into parallel position. Now, we do not claim this differential speed of the rolls, nor the longitudinal reciprocation of the same. We have found, however, that where the rolls are all reciprocated with the same stroke or range of movement the slivers are quickly rolled or twisted into a compact body, after entering the series of rolls, and when thus compactly rolled they do not respond properly to the drawing effect of the rolls near the end of the series which have a faster movement, but break instead of being drawn out. We therefore make the degree of reciprocation of the first rolls very slight, and go on increasing the range of reciprocation for the succeeding rolls of the series, making the rolls which have the fastest rotary movement to have also the longest and most rapid reciprocation. The result is that the rolling and drawing are properly proportioned to each other, and the drawing is not defeated by the too great incipient rolling or twisting. For imparting mechanically this differential reciprocating movement to the rolls, a rock-shaft, N, is journaled in bearings at the ends of the rolls, and has an arm, O, which is slotted at its lower end, and depends from the rock-shaft to a position where a pin, *f*, carried by a disk on the end of shaft K, engages with it and serves to oscillate it. This rock-shaft extends at right an-

gles to the rolls throughout the whole series and at the ends of the same, and is provided with oppositely-arranged crank-like projections, g g' g^2, which are of greatest radius or throw at the points opposite the rolls which have the fastest speed, and are designed for the longest longitudinal throw, and said cranks decrease gradually in length for the other rolls as they approach the doffer. These crank-like projections are connected to straps h h' h^2, which have a swiveling connection with the journals of the rolls, so that as the rock-shaft and its cranks oscillate the rolls are reciprocated longitudinally in the relation and to the extent before described.

In clothing the rolls M M', &c., any of the usual substances, such as leather or corduroy, may be used. We prefer, however, to use a jacket made of wrapping-twine, as shown in Fig. 4.

Having thus described our invention, what we claim as new is—

1. The combination, with a carding-cylinder having a continuous clothing of card-cloth, and a cylinder provided with spaced rings of card-cloth, of a stripper-cylinder having an endwise reciprocation, together with mechanism for operating the same, substantially as described, and for the purpose set forth.

2. The combination, with a cylinder, C, having a set of spaced rings of card-cloth, of a cylinder, D, having a set of spaced rings of card-cloth adjusted to the spaces between the rings of cylinder C, and a longitudinally-reciprocating stripper, D', arranged to take the fiber from cylinder D and transfer it to the rings of the cylinder C, and mechanism for operating the same, substantially as described.

3. The pairs of rolls M M' M², having an accelerated rotary movement throughout the series, and a longitudinally-reciprocating movement, increasing in direct proportion to the increase of the rotary movement, combined with mechanism for imparting these movements, as and for the purpose described.

The above specification of our invention signed by us this 4th day of June, 1880.

JAMES DEMPSTER.
HENRY HOLCROFT.

Witnesses:
GEO. H. RIGBY,
WM. RUSSELL.