(No Model.) 3 Sheets—Sheet 1.

W. WHITE & R. T. SMITH.

SPEED REGULATING MECHANISM FOR CARD FEEDING MACHINES.

No. 506,960. Patented Oct. 17, 1893.

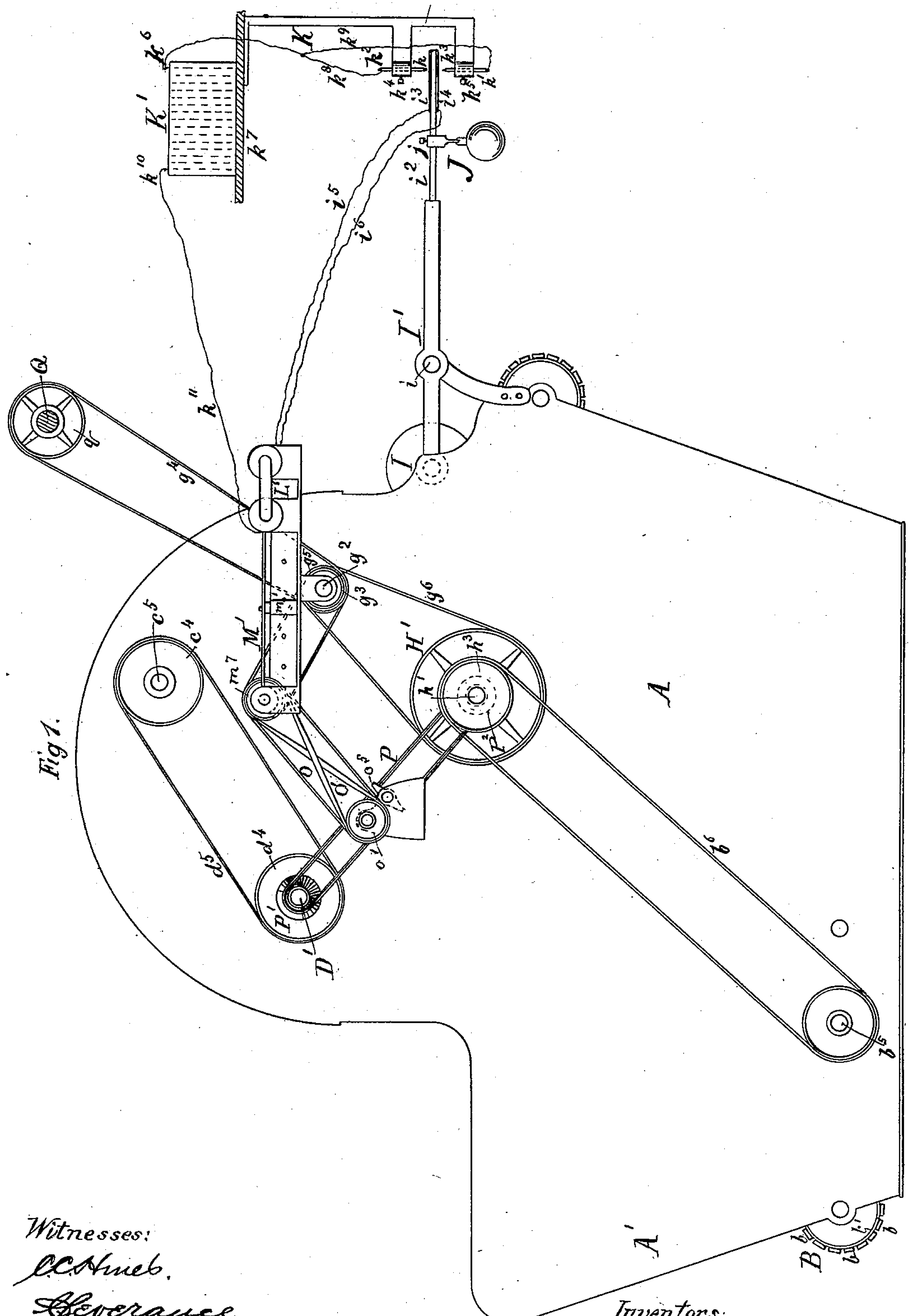

Fig 1.

Witnesses:
C. C. Hines.
J. Severance.

Inventors:
William White
Roswell T. Smith,
by their Attys Mason, Fenwick & Lawrence.

(No Model.) 3 Sheets—Sheet 2.

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SPEED REGULATING MECHANISM FOR CARD FEEDING MACHINES.

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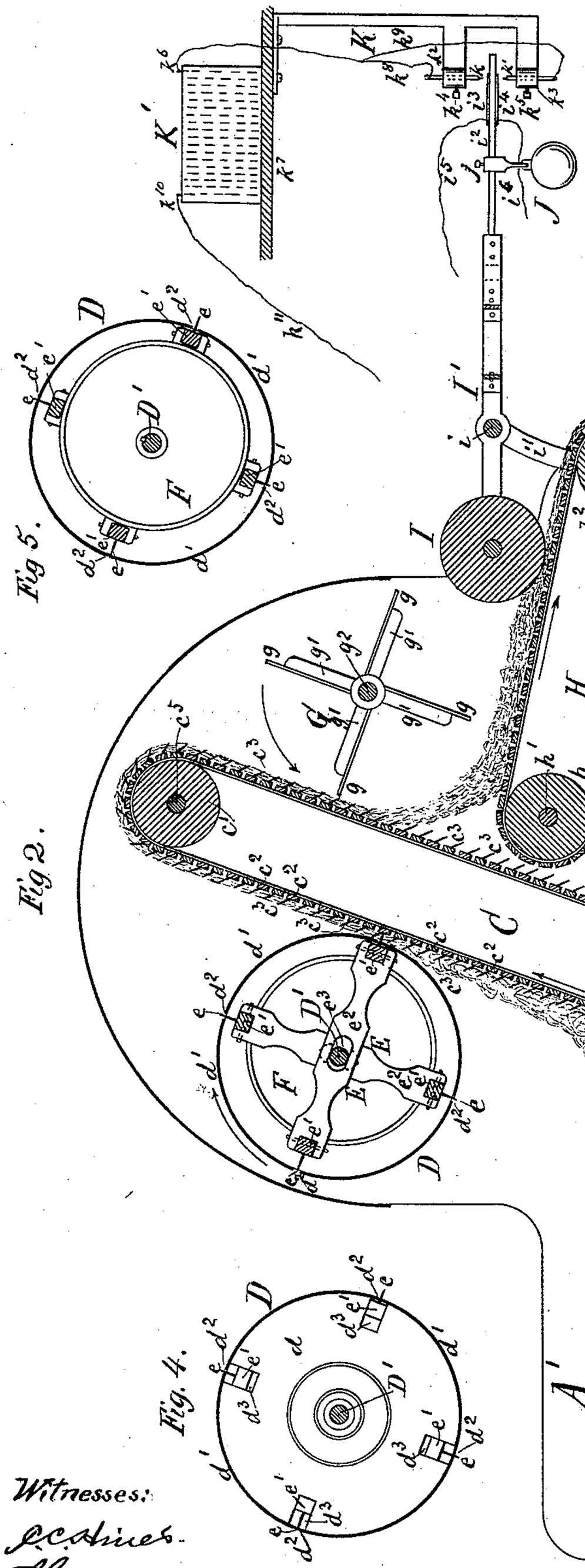

Fig 2.

Fig 5.

Fig. 4.

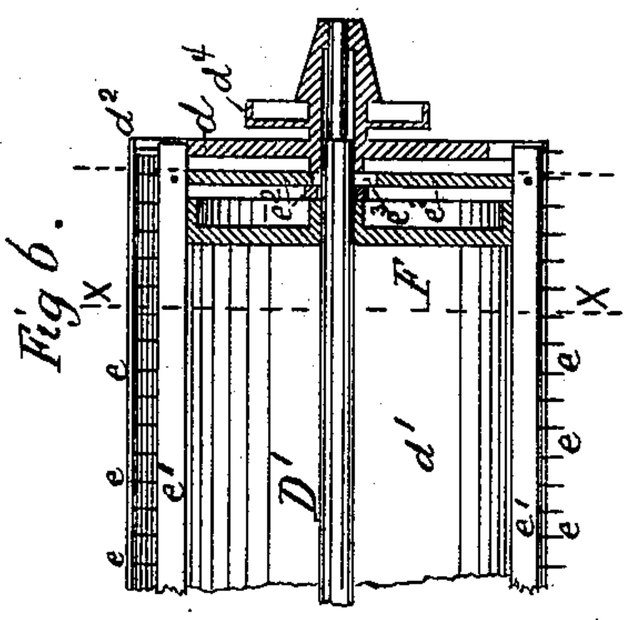

Fig 6.

Witnesses:
P. C. Dines.
Heverance.

Inventors William White
Roswell T. Smyth
by Their Attys Mason, Fennick & Lawrence

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W. WHITE & R. T. SMITH.

SPEED REGULATING MECHANISM FOR CARD FEEDING MACHINES.

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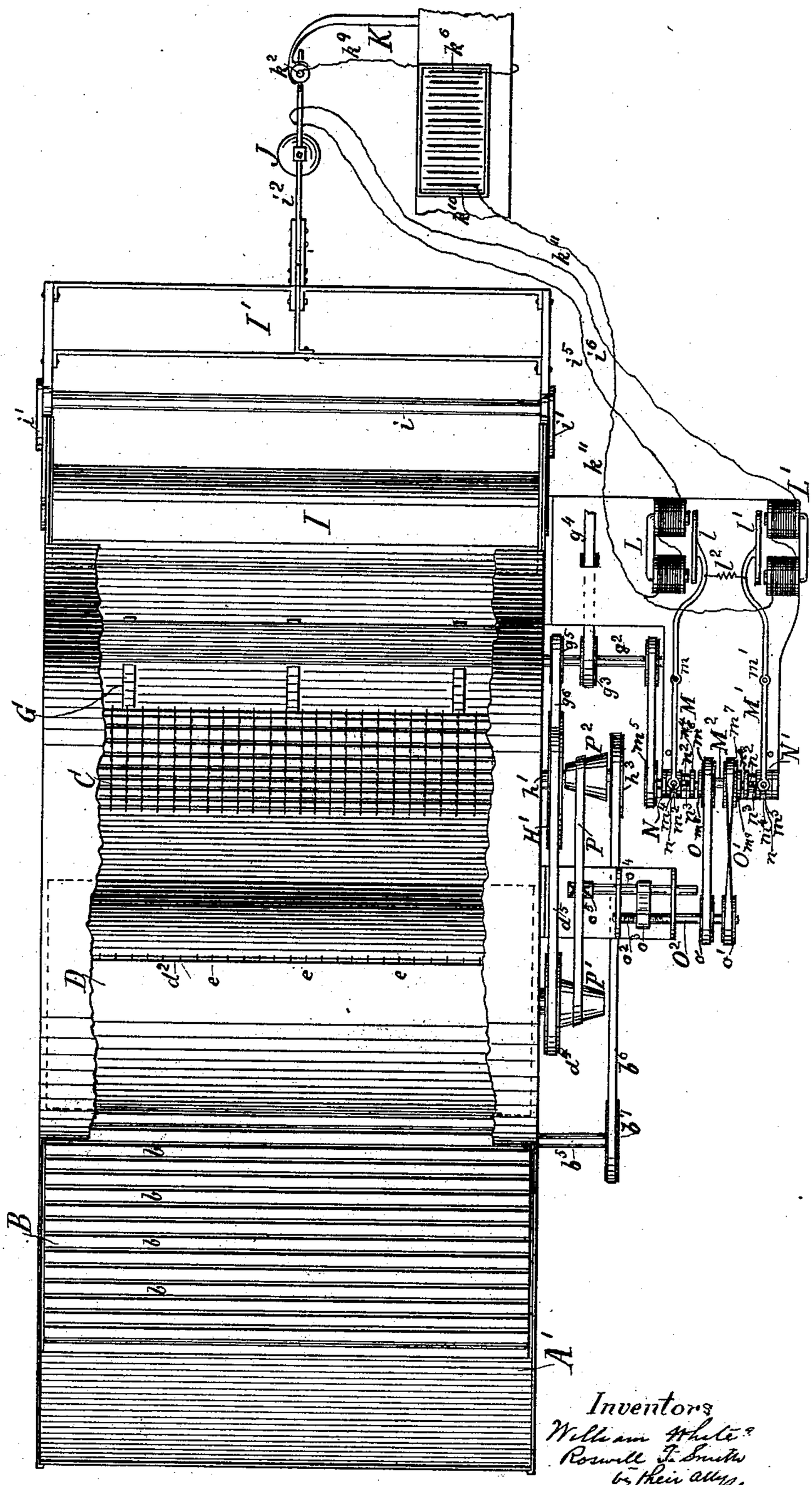
Fig 3.



Witnesses:
C. C. Hines.
B. Everance.

Inventors
William White
Roswell T. Smith
by their attys
Marw., Fenwick & Lawrence

UNITED STATES PATENT OFFICE.

WILLIAM WHITE AND ROSWELL T. SMITH, OF NASHUA, NEW HAMPSHIRE.

SPEED-REGULATING MECHANISM FOR CARD-FEEDING MACHINES.

SPECIFICATION forming part of Letters Patent No. 506,960, dated October 17, 1893.

Application filed December 23, 1892. Serial No. 456,170. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM WHITE and ROSWELL T. SMITH, citizens of the United States, residing at Nashua, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Speed-Regulating Mechanism for Card-Feeding Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to automatic cotton or wool card feeders, and it consists in certain novel constructions, combination, and arrangements of parts whereby an improved machine is produced for feeding, combing and shaping a continuous cotton fleece of uniform thickness for packing or other purposes as will be shown. We attain these objects by the mechanism illustrated in the accompanying drawings in which—

Figure 1 is a side elevation of our improved automatic feeder for cotton or wool carding machines. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a top view of the same. Fig. 4 is an end view of a combing cylinder. Fig. 5 is a transverse section of the same in the line x—x of Fig. 6. Fig. 6 is a central longitudinal section of the right end portion of the combing cylinder.

A in Fig. 1 represents a suitable housing which incloses a combing, an elevating, and a feeding mechanism. The front portion A′ of said housing is open at the top and serves as a receiving hopper into which the cotton or wool is from time to time thrown as it comes from the gin or wool receptacle. The bottom of said hopper consists of an endless apron B made of slats b fastened to a continuous canvas belt b' or to a number of straps, and stretched over two rollers b^3, b^4, hung to the housing in a suitable manner. Close to the rear end of the apron B an inclined apron C of similar construction is stretched over two rollers c, c'. The slats c^2 of the apron C are provided with upwardly inclined pointed pins c^3 arranged in straight longitudinal rows. Near the upper termination of the apron C the combing cylinder D is suitably hung in the housing A in front of the apron C. This combing cylinder D consists of a rigid shaft D′ having two loose end disks d, one of which, only, can be seen in the drawings, united by a cylindrical metal cover sheet d' which is provided with a number of slots d^2 the purpose of which will be made plain later on. The combs consist of bars e' provided with combing pins e arranged to pass between the pins c^3 of the apron C. The bars e' are fastened to the ends of transverse arms or bars e^2 forming oblong frames E. These arms e^2 are provided with slots e^3 through which the shaft D′ passes.

We have shown two frames E, but do not want to confine ourselves to that number as any other number of such frames may be used without departing from the principles of our invention.

The pins e are arranged to move in and out of the slots d^2, and the bars e' are for this purpose fitted into slots d^3 of the end disks d wherein they are moved forward and backward by sliding over a circular disk F eccentrically attached to the rigid shaft D′ when the combing cylinder is revolved around said rigid shaft. The eccentric disks are so arranged that they cause the combing pins e to project through the corresponding slot d to their greatest extent while opposite the inclined apron C, and to be withdrawn wholly inside the combing cylinder on the side away from said apron. On the rear side of the apron where the pins c^3 are downwardly inclined, the cotton carried by said pins is loosened away from them by means of a revolving beater G. A suitable apron H stretched over rollers h below the beater, the shafts h', h^2, of which are suitably hung to the housing A, receives the descending cotton or wool and conveys it out of the housing. Before leaving the apron H the cotton, or wool, passes under a roller I hung in a frame I′. This frame is hung by means of a shaft i to two stays i' attached to the housing A, and it extends rearward terminating in a non-conducting arm i^2. A counterpoise J is provided on the arm i^2 to which it can be fastened by means of a set-screw j. By this construction the bearing of the roller I upon the cotton, or wool, can be adjusted to any desired degree of delicacy. The end portion of the arm i^2 is

provided with a top and a bottom conducting plate i^3 and i^4 respectively. This end portion i^2 swings up and down between two metal pins k, k', secured in non-conducting blocks k^2, k^3 by means of set-screws k^4, k^5. The blocks k^2, k^3, are attached to a frame K which is suitably fastened to a shelf k^7. Conducting wires k^8, k^9, connect the pins k, k', with one of the pole plates k^6 of a battery K'. The other pole plate k^{10} of the said battery is connected by a conducting wire k^{11} with the coils of two magnets L, L' of ordinary construction. The conducting plates i^3, i^4 are also connected to the said magnets by means of conducting wires i^5, i^6, and thus the circuits of the coils of the magnets are open as long as the arm i^2 stands between the pins k, k'. When the arm i^2 rises and touches the upper pin k the magnet L will be charged and when the arm i^2 descends and touches the lower pin k' the magnet L' is charged. The alternate charging of the magnets L, L' causes the armatures l, l' which are held away from the magnets by a spring l^2 to be alternately attracted to the charged magnets, and their sustaining levers M, M' are swung around their respective fulcrums m, m'. The levers M, M' terminate with forked heads m^2, m^3 which are provided with pins m^4. The pins m^4 extend into annular grooves n in sleeves N, N' on a shaft M^2. The sleeves N, N' have longitudinal slots n^2, n^2 through which pins n^3 are passed. The pins n^3 are fastened to the shaft M^2 and thus the sleeves N, N' are revolved by the revolving shaft while they can also be moved longitudinally upon it by means of the pins m^3 of the levers M, M'. The shaft M^2 is provided with a driving pulley m^5 and with two reversing pulleys m^6, m^7, the latter being placed between the sleeves N, N' in such a manner that their hubs m^8, m^9 are touched by the end faces n^4 of the sleeves N, N' when the latter are moved by the action of the charged magnets. The friction ensuing thereupon between the sleeves and pulleys causes the pulleys to alternately revolve with the sleeves and communicate their motion alternately through a straight belt O and a cross-belt O' to two pulleys o, o' on a shaft O^2 which latter is thus alternately revolved forward and backward. The shaft O^2 is provided with screw-threads o^2 to which a nut brace o^3 is attached, the end of which is fastened to a rod o^4. By revolving the shaft O^2 forward or backward, the rod o^4 which has a belt-shifter o^5 attached to its end, is moved backward and forward and thereby shifts a belt P backward and forward upon two cones P', P^2 of which P^2 is the driving cone on shaft h'. By this construction the speed of the cone P' is varied in accordance with the movement of the roller I. The cone being rigidly connected with one of the end disks d of the combing cylinder D, the speed of both is the same through all its changes. The beater G is constructed with beating and fanning boards g fastened to radial arms g' on a shaft g^2. By means of a pulley g^3 and belt g^4 the beater receives motion from a pulley q on the line shaft Q of the building in which the machine is located. Another pulley g^5 is fastened to the shaft g^2 which by means of a belt g^6 drives a pulley H' on the shaft h' and thus communicates motion to the apron H. The cone P^2 as previously mentioned is also fastened to shaft h' giving motion to the combing cylinder D as already described. By means of a pulley d^4 formed with the end disk d and cone P' a belt d^5 is caused to drive a pulley c^4 on the shaft c^5 of the upper roller c' of the apron C; and by means of a pulley h^3 attached to shaft h' and a belt b^6 a pulley b^7 on shaft b^5 is driven thereby setting the lower feed B in motion. It is easily seen that by this arrangement of pulleys and belts a variable speed is obtained for the combing cylinder and apron C, while the speed of the other parts is uniform. The variable speed being adjusted by the thickness of the cotton or wool sheet upon the apron H, it will be seen that a more than ordinary amount of cotton or wool on the apron H will, by means of its tendency to push the roller I up above its normal height and thus by means of the adjusting mechanism above described and set in motion by the changed position of said roller, cause the belt P to be shifted toward the housing. The speed of the combing cylinder D and apron C is thereby retarded and a less amount of cotton will be deposited upon the apron H. The cotton or wool is loosely thrown into the hopper and is moved by the apron B toward the apron C, the pins c^3 of which seize and carry a nearly continuous portion of it up under the combing cylinder. There the pins e of the combing cylinder moving in the opposite direction pass through it and comb it during its ascent so that its fibers become parallel and even, the highest portions of the ascending cotton being brushed back into the hopper while the pins c are drawn into the cylinder D. The combed cotton sheet of uniform thickness and parallel fiber now passes around the upper roller c' to the rear of it, where the pins become downwardly inclined and gradually lose their hold on the cotton sheet which now readily yields to the blows and air draft of the beater G and descends upon the apron H whence it is removed from time to time to its place of destination. Solenoids instead of magnets may be employed; and toothed instead of plain surfaced connections may be adopted between the parts m, m', m^4 and N N'.

By our invention, it will be seen, that the varying of the speed of the belt and feed is accomplished by the increased or decreased thickness of the product of the machine which is passed over the last belt, and that the speed can be varied by the electric device between the upright belt and the combing beater, whether the belt or the beater is retarded or quickened.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In an automatic cotton or wool feeder, the combination of feeding mechanism, a source of power for actuating said feeding mechanism, a speed regulating device for the feeding mechanism and an operative connection with said source of power for actuating said device, said connection being normally broken, an independent source of power, such as a galvanic battery, for throwing said connection into operation, and means located adjacent to the receiving apron and actuated by the passage of the material thereon, for applying power from said independent source to make said operative connection, substantially as described.

2. In an automatic cotton or wool feeder, the combination of feeding mechanism, a source of power for actuating said feeding mechanism, a speed regulating device for the feeding mechanism, an electric battery, an operative connection between said battery and said speed regulating device for throwing the latter into operation, and a swinging switch actuated by the passage of the material on the discharge apron and closing or opening the circuit of said battery to actuate said device, substantially as described.

3. In an automatic cotton or wool feeder, the combination of feeding mechanism, a source of power for actuating said feeding mechanism, a train of mechanism connecting said source of power with the feeding mechanism for raising its speed, a second train of mechanism connecting said elements for lowering the speed, both of said trains being normally at rest, an electric battery, an operative connection between said battery and each of said trains for making connection thereof, two normally open circuits of which said battery is a part, and a swinging switch, arranged to be operated by the passage of the material upon the discharge apron, and to close one or the other of said circuits, substantially as described.

4. In an automatic cotton or wool feeder, as described, the combination of the elevating apron C, discharge apron H arranged in proximity thereto, gravitating gage supported on said apron H, swinging switch frame I′ actuated by said gage, electric battery K′, magnets L, L′, energized by circuits of which said battery is a part, armature levers M, M′ operated by said magnets, sleeves N, N′ carried by the ends of said levers, belts O, O′ adapted to be thrown into engagement by the movement of said sleeves, shaft O^2 actuated by one or the other of said belts O, O′, brace nut O^3 on said shaft, movable longitudinally thereon, belt shifter o^4, carried by said brace nut, and belt P shifted thereby, cones P′, P^2, on which said belt travels, and devices for transmitting power from the main source of supply to the elevating apron through said cones, whereby the velocity of said apron may be automatically regulated, substantially as described.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

WILLIAM WHITE.
ROSWELL T. SMITH.

Witnesses:
S. J. M. SMITH.
LIZZIE G. SMITH.