(No Model.) 5 Sheets—Sheet 1.

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C. L. STURTEVANT, Administrator.

COTTON OPENER AND STOPPING MECHANISM THEREFOR.

No. 520,832. Patented June 5, 1894.

Fig. 1.

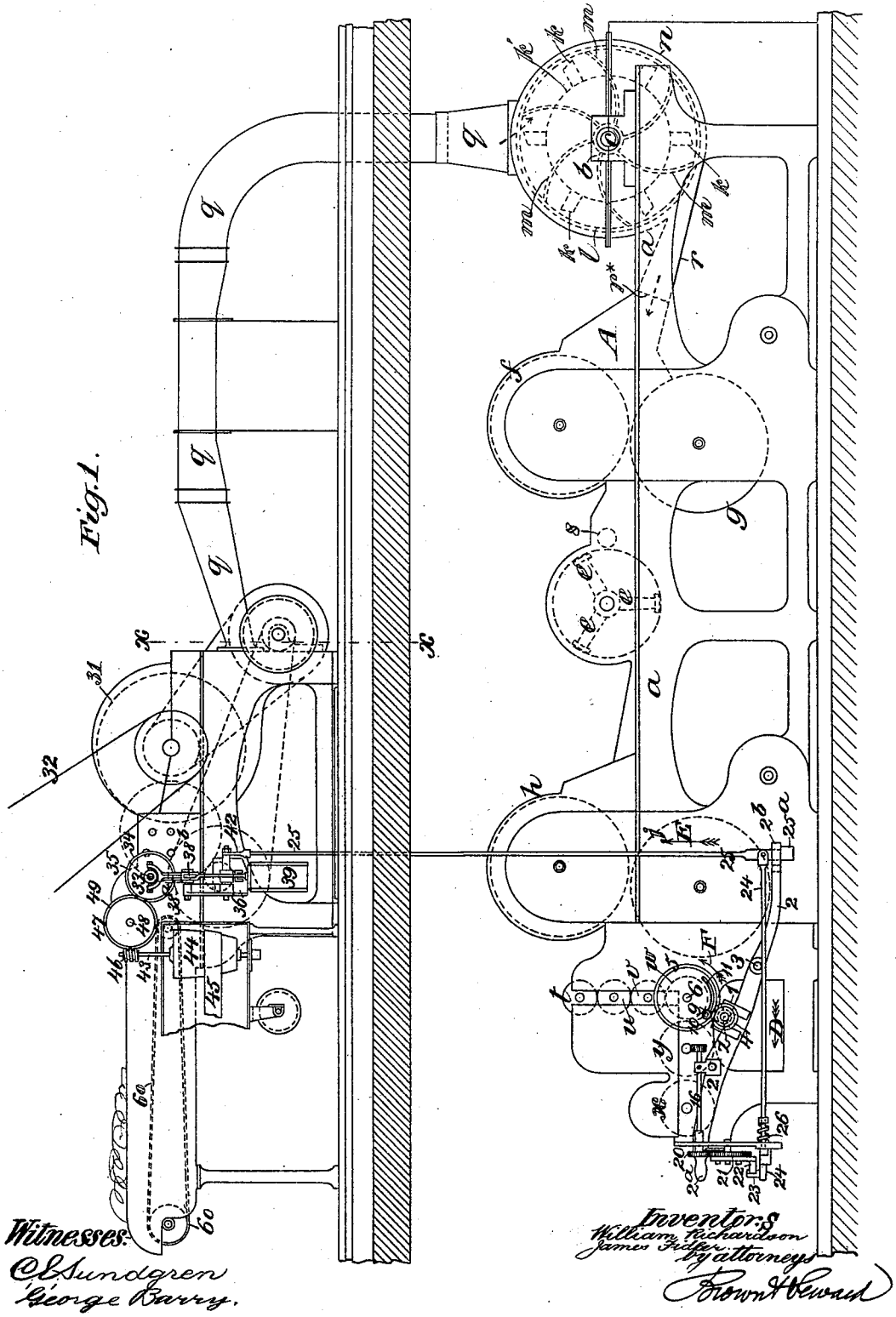

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Fig. 2.

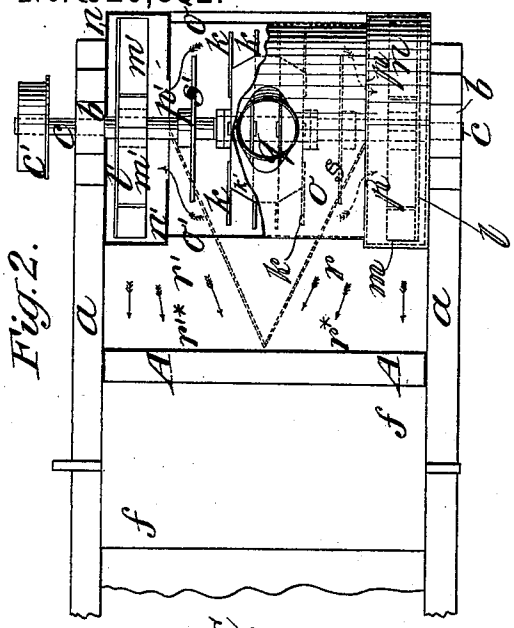


Fig. 4.

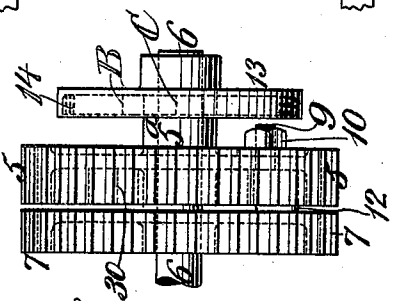
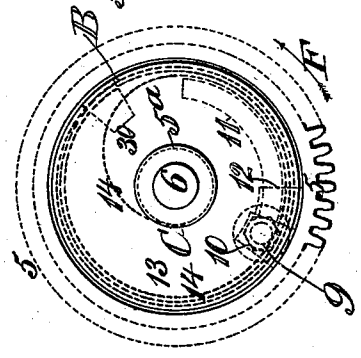


Fig. 3.



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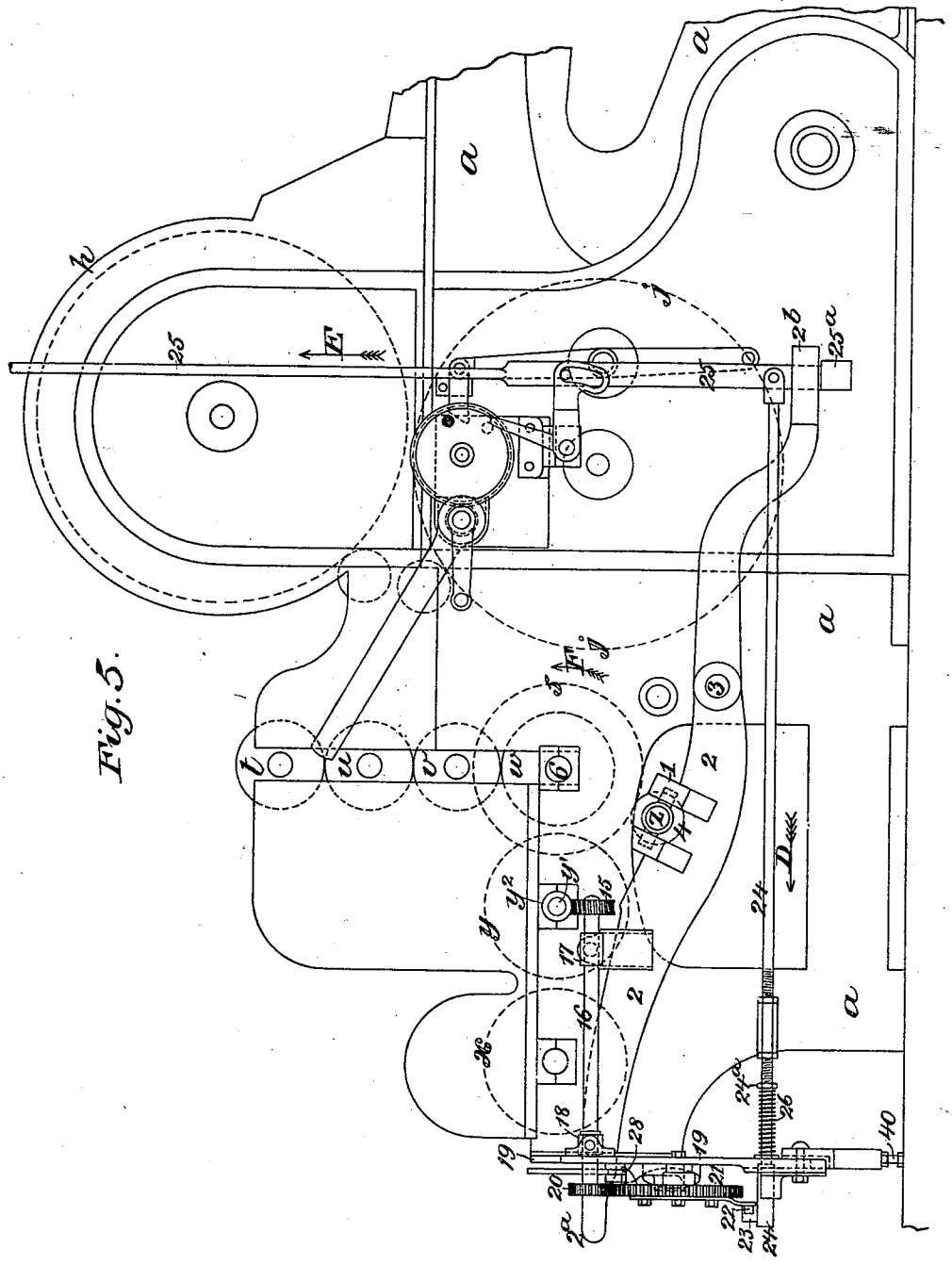

Fig. 5.

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Fig. 6.

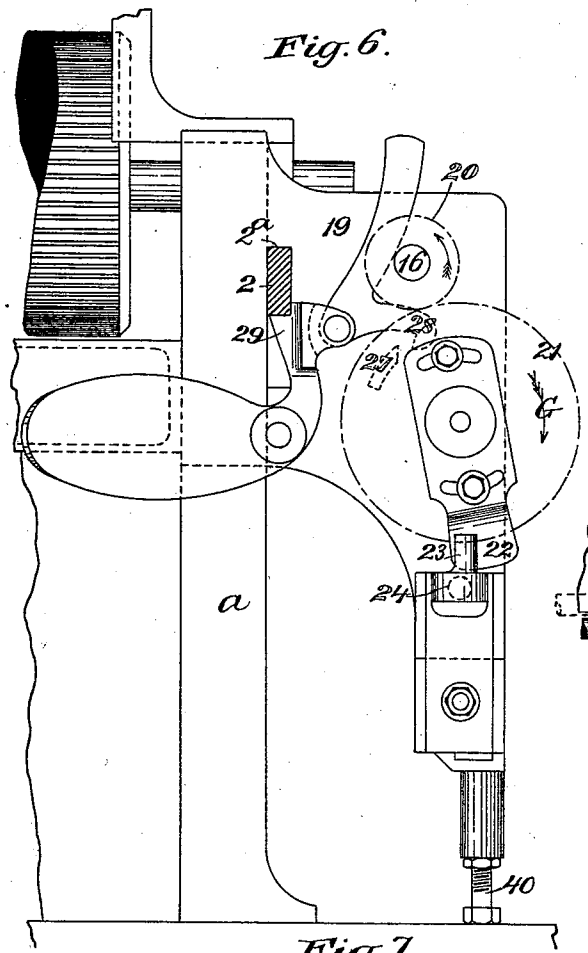


Fig. 8.

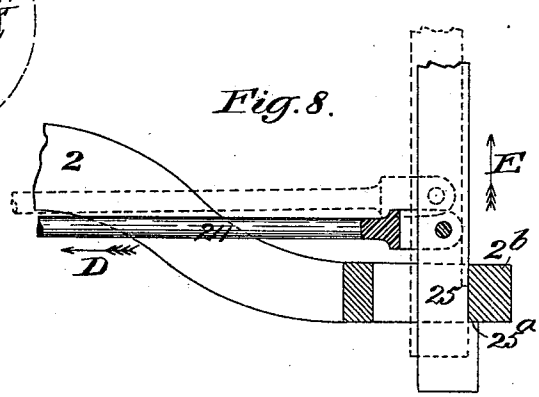


Fig. 7.

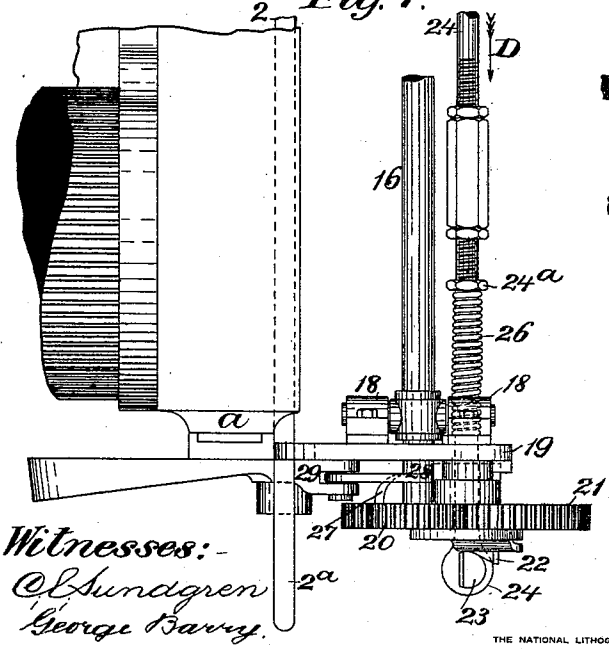
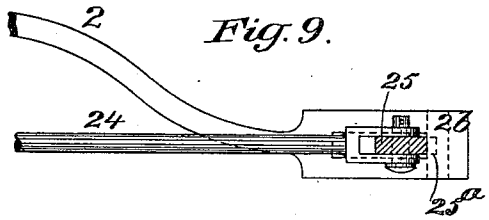


Fig. 9.



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COTTON OPENER AND STOPPING MECHANISM THEREFOR.

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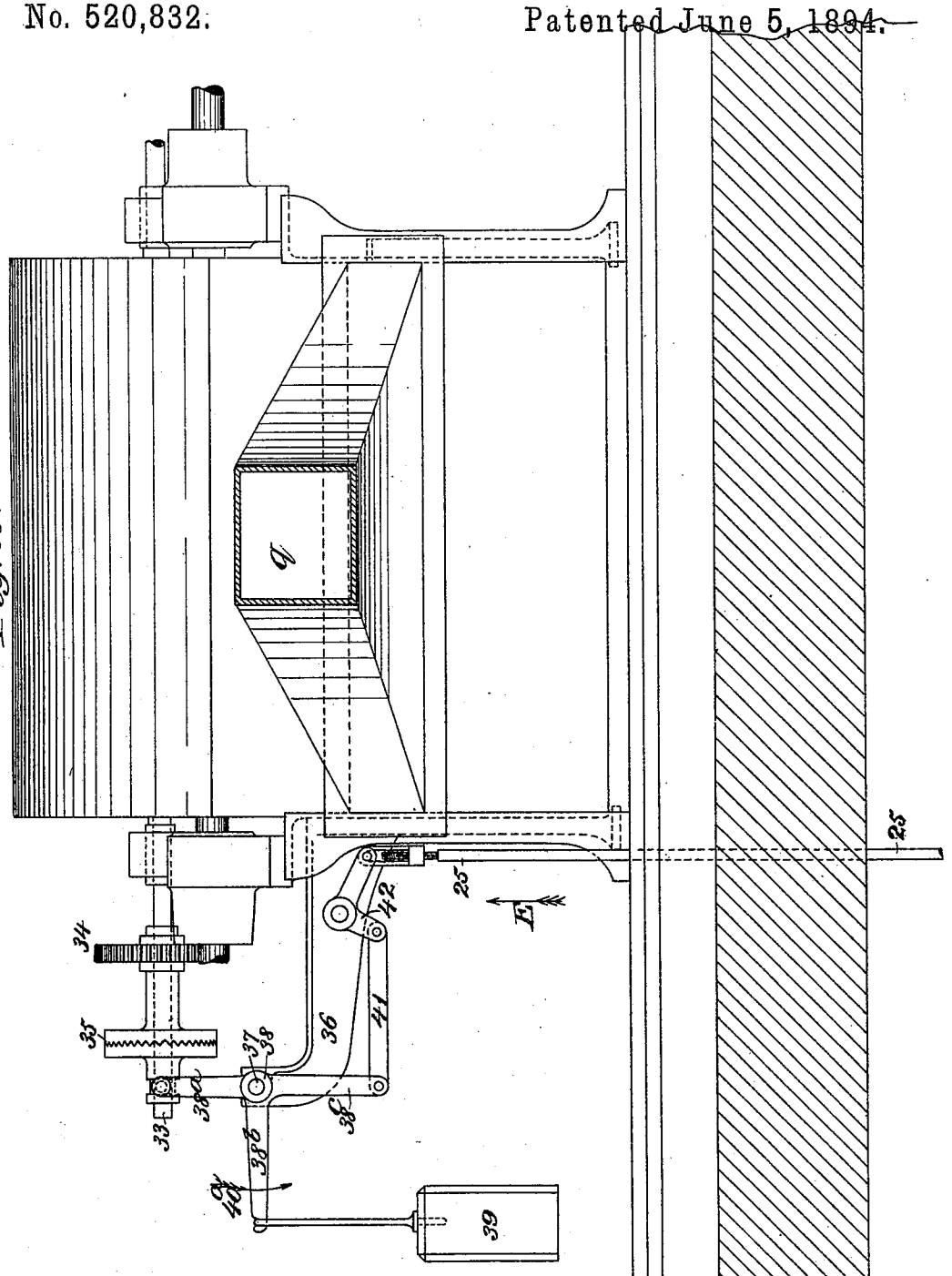
Fig. 10.



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UNITED STATES PATENT OFFICE.

WILLIAM RICHARDSON AND JAMES FIDLER, OF OLDHAM, ENGLAND; CHARLES L. STURTEVANT ADMINISTRATOR OF SAID FIDLER AND RICHARDSON, DECEASED; SAID STURTEVANT ASSIGNOR TO THE PLATT BROTHERS & COMPANY, LIMITED, OF SAME PLACE.

COTTON-OPENER AND STOPPING MECHANISM THERFOR.

SPECIFICATION forming part of Letters Patent No. 520,832, dated June 5, 1894.

Application filed January 11, 1892. Renewed April 11, 1894. Serial No. 507,184. (No model.) Patented in England April 27, 1885, No. 5,182.

To all whom it may concern:

Be it known that we, WILLIAM RICHARDSON, engineer, and JAMES FIDLER, machinist, both of Hartford Works, Oldham, in the county of Lancaster, England, have invented certain new and useful Improvements in Cotton-Openers and Stopping Mechanism Therefor, (for which British Letters Patent No. 5,182, dated April 27, 1885, have been granted to us,) of which the following is a specification.

Our invention relates to machinery for feeding cotton and other fibrous materials to those exhaust openers and lap machines to which the cotton or other fibrous material to be operated upon is supplied by means of a tube or pipe along which the said cotton or other fibrous material is carried by means of a current of air.

We will describe our invention with reference to the accompanying drawings and afterward point out its novelty in claims.

Figure 1 represents a side elevation of an exhaust opener and lap machine and a preliminary feeding machine in connection and communication therewith. Fig. 2 is a plan view partly in section, of a portion of the exhaust opener illustrated in Fig. 1. Fig. 3 is a front view and Fig. 4 a side view showing certain details of the lap machine. Fig. 5 is a side view of the lap machine. Fig. 6 represents an end elevation of one side of the lap machine. Fig. 7 is a plan view corresponding with Fig. 6. Fig. 8 is a side view and Fig. 9 a plan, both partly in section, of certain parts shown in Fig. 1. Fig. 10 is an end view of the preliminary feeding machine showing a section of the feeding tube in the line x—x of Fig. 1. All the other figures are on a larger scale than Figs. 1 and 2.

Similar letters and numerals of reference designate corresponding parts in all the figures.

The first part of our invention relates to exhaust openers and will be described with reference to Figs. 1 and 2.

$a\,a$ are the side frames of an exhaust opener and lap machine. To these side frames $a\,a$ are secured pedestals $b\,b$ which support an axle c which is capable of being rotated in the pedestals $b\,b$ and prevented from moving longitudinally by collars formed upon the axle c. We place the axle c parallel to the axes of the beater e and cages $f\,g\,h\,j$ of the opener and lap machine to which our invention is applied. We mount upon the axle c and secure in any convenient manner thereto an opening cylinder k' provided with blades or beaters $k\,k\,k$. We also mount and secure upon the axle c in any suitable manner which will permit of lateral adjustment the plates or disks $l\,l'$ provided with vanes or wings m m' respectively. The plates or disks $l\,l'$ with their vanes or wings m m' constitute fans. We also mount and secure flanges or disks s s' upon the axle c. The flanges or disks $s\,s'$ serve to regulate the passage of the cotton or other fibrous material to be operated upon and guide such cotton or other fibrous material in its passage from the blades or beaters k to the fans or trunks or passages r r'. Upon the axle or fan shaft c is secured the pulley c' by means of which rotary motion is communicated to the axle c and the parts mounted thereon. We inclose the plates or disks $l\,l'$ and their vanes or wings m m' by casings n n' respectively. We inclose the blades or beaters k and disks $s\,s'$ by a casing $o\,o'$ secured at its ends to the casings n n'. Through the sides of the casings $n\,n'$ we form openings $p\,p'$ respectively by which the interior of the casing $o\,o'$ communicates with the interiors of the casings $n\,n'$. To the casings $n\,n'$ respectively we connect trunks or passages r r' the interiors of which trunks or passages $r\,r'$ communicate at one end with the casings $n\,n'$ respectively and at their other and wider ends r^* r'^* with the space or cavity A which incloses the cages $f\,g$. We form the trunks or passages $r\,r'$ so that they gradually widen toward the cages f g and so insure that an even sheet or layer of fibers of the full width of the cages $f\,g$ and of uniform thickness or weight is delivered to the cages. By means of the tube or pipe q (see Fig. 1) the interior of which communicates with the interior of the casing $o\,o'$ the cotton or other

fibrous material to be operated upon is conducted to the blades or beaters *k* by the action of the exhaust. The cotton or other fibrous material to be supplied to the blades or beaters *k* is supplied to the tube or pipe *q* by means of any breaking up or feeding machine which we designate a preliminary feeding machine, such for example as that shown in the upper part of Fig. 1, suitable for being used for supplying cotton or other fibrous materials to the tubes or pipes used to convey the cotton or other fibrous materials to the feeder parts of the exhaust openers and lap machines. The vanes or wings *m m'* are fixed upon and carried around by the axle or fan shaft *c* and in consequence of their being so mounted each of them when properly adjusted laterally is caused to exhaust an equal quantity of air from the tube or pipe *q* and thereby causes the cotton or other fibrous material which is to be operated upon to be drawn along the tube or pipe *q* and to be delivered to the blades or beaters *k* which disintegrate it and throw it into the part of the casing *o o'* in which the exhaust current of air is divided and from which one half of the air and the cotton or other fibrous material carried with it is drawn toward the vanes or wings *m* situate at one side of the machine and the remaining half of the air and the cotton or other fibrous material carried with it is drawn toward the vanes or wings *m'* at the other side of the machine. Should either of the vanes or wings *m* or *m'* not draw as much cotton as the other then the one which draws too little should be moved nearer to the other or the one drawing too much set farther from the other.

The vanes or wings *m* as shown in the drawings deliver their portion of the cotton or other fibrous material to the smaller end of the trunk or passage *r* and the vanes or wings *m'* deliver their portion of the cotton or other fibrous material to the smaller end of the trunk or passage *r'*. The cotton or other fibrous material which passes along either one or the other of the trunks or passages *r r'* becomes spread out as the current of air by which it is carried expands to fill the space. The two streams of cotton or other fibrous material are then brought together and delivered in a practically united and uniformly distributed sheet to the cages *f g* in a more even and uniform manner than has hitherto been possible.

We have referred to the feeding apparatus above described as forming part of an exhaust opener and lap machine; but we would have it understood that such a feeding apparatus may be employed in conjunction with a lap machine of any ordinary construction by connecting the said feeding apparatus or machine to the lap machine thereby converting the lap machine into an exhaust opener and lap machine.

We would have it understood in reference to this part of our invention that we do not confine ourselves to the precise arrangements hereinbefore described and shown in the drawings hereunto annexed as such locomotive, opening and distributive arrangements may be modified without departing from the principles of our invention, by means of which we are enabled to employ in the feeding part of an exhaust opener and lap machine a revolving axle carrying two sets of vanes or wings *m m'* and working in a position parallel with the axes of the beaters and cage or cages of the exhaust opener and lap machine to which such feeding apparatus or machine is applied. The result is that we cause the cotton or other fibrous material supplied to exhaust openers and lap machines by means of a tube or pipe to be drawn into the feeding part of the machine in such a manner that one half or portion of the said cotton or other fibrous material is drawn to one side of the machine and the other half or portion of the said cotton or other fibrous material is drawn to the other side of the machine; the two streams being afterward brought together and delivered in a practically united and uniformly distributed sheet to the cages of such exhaust openers and lap machines in a more even and uniform manner than has hitherto been possible.

The second part of our invention relates to and consists in arrangements for stopping the preliminary breaking up or other feeding machines by means of which cotton or other fibrous material is supplied to the tube or pipe *q* for feeding exhaust openers and lap machines before the said exhaust openers and lap machines are stopped, thereby preventing an accumulation of cotton or other fibrous material in the tube or pipe *q* while the exhaust opener and lap machine is stopped; and this part of our invention also relates to and consists in arrangements by means of which we start the breaking up or other feeding machine previously referred to, so as to supply cotton or other fibrous material to the tube or pipe *q* before starting the portion of the exhaust opener and lap machine which forms the lap thus preventing a thick place being formed in the lap by the exhaust opener and lap machine. We will now proceed to describe this part of our invention by reference to Figs. 1, 5, 6, 7, 8, 9, and 10 of the drawings.

The cotton is fed upon the lattice feeder 60 as shown in Fig. 1, which carries the cotton to the preliminary feeding machine which will be presently described. From this feeding machine the cotton passes into the tube or pipe *q* by means of which cotton or other fibrous material is supplied to the feeder part of the exhaust opener and lap machine, and thence to the cages *f g* from which the said cotton or other fibrous material passes to the beater *e* and forward to the cages *h j* and thence to the calender rollers *t u v w* and to the rollers *x y* by means of which the lap is formed. The shaft *z* by which the calender rollers *t u v w* are rotated is carried at one

end by a bracket or bearing 1 mounted upon a lever 2 (see Figs. 1, 5, 6, 7 and 9). The lever 2 is capable of being turned upon the stud 3 carried by the side frame *a* of the exhaust opener and lap machine. Fast upon the shaft *z*, which is driven as usual, is the wheel 4 by means of which the portion of the exhaust opener and lap machine which forms the lap is driven. The wheel 4 gears into a wheel 5 which we mount loose upon the axle 6 of the roller *w*. The wheel 5 and certain parts connected therewith are shown upon an enlarged scale in Figs. 3 and 4. Fig. 3 is a front view and Fig. 4 a side view of the wheel 5 and the said parts connected therewith. Fast upon the axle 6 is a wheel 7 which gears into the usual gearing by means of which the cages *f g h j* and feed rollers 8 are rotated.

We provide the wheel 5 with a projecting stud 9 secured by means of a nut 10 in a curved slot 11 formed in the wheel 5. Fastened to and projecting from the wheel 7 is a projection 12. The use of the projecting stud 9 and the projection 12 will be hereinafter described. Fast upon the axle 6 is a flanged disk 13 to which at the point B is secured one end of a coiled spring 14. The other end of the spring 14 is secured at the point C to the boss 5^a of the wheel 5. Fast upon the axle y' of the roller *y* is a worm y^2 which gears into a worm wheel 15 mounted fast upon a shaft 16. The shaft 16 is supported and capable of being rotated in bearings 17, 18 (see Fig. 5). The bearing 17 is carried by the lever 2 and the bearing 18 is carried by a bracket 19 (see Figs. 6 and 7) secured to the side frame *a* and supported at its lower end by the adjusting screw 40 which rests on the floor. Fast upon the shaft 16 is a wheel 20 gearing into the regulator wheel 21 ordinarily used in lap machines for regulating or governing the size of the lap. To the wheel 21 we secure a cam or incline 22 (see Figs. 5, 6 and 7). This cam or incline 22 at times acts upon a stud 23 secured to a rod 24 so as to draw the rod 24 in the direction indicated by the arrow D. One end of the rod 24 is jointed to the lower end of the rod 25 (see Fig. 8). Upon the rod 24 is mounted a spring 26. One end of the spring 26 abuts against the bracket 19 while the other end of the spring 26 abuts against a collar 24^a upon the rod 24. The spring 26 tends to force the rod 24 in a direction opposite to that indicated by the arrow D. The lower end of the rod 25 passes through a slot or opening formed through one end of the lever 2, the said slot being long enough for the rod to swing backward and forward a short distance therein and the said rod being provided with a projecting part or hook 25^a which forms a catch, which when in the position shown in Fig. 8 prevents the rod 25 from being moved in the direction indicated by the arrow E.

The rod 25 is connected to any arrangement of mechanism suitable for being employed for stopping and starting the feed rollers of any breaking up or feeding machine by means of which cotton or other fibrous material is supplied to the tube or pipe *q*. The rod 25 must be connected to the mechanism suitable for stopping or starting the feed rollers of the breaking up or feeding machine which supplies cotton or other fibrous material to the tube or pipe *q* so that when the said rod 25 is moved by a spring or weight, to be presently described, in the direction indicated by the arrow E, the motion of the feed rollers above mentioned will be stopped and when the rod 25 is moved in a direction opposite to that indicated by the arrow E, the feed rollers above referred to will be started. Figs. 1 and 10 show an arrangement of mechanism by which this is carried into effect. The opening cylinder 31 of the preliminary feeding machine has a continuous motion imparted to it by the driving belt 32. The regulating feed roller shaft 33 is arranged so that it may be stopped or started to suit the requirements of the exhaust opener and lap machine, without stopping the opening cylinder. The wheel 34 is secured to one half of the catch box 35 which is free to revolve on the end of the said shaft 33 (see Fig. 10) and receives continuous motion as will be hereinafter fully described. The other half of the catch box 35 is mounted so as to slide upon a key secured to the shaft 33 so that when engaged with the other half of the catch box it will impart motion to said shaft 33 and its roller, when the cotton will be fed to the feeding machine. When the catch boxes are separated as will be hereinafter described, the motion of the feed roller will be arrested and cotton or other fibrous material no longer supplied to the feeding machine. At 36 is a bracket secured to the framing of the feeding machine. Mounted upon a fulcrum stud 37 secured to the bracket 36 is a three armed lever 38. The arm 38^a engages into a groove formed in the sliding catch box 35. The arm 38^b carries a weight 39 which has a constant tendency to turn the arm 38^b in the direction indicated by the arrow 40^a. The arm 38^c is connected by means of a stud to a connecting rod 41, the other end of which is secured to one arm of the bell-crank-lever 42. The other arm of the bell-crank-lever 42 is connected by means of a joint pin to the rod 25. Mounted on the shaft 43 is shown the driven cone 44 (Fig. 1) which forms a part of the well known apparatus for regulating the supply of cotton or other fibrous material by means of feed rollers to machines of this class. The cone 44 receives motion in the usual way by means of the belt 45. At the end of the shaft 43 is secured the worm 46 which engages into and imparts motion to the wheel 47 which is mounted on the stud 48 and is free to turn thereon. Secured to the boss of the wheel 47 is a wheel 49. The wheel 49 engages into and imparts motion to the wheel 34.

The drawings show the position of the parts

when cotton or other fibrous material is being supplied to the exhaust opener and lap machine by means of the tube or pipe q. The wheel 5 is being rotated in the direction indicated by the arrow F, (see Figs. 1, 3 and 5) and the projecting stud 9 is acting against the projection 12 and carrying the wheel 7 and axle 6 in the same direction and by means of the axle 6 and wheel 7 drives the part of the exhaust opener and lap machine which forms the lap. The regulator wheel 21 is being rotated in the direction indicated by the arrow G (Fig. 6) and when it has been rotated sufficiently will cause the cam or incline 22 to act upon the stud 23 so as to draw the rod 24 in the direction indicated by the arrow D (Figs. 1, 5, 7, and 8) and thus withdraw the projecting part 25^a from beneath the lever 2. The rod 25 will then be at liberty to be moved in the direction indicated by the arrow E (Figs. 1, 5 and 8) by means of the weight 39 suspended on the arm 38^b of the lever 38 to which the rod 25 is connected by the arm 38^c. This movement of the lever 38 will cause the catch box 35 to be disengaged when the shaft 33 and the feed roller of the breaking up or other feeding machine above mentioned will be stopped. A further rotation of the regulator wheel 21 will cause the ordinary projecting part 27 upon the regulator wheel 21 to act upon the catch 28 so as to withdraw a catch 29 (see Fig. 6) which supports the end 2^a of the lever 2, thereby permitting the said end of the lever 2 to descend. The descent of the end 2^a of the lever 2 will remove the wheel 4 out of gear with the wheel 5 and arrest the motion of that portion of the exhaust opener and lap machine which forms the lap. The cam or incline 22 is caused to act upon the stud 23 so as to liberate the catch 25^a to stop the feed roller of the breaking up or other preliminary feeding machine by which the cotton or other fibrous material is supplied to the tube or pipe q so as to allow a sufficient time to elapse before the end 2^a of the lever 2 is allowed to descend to stop the lap part as will be necessary for the tube or pipe q to become emptied of cotton or other fibrous material. The descent of the end 2^a of the lever 2 will cause the other end 2^b of the said lever 2 to be raised so as to bring the said end 2^b of the lever 2 above the projecting part 25^a upon the rod 25. As soon as the wheel 4 is taken out of gear with the wheel 5, the coiled spring 14 will rotate the wheel 5 upon the axle 6 in a direction opposite to that indicated by the arrow F until a projecting part 30 fast upon the wheel 5 arrives against the projection 12. When it is desired that the formation of another lap be commenced in the exhaust opener and lap machine the end 2^a of the lever 2 which projects far enough beyond the catch 29 to serve as a handle, is raised by the attendant so as to be again supported by the catch 29. This raising of the end 2^a of the lever 2 will draw down the end 2^b of the lever 2 and also draw down the rod 25 which has again engaged with the end 2^b of the lever 2 in the direction opposite to that indicated by the arrow E. The movement of the rod 25 in the direction opposite to that indicated by the arrow E will move the lever 38 in a direction opposite to that indicated by the arrow 40^a which will re-engage the catch box 35 when motion will be again imparted to the feed roller of the breaking up or other feeding machine above referred to and cause cotton or other fibrous material to be supplied to the tube or pipe q. The raising of the end 2^a of the lever 2 will also cause the wheel 4 to gear with the wheel 5 which wheel 5 will be revolved upon the shaft 6 in the direction indicated by the arrow F until the projecting stud 9 arrives against the projection 12 when rotary motion will be imparted to the wheel 7 and axle 6 and the part of the exhaust opener and lap machine which forms the lap will be started. The projecting stud 9 is so adjusted in position relative to the projection 12 that when the end 2^a of the lever 2 is raised to start the feed roller of the breaking up or other feeding machine above mentioned, the projecting stud 9 will not cause the axle 6 to rotate until the tube or pipe q has become sufficiently charged with cotton or other fibrous material. By this part of our invention we are enabled to stop the breaking up or other feeding machine by means of which cotton or other fibrous material is supplied to the tube or pipe q for feeding an exhaust opener and lap machine before stopping the part of the exhaust opener and lap machine which forms the lap in exhaust openers and lap machines. By this means we are enabled to exhaust all the cotton from the tube or pipe q before the lap-forming part is stopped, and thereby prevent the accumulation of cotton or other fibrous material in the tube or pipe q. By this part of our invention we are also enabled to start the breaking up or other feeding machine above referred to so as to supply a sufficient quantity of cotton or other fibrous material to the tube or pipe q above mentioned before the part of the exhaust opener and lap machine by which the lap is formed is started. By this means a proper quantity of cotton or other fibrous material is supplied to the exhaust opener and lap machine when the latter is started, thus preventing the formation of thick or thin places in the lap when commencing a fresh lap.

Although we have only shown and described our invention as applied to an exhaust opener and lap machine having one beater we would have it understood that our said invention may be applied to exhaust openers and lap machines each having more than one beater or cylinder.

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

1. The combination with the beater e and cages f g h j of an exhaust opener, of an axle

c arranged parallel with the said beater and cages, two plates or disks *l* and *l'* arranged on said axle at a distance apart and carrying fan vanes *m* and *m'*, casings *n* and *n'* for the said plates or disks and fan vanes, an intermediate casing *o o'* having an inlet tube *q* and arranged between and communicating laterally with the said casings *n* and *n'*, and trunks or passages arranged between the said casings *n* and *n'* and the cages *f g* and gradually widening toward said cages, all substantially as and for the purpose herein set forth.

2. The combination with the beater *e* and cages *f g h j* of an exhaust opener, of an axle *c* arranged parallel with the said beater and cages, an opening cylinder *k'* mounted on said axle and provided with beaters *k k*, plates or disks *l* and *l'* mounted on said axle on opposite sides of said opening cylinder and provided with vanes *m* and *m'* constituting fans, a casing *o o'* for the said opening cylinder *k'*, an inlet tube *q* to said casing, separate casings *n* and *n'* for the disks *l* and *l'* and their fans *m m'* communicating through openings *p* and *p'* with opposite sides of the casing *o o'*, disks *s* and *s'* mounted on said axle *c* opposite the openings *p* and *p'* and trunks or passages arranged between the said casings *n* and *n'* and the cages *f g* and gradually widening from the said casings toward said cages, all substantially as and for the purpose herein set forth.

3. The combination with an exhaust opener and lap machine and a machine for feeding cotton or other fibrous material to the exhaust opener, the apparatus hereinbefore described for stopping the feeding machine, said apparatus consisting in the combination of the wheel 21 provided with the cam 22, the rod 24 provided with a stud 23 and collar 24ª, the spring 26 on said rod, the rod 25 having a catch hook 25ª, the lever 2, lever 42, connecting rod 41, lever 38, weight 39, and catch box 35, all substantially as herein described.

4. The combination with an exhaust opener and lap machine and a machine for feeding cotton or other fibrous material to the exhaust opener, the apparatus hereinbefore described for starting first the said feeding machine and afterward the lap machine, said apparatus consisting of the combination of the rod 24 provided with a collar 24ª and spring 26, the rod 25 having a catch hook 25ª, the lever 2, lever 42, connecting rod 41, lever 38, weight 39, catch box 35, the axle 6, the wheel 5 mounted loosely upon the said axle and having a projection 30 and a curved slot 11, the adjustable projecting stud 9 in said slot, the wheel 7 fast on said axle 6 and having a projection 12, the flanged disk 13 fast on the axle 6, and the coiled spring 14 attached at one end to the said disk 13 and at the other end to the wheel 5, all substantially as hereinbefore described.

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