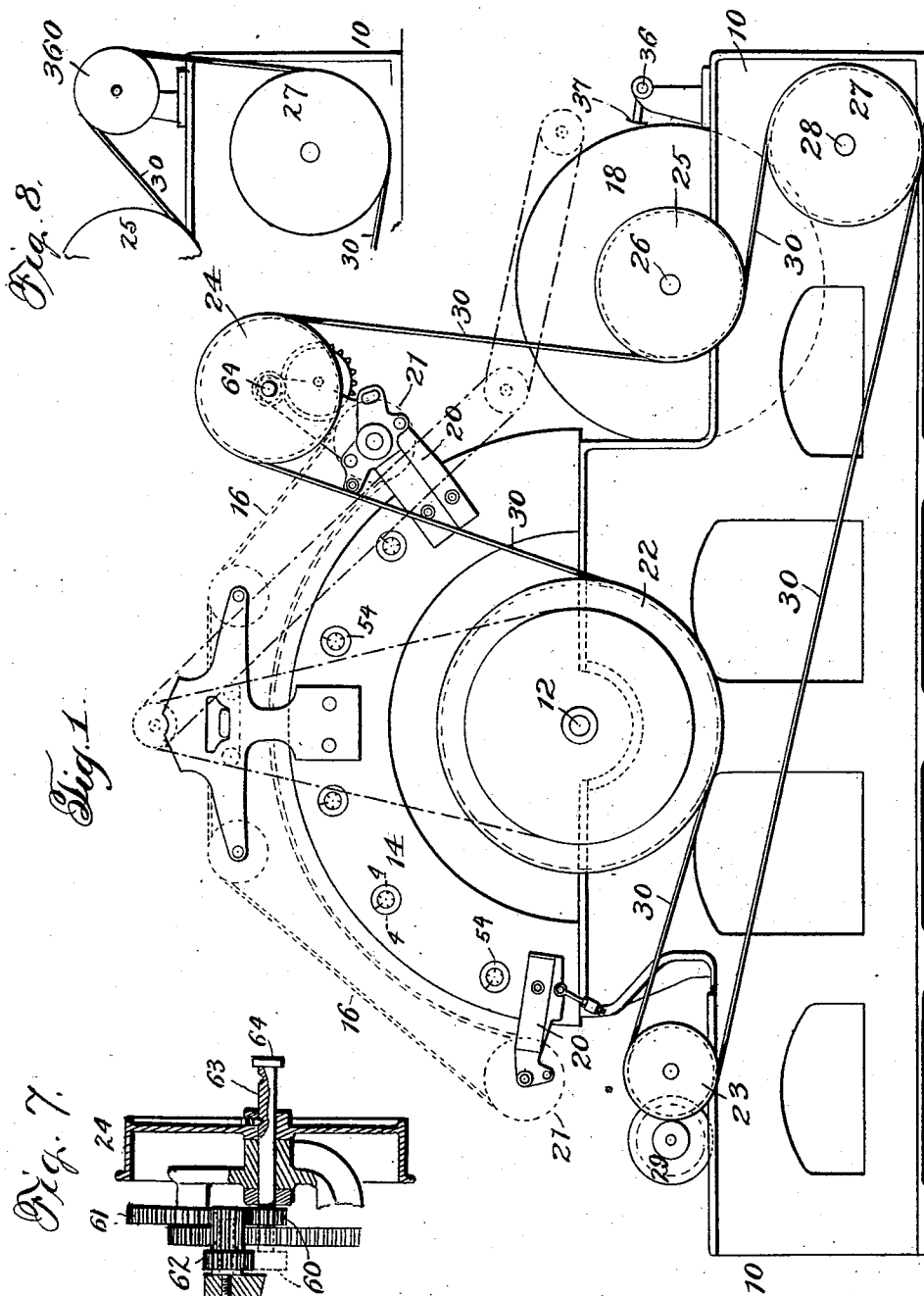


J. C. POTTER.
CARDING MACHINE.
APPLICATION FILED MAY 11, 1911.

1,015,835.

Patented Jan. 30, 1912.

3 SHEETS—SHEET 1.



Witnesses:
Jas. Hutchinson
A. T. Hayes.

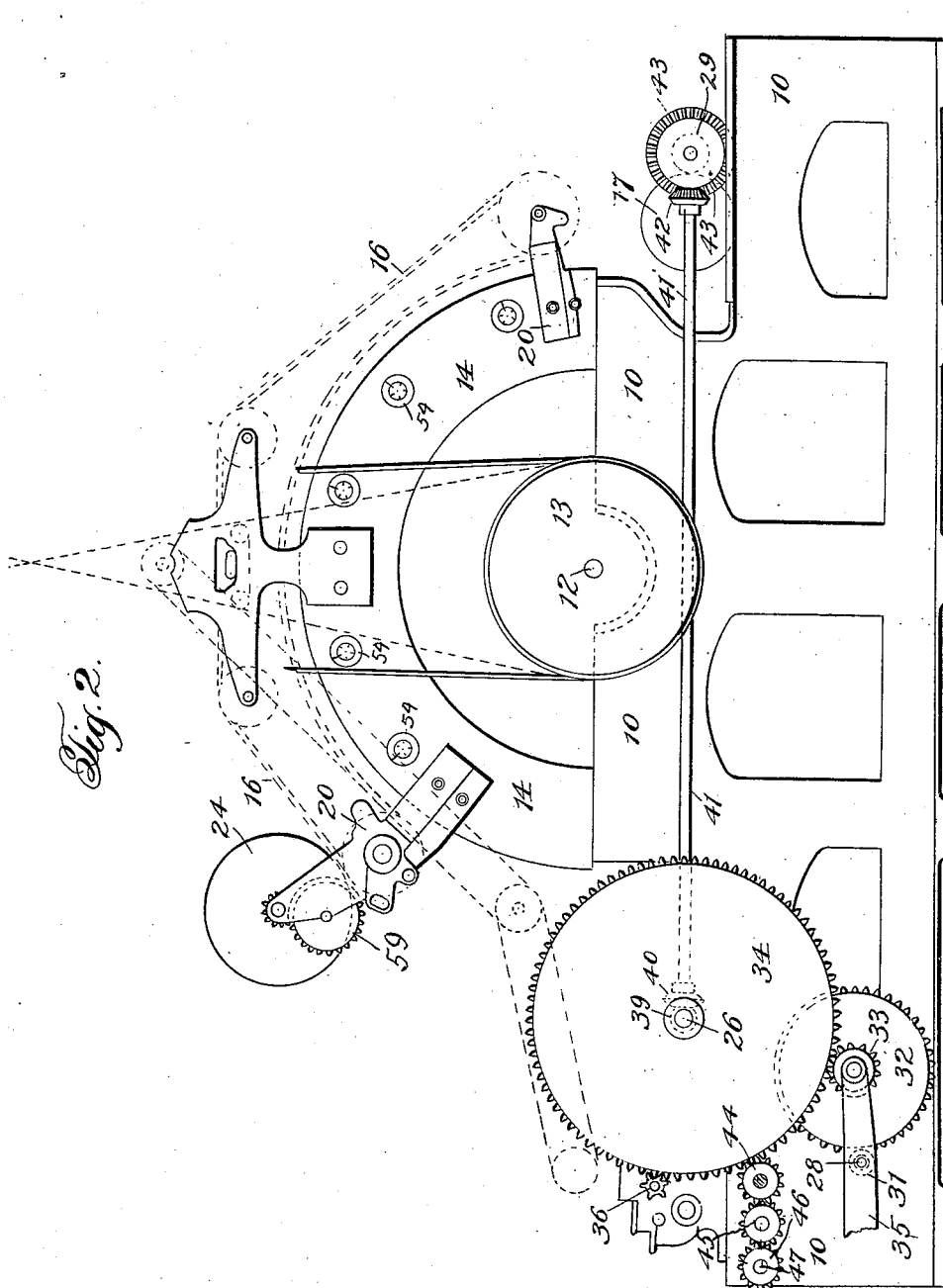
Inventor:
James C. Potter
By Chas. Williamson
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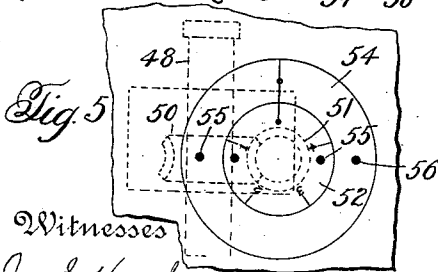
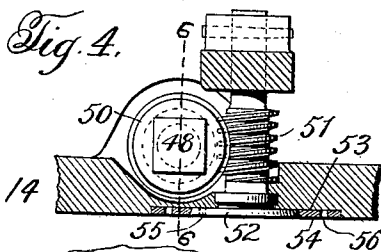
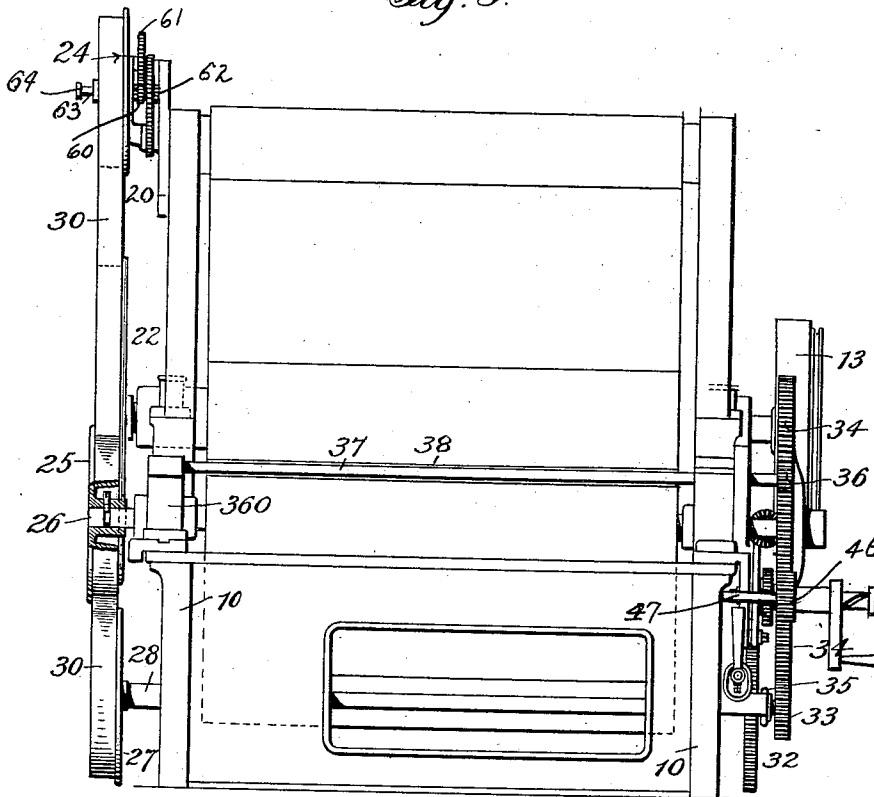


Witnesses:
Joseph Hutchinson
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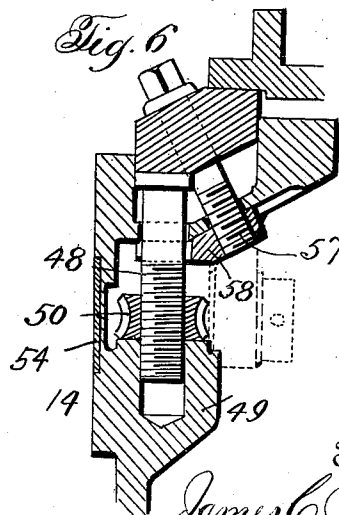
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Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES CHARLES POTTER, OF PAWTUCKET, RHODE ISLAND.

CARDING-MACHINE.

1,015,835.

Specification of Letters Patent.

Patented Jan. 30, 1912.

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To all whom it may concern:

Be it known that I, JAMES C. POTTER, of Pawtucket, in the county of Providence and State of Rhode Island, have invented a certain new and useful Improvement in Carding-Machines, and do hereby declare that the following is a full, clear, and exact description thereof.

Heretofore in revolving flat carding engines or machines, numerous independent belts have been used to connect up and drive such elements or parts of the machine, as the feed roll, the licker-in, the flats, the doffer and the doffer comb. These numerous belts are objectionable for a number of important practical reasons:

First, if any of the belts should break or become slack, the part driven thereby would stop running, although the rest of the machine would continue in motion. Should it be the feed or licker-in affected, the feed of cotton to the machine would stop and the machine would finish its work upon such cotton as might still be in it, but the product would thus have a thin length or portion, and, therefore, be deficient or poor; and there would be a thin portion on the resumption of the feed continuing until the normal quantity should be fed to the machine, the product again being deficient or poor for a portion of its length. Should the flats be the part of the machine affected, the cotton would not be properly carded and cleaned and inferior product would be the result. Should the doffer be the part of the machine concerned, the cotton would accumulate on the cylinder with likelihood of injury to the card clothing and loss of use of the machine during the time required to repair the clothing. Should the belt affected be the one used for operating the comb, the doffer would not be cleaned or combed, and the cotton would pile up on the doffer and the cylinder and choke the flats with consequent injury to the machine, the possibilities of harm resulting in this case making the stoppage of the comb the most serious of all. As it is customary to run from 50 to 100 machines in the same room, the machine might run for a long time in its disabled condition before the discovery of it by the attendant, and, of course, the greater the delay in attending to the machine the more serious the consequences of the piling up of the cotton from the continued revolution of the doffer.

Second, the mere multiplication of belts in itself is objectionable, especially as some of the belts must be crossed. The more belts there are the greater the time required for looking after them and the more trouble from slack belts; and crossed belts wear out quickly. In grinding, the removal of a number of belts which has been necessary, is, of course, troublesome, and where reversal of the direction of travel of the card clothing is necessary for grinding, which requires the substitution of opened or crossed belts, the provision of extra shorter belts is necessary.

Again in carding machines heretofore used, the doffer comb has been vibrated at the same rate regardless of the speed of revolution of the doffer, which is objectionable, both on the ground of involving needless wear, as well as not resulting in the best work. Still another objectionable feature in carding machines, as heretofore constructed, is the flexible bend adjusting means which have not been satisfactory because requiring special care in manipulation to secure accurate results, the special degree of care required not being always available by reason of the class of workmen employed about the machine, and for other reasons inhering in the construction thereof.

Accordingly it has been the object of my invention to provide a carding machine which shall be free from the defects or insufficiencies above pointed out, and which in many respects will be appreciated by those skilled in the art as an important improvement.

In the accompanying drawings—Figure 1 is a side elevation of a carding machine embodying my improvements; Fig. 2 is a similar view of the opposite side of the machine, but showing only a portion thereof; Fig. 3 is an end elevation of said machine; Fig. 4 is a detail view in section on the line 4—4 of Fig. 1, to illustrate the construction of the flexible bend micrometer adjustment; Fig. 5 is a detail front elevation of said micrometer adjustment; Fig. 6 a detail section on the line 6—6 of Fig. 4; Fig. 7 is a detail view in section showing the reversing device by which the direction of travel of the flats for grinding may be secured, notwithstanding, the reversal of the direction of revolution of the cylinder and the doffer; and Fig. 8 a detail view showing a different

arrangement from that shown in Fig. 1 for vibrating the doffer comb.

In its general construction the carding machine illustrated in the drawings, is substantially the same as usual, it comprising frame sides 10, a carding cylinder 11 mounted on a main shaft 12 journaled in bearings on the frame sides and having a band pulley 13 for receiving motion from a motor or counter shaft; arches 14 mounted on the frame sides 10, adjustably supporting flexible bends 15; traveling flats 16; a lick-in 17; a doffer 18 and a doffer comb 19. Brackets 20 are bolted to the arches 14 to support the revolving flat guiding and holding rolls 21, and the mechanism for imparting motion to said flats, which may be of any desired construction except in the particulars hereinafter described, whereby most simply and easily the direction of travel of the flats may be maintained, notwithstanding, the direction of revolution of the cylinder and doffer is reversed for grinding purposes.

Upon the side of the machine opposite that where the driving pulley 13 is located, the main shaft 12 has keyed to it a belt pulley 22; the shaft of the lick-in has keyed to it on the same side of the machine a belt pulley 23; and likewise on the same side of the machine there is a belt pulley 24 supported by one of the brackets 20 and forming a part of the flat driving mechanism; a belt pulley 25 mounted on the shaft 26 of the doffer to revolve independently thereof during the carding operation of the machine, but adapted to be fixed to said shaft so as thereby to be the means for revolving the doffer for grinding; and a belt pulley 27 fixed to the end of the shaft 28 that extends to the opposite side of the machine, whereby, by trains of gearing, hereinafter described, motion is imparted to the doffer during the carding operation of the machine, to the doffer comb and to the feed roll 29, provided as usual at the front end of the machine. By reference to Fig. 1, it will be seen that a single endless belt 30 passes about all the belt pulleys mentioned, they being 22, 23, 24, 25 and 27, so that all the moving members, or elements, of the machines whose continued movement is essential, either to the excellence of the product of the machine or to the welfare of the machine itself, receive their motion, and are dependent upon but the one belt, so that if that one belt slackens or breaks all of said members, or elements, of the machine will simultaneously stop and no loss result save the temporary stoppage of the machine.

Proceeding now with a detailed description of the gearing, from the shaft 28 to the doffer, the doffer comb and the feed roll, there will be found on reference to Fig. 2, a pinion 31 on the end of the shaft 28 opposite that having the belt pulley 27, which

pinion 31 meshes with a gear wheel 32 rotatably connected with a pinion 33, which meshes with a large spur gear 34 upon the doffer shaft 26. The gears 32 and 33 are change gears to enable the speed of the doffer to be varied when desired. Such change gears 32 and 33 are carried by a bar or frame 35 pivoted concentric with the shaft 28 by which, at will, the gear or pinion 33 may be moved out of mesh with the doffer shaft gear 34, so that the latter will then not be revolved by means of the pinion 33. The purpose of this is to enable the doffer to be directly revolved from the belt pulley 25 when the latter is fixed to the doffer shaft 26 to impart the reverse and proper direction of revolution to the doffer for grinding.

Meshing with the doffer gear 34 is a pinion 36, which through a train of gears, (which may be the usual arrangement for the purpose, and not, therefore, requiring to be described,) imparts the vibratory or oscillating movement to the comb shaft 37 carrying a doffer comb 38, which shaft 37 is supported in bearings on the two side frames 10. Inasmuch as the doffer and the doffer comb are thus geared together, it will be evident that the vibration or swing of the comb will vary with the speed of the doffer, and, therefore, the objectionable condition of a high rate of vibration of the comb with a slow movement of the doffer is eliminated, and thus wear, due to an unnecessarily high rate of vibration of the doffer comb, is saved. Another important advantage arising from the use of toothed gears to gear together the doffer and the doffer comb, is that there is no danger of slip or lost motion, is that the doffer comb is maintained always in proper working relation with the doffer so that an even, uniform action of the comb upon the doffer is secured, that, of necessity, results in the delivery from the machine of a product of uniform excellence. In some cases where the advantage of variation of the rate of vibration of the doffer comb according to the speed of revolution of the doffer, and the positive driving of the doffer comb may be disregarded, I contemplate, as indicated in dotted lines in Fig. 8, operating the doffer comb by substituting for the pinion 36 a belt pulley 360 on the opposite side of the machine geared to the comb shaft, so as to vibrate or oscillate the same, and extending the belt 30 from the belt pulley 25 over said pulley 360 before carrying the belt 30 to the belt pulley 27.

The feed roll 29 is geared to the doffer shaft and thus depends upon the belts 30 for its motion, by means of a bevel gear 39 on the doffer shaft meshing with a like gear 40 on a shaft 41 that extends alongside of the machine to the front end thereof where it has a bevel pinion 42 meshing with a

bevel gear 43 on the feed roll shaft, the pinion 42 being a change gear so that the speed of the feed roll may be changed when the speed of the doffer is changed.

5 The machine is provided with the usual calender rolls for receiving the sliver and delivering it to the coiler and can, and for imparting motion to these parts a train of gears is employed comprising a gear 44 meshing with the doffer gear 34, a gear 45 meshing with the gear 44, and a gear 46 meshing with the intermediate gear 45 and mounted upon a shaft 47 situated in the end frame of the machine by which it is conveniently housed or concealed.

For the micrometric adjustment of the flexible bends, each bend at a suitable number of points is adapted to be acted upon by the devices consisting each of a radially arranged bolt 48 mounted to move longitudinally in a bearing hole formed in an offset or lug 49 on the inner side of the arch. A nut 50 in the form of a worm wheel on said bolt, and a worm or screw 51 meshing with the worm wheel nut 50, which is swiveled in suitable bearings in the arch and has a head 52 seated in a recess 53 in the outer face of the arch, the outer face of the head being graduated in thousandths of an inch to read with a dial formed on the outer face of a ring 54, also seated in the arch recess 53, and filling the same between the periphery of the screw head and the recess wall. The dial-form ring 54 is split radially and it has a taper fit on the head 51 of the screw and thus the dial ring is securely held in place, although it may be revolved around the screw head in order to place its zero mark (which is coincident with, or formed by the split) in alinement with the zero indication on the screw head when the original or first adjustment or setting of the flexible bend is made. For revolving the screw 51, it has a pair of diametrically opposite holes 55 for the insertion of a key or turning tool, and the dial 54 has similar holes 56 for a like purpose. The outer face of the screw head and dial are flush with the outer face of the arch, and they are also flush with each other so that the graduations on screw head and dial are in the same plane, which, of course, insures accuracy in reading when adjustment is being done, and enables the adjustment to be done expeditiously. The movement of the screw head is so magnified that the graduations for a thousandth of an inch are exceedingly coarse, and thus the adjustment of the bend may very easily, and most quickly be performed, and yet done with the utmost accuracy.

The adjusting bolts, as usual, at their outer ends, bear upon the inner circumference of the flexible bend and there are bend clamping devices comprising each a bolt 57

that extends from the outer circumference of the bend obliquely inward, and a clamping nut 58 which the threaded inner end of the bolt engages.

When the grinding operation is to be performed, the direction of revolution of the carding cylinder and the doffer is the reverse of that for carding, while the direction of travel of the flats is unchanged. With my machine, to reverse the direction of revolution of the carding cylinder and the doffer, I simply cross the belt running to the main driving pulley 13 and do not disturb the belt 30 at all, my machine in this regard being sharply differentiated from other machines wherein it is necessary to change the belts that are provided to produce the same movements which my belt 30 produces. Crossing of the belt to the main driving pulley 13, and the consequent reversal of the carding cylinder shaft, of course, reverses the travel of the belt 30, but I provide a very simple contrivance or device by which, notwithstanding, the reversal of the belt 30, and the reversal of direction of revolution of the flat driving pulley 24, the flats will, nevertheless, continue to run in the same direction during a grinding operation as they run during a carding operation. The mechanism that I employ for this purpose comprises a reversible train of gears by which to transmit motion from the pulley 24 to the revolving brush 59, from which, as usual, motion is transmitted to the flats, which train of gears includes a slidable pinion 60, so that whether the pulley 24 revolves in one direction or the other, the direction of movement of the flats will be the same. Said train of gears consists of a gear wheel 61 and a double pinion 62 always in mesh, and the slidable pinion is shiftable axially to change its mesh with one or the other by a rod or plunger 63 having a sliding key connected with the pulley 24 at the center thereof, and which outside the pulley has a head or knob 64 by which it may be pulled out or pushed in. A suitable latch device 65 is provided to cooperate with each of two notches 66 in the surface of the plunger 63 corresponding with the two positions of the slidable pinion. The simple operation of merely pulling out or pushing in the rod or plunger 63, is all that is required with my machine, besides the crossing of the belt running to the main driving pulley 13, to alter the machine from carding work to grinding, and, as I have already said, nothing whatever needs to be done to the belt 30, as far as is concerned the matter of securing the proper direction of travel of the flats for grinding. Of course, as has already been pointed out for grinding, the pulley 25 loose on the doffer shaft 26 is fixed thereto, which is a mere matter of tightening a screw, and it is nec-

essary to throw the change gear 18 and the pinion 36 of the comb vibrating mechanism out of mesh with the doffer gear 34, but these are simple and easily performed operations.

On its outer face the pulley 22 on the carding cylinder shaft 12, carries a pulley 67 for taking power to revolve the grinding rolls which may be of usual construction, and are mounted in the usual positions on the machine, so that no special description thereof herein is necessary.

Having thus described my invention what I claim is—

1. A carding machine comprising a revolving roll at the feed end of the machine, a doffer, a driving shaft having a carding cylinder thereon, a series of belt pulleys for the elements mentioned, a single endless belt passing over all said pulleys, a doffer comb and operative driving connections between said belt and said comb.

2. A carding machine comprising a revolving roll at the feed end of the machine, a doffer, flats, a driving shaft having a carding cylinder thereon, a series of belt pulleys for the elements mentioned, a single endless belt passing over all said pulleys, a doffer comb and operative driving connections between said belt and said comb.

3. A carding machine comprising a lick-in roll, revolving flats, a doffer, a main driving shaft having a carding cylinder thereon, a series of belt pulleys for the elements mentioned, a single endless belt passing over all said pulleys, a doffer comb and operative driving connections between said belt and said comb.

4. A carding machine comprising a lick-in roll, flats, a doffer, a main driving shaft, a series of belt pulleys for the elements mentioned, a single endless belt passing over all said pulleys, a doffer comb, operative driving connections between said belt and said comb, a feed roll, and gear and shaft connections between the doffer and the feed roll.

5. A carding machine comprising a revolving roll at the feed end of the machine, a doffer, flats, a driving shaft, a series of belt pulleys for the elements mentioned, a single endless belt passing over all said pulleys, a doffer comb, means transmitting movement from said belt to said comb and means to reverse the power connection between the flats and the pulley for driving the same.

6. A carding machine comprising a revolving roll at the feed end of the machine, a doffer, flats, a driving shaft, a series of belt pulleys for the elements mentioned, an endless belt passing over said pulleys, a doffer comb, operative driving connections between said belt and said comb, and means to reverse the power connection between the flats and the pulley for driving the same,

comprising two trains of gears and a slidable pinion.

7. In a carding machine, the combination of a driving shaft, a belt pulley thereon, a doffer, a loose pulley on the doffer shaft adapted to be fixed thereto, a third pulley, gearing between said third pulley and the doffer, and a single belt passing over all said pulleys.

8. In a carding machine, the combination of a driving shaft, a belt pulley thereon, a doffer, a loose pulley on the doffer shaft adapted to be fixed thereto, a third pulley, gearing between said third pulley and the doffer, flats, a pulley for driving the flats, means for reversing the power connection between the pulley and the flats, and a single belt passing over all said pulleys.

9. In a carding machine, the combination of a doffer, a doffer comb, and gearing positively connecting the doffer and the comb, whereby change of speed of the doffer is accompanied by change of rate of vibration of the comb in a fixed relation.

10. In a carding machine, the combination of a doffer, a doffer comb, toothed gearing connecting the doffer and the comb, whereby change of speed of the doffer is accompanied by change of rate of vibration of the comb in a fixed relation.

11. In a carding machine, the combination of a carding cylinder, its driving shaft, a pulley on said shaft, a lick-in roll, a pulley connected with the lick-in roll flats, a belt pulley for imparting movement to the flats, a doffer, a doffer comb, a belt pulley for imparting movement to the doffer and the doffer comb, and a single endless belt passing over all said pulleys.

12. In a carding machine, the combination of a card cylinder, its driving shaft, a pulley on said shaft, a lick-in roll, a pulley connected with the lick-in roll, flats, a belt pulley for imparting movement to the flats, a doffer, a doffer comb, a belt pulley for imparting movement to the doffer and the doffer comb, a pulley loose on the doffer shaft and adapted to be fixed thereto, means for reversing the power connection between the flats and the pulley for driving the same, and a single endless belt passing over all said pulleys.

13. In a carding machine, the combination of a card cylinder, its driving shaft, a pulley on said shaft, a lick-in roll, a pulley connected with the lick-in roll, flats, a belt pulley for imparting movement to the flats, a doffer, a doffer comb, a belt pulley for imparting movement to the doffer and the doffer comb, a feed roll, positive gearing between the feed roll and the doffer, and a single endless belt passing over all said pulleys.

14. A flexible bend adjusting device for carding machines, comprising a bend en-

gaging bolt, a worm wheel nut on the bolt, a worm or screw engaging said nut, the head of the screw being provided with graduations, and a dial.

5 15. A flexible bend adjusting device for carding machines, comprising a bend engaging bolt, a screw, connections between the screw and the bolt, the head of said screw being provided with graduations, and
10 a dial concentric with the screw and rotatable about the same.

16. A flexible bend adjusting device for carding machines, comprising a bend-engag-

ing bolt, a screw, connections between the screw and the bolt, the head of said screw
15 being provided with graduations, a dial concentric with the screw and rotatable about the same, and consisting of a radially split ring, and an arch having a recess in which
20 said head and dial are placed.

In testimony that I claim the foregoing I have hereunto set my hand.

JAMES CHARLES POTTER.

Witnesses:

EARLE ROBERTS,

ELVERY LINGARD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."