

Dec. 25, 1923.

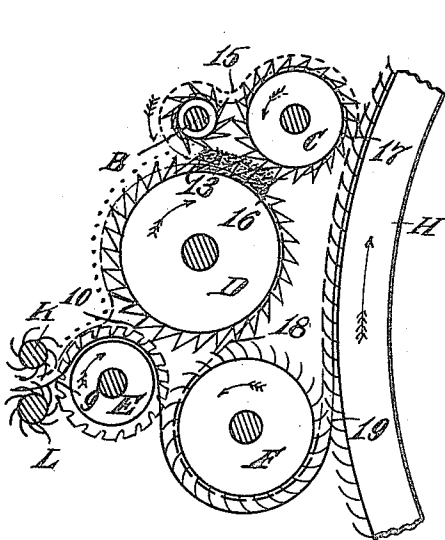
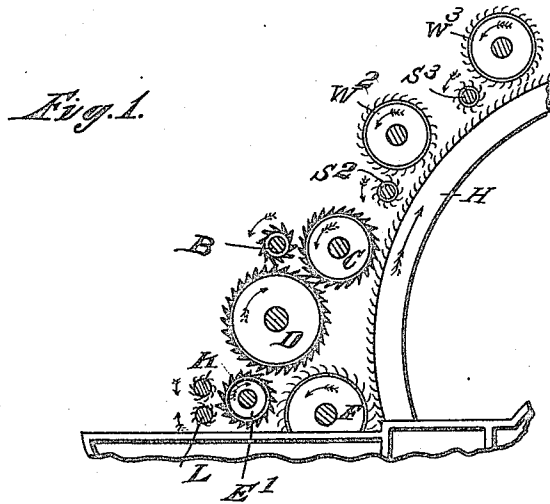
1,478,630

E. V. BATES

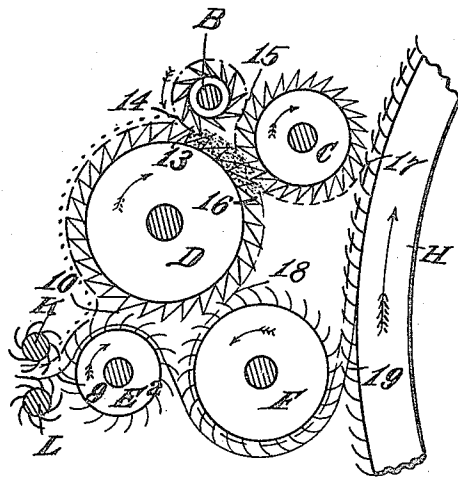
POINT TO POINT BREAST FOR WOOL CARDS

Filed Jan. 14, 1920

4 Sheets-Sheet 1



*Fig. 2.*



*Fig. 3.*

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4 Sheets-Sheet 2

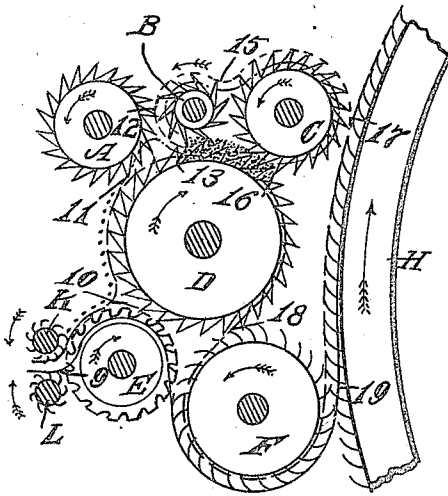


Fig. 4.

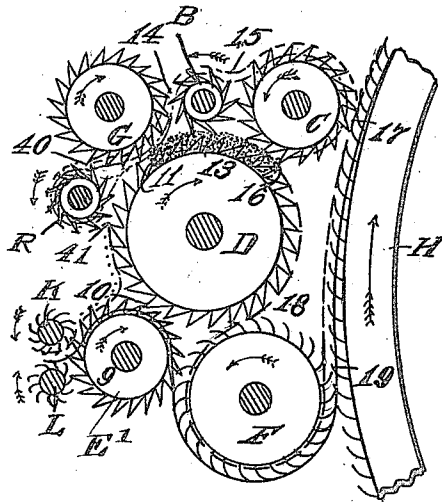


Fig. 5.

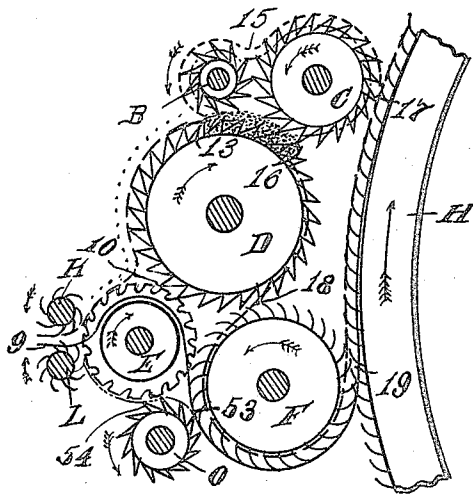


Fig. 6.

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4 Sheets-Sheet 3

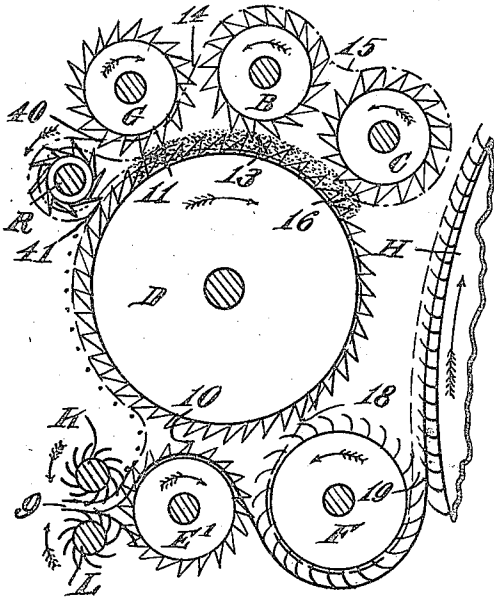


Fig. 7.

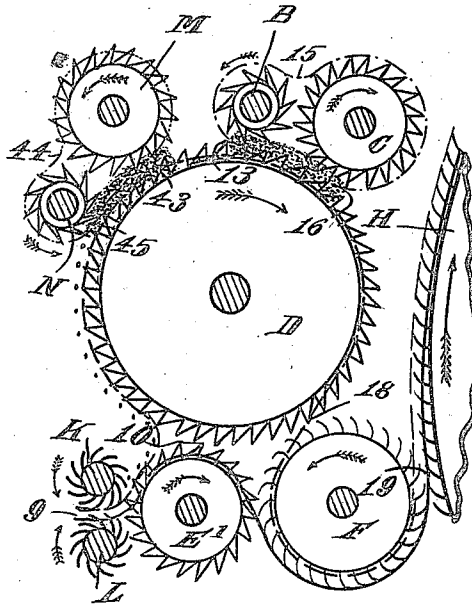


Fig. 8.

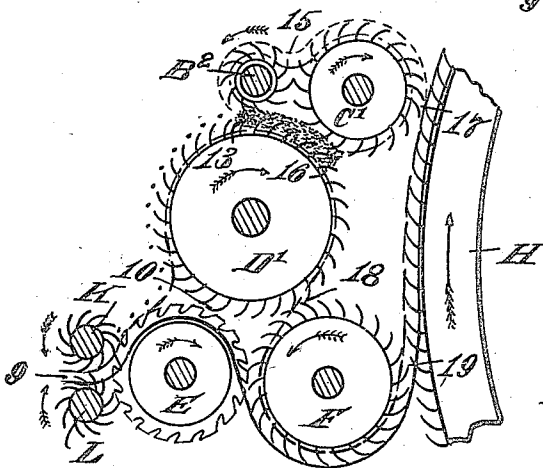


Fig. 9.

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POINT TO POINT BREAST FOR WOOL CARDS

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4 Sheets-Sheet 4

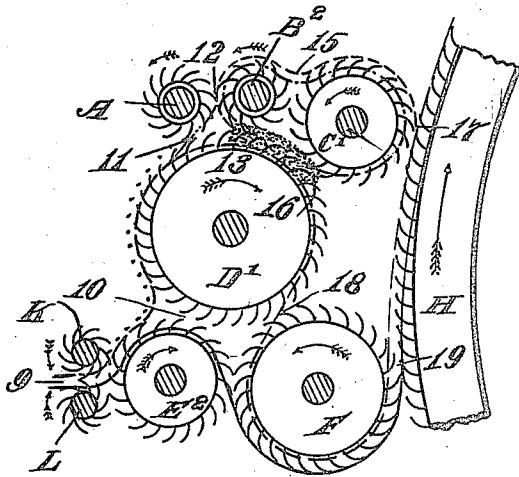


Fig. 10.

Fig. 11.

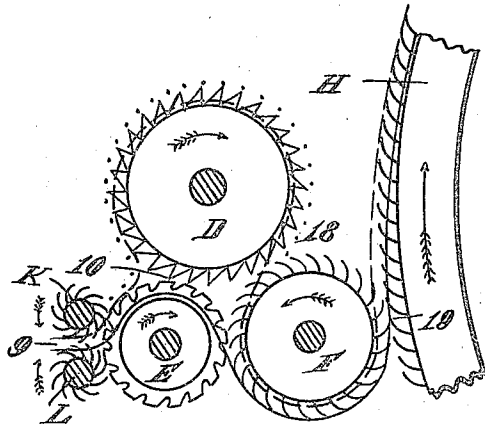
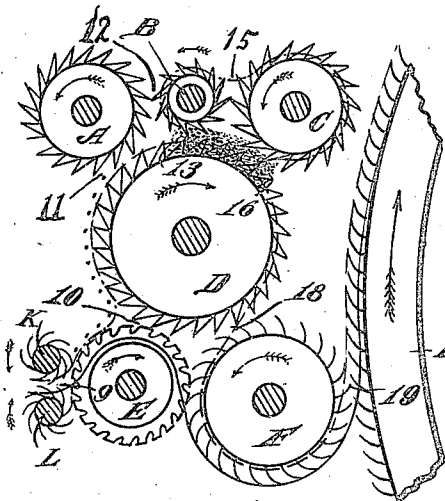


Fig. 12.



INVENTOR.

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# UNITED STATES PATENT OFFICE.

EDDO V. BATES, OF LOWELL, MASSACHUSETTS.

POINT-TO-POINT BREAST FOR WOOL CARDS.

Application filed January 14, 1920. Serial No. 351,461.

*To all whom it may concern:*

Be it known that I, EDDO V. BATES, a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Point-to-Point Breasts for Wool Cards, of which the following is a specification.

This invention relates to what are known as breasts for woolen cards. It is of a type similar to those shown in patents to E. V. Bates on breast for carding machines, Nos. 1,103,649, July 14, 1914, and 1,162,846, December 7, 1915, wherein a breast cylinder and other rolls cooperating therewith are located at the feed end of a card with little, if any, change in the arrangement of the main cylinder, workers, strippers, lickerin, tumbler, etc.

My device is particularly useful on the first breaker card, as the stock fed to such first breaker is generally made up of matted locks and, especially with low grade stock, contains pieces of cloth, which must be torn up, together with buttons, seeds and other impurities which should be removed. My device may, however, be used as described herein or, with the slight modifications familiar to every carder, on the intermediate or finisher cards.

Especially when used on the first breaker, I prefer that all my rolls shall be covered with flat wire or Garnett wire instead of with card clothing, as cylinders covered with such wire are stronger and the teeth thereof are not so readily bent or injured.

The particular feature of this invention is the use of a forward running lickerin, preferably of the burr cylinder type, which runs in the same direction with the main cylinder and carries the stock upward from the feed rolls, associated with a forward running breast cylinder, which carries the stock up from the lickerin, having teeth which engage those of the lickerin point to point whereby something in the nature of carding occurs between them. This breast cylinder should run at a surface speed faster than the lickerin.

Especially where used on a first breaker card operating on low grade stock, in which the fibre is matted into locks and may contain pieces of cloth, etc., some of the relatively small parts are pulled into the teeth

of the lickerin and such parts as stick up on the teeth are pulled off and the lock or other piece of material is thus separated and carried partly by the breast cylinder and partly by the lickerin.

I provide a tumbler, which is preferably covered with card clothing, and arrange it in such manner that it will clear the teeth of the lickerin of the relatively good stock left thereon by the breast cylinder and will transfer it to the main cylinder of the card. This tumbler also preferably clears the teeth of the breast cylinder and transfers the stock therefrom to the main cylinder.

My device is substantially a re-working breast in which the stock is first carded or separated, as described, between the lickerin and the breast cylinder. I prefer that the lickerin should be covered with burr cylinder wire and the breast cylinder with Garnett wire, but both may be covered with card clothing.

In my preferred construction, I prefer to further card the stock by means of suitable workers associated with the breast cylinder and prefer that these workers should also be covered with Garnett wire. I prefer also to arrange one worker, preferably covered with Garnett wire, in carding contact with the main cylinder and also with the breast cylinder whereby any lumps, locks, or other pieces of material which start on the main cylinder but are not drawn into the teeth thereof will be removed therefrom and placed on and carded by the breast cylinder before they have passed on to the other workers and strippers of the card, which are usually covered with card clothing, and which card clothing can readily be injured.

My breast is easily attached to an old card as little, if any, change is necessary in the lickerin or tumbler. It consists substantially of one breast roll or breast cylinder, with or without additional rolls, attached to a card in a very simple manner where it does not interfere with the operation or cleaning of the other parts. It is easy to clean, and as the lickerin and the breast roll both run forward, the condition of the stock can be readily observed by the carder at all times.

By card clothing, I mean clothing with an elastic or yielding foundation and round wire teeth. Under flat wire teeth, I include

convex wire toothed card clothing, Garnett wire with saw teeth, and burr cylinder wire with flat-topped teeth, both known to the trade as metallic tooth wire.

5 Such metallic tooth wire will not bend nor give, and convex wire teeth will bend or give very little, while the round teeth of card clothing will yield and are permanently bent out of shape with little difficulty.

10 Any flat wire tooth is rigid and, if rigidly held, may separate or even break the stock but will not yield.

By forward running, applied to rolls and cylinders, I refer to the direction in which the top moves from the feed end of the card towards the delivery end, or from left to right in the drawings, and by backward running I refer to the opposite direction. By forward pitching, applied to teeth, I refer to the rake, from base to point when at the top of a roll, being towards the delivery end of the card, and by backward pitch I refer to the opposite pitch.

It is believed that the stock is acted upon as indicated graphically by the broken and whole lines used in all the figures except Fig. 1 but this cannot be positively determined.

In the drawings, Fig. 1 is a diagrammatic side elevation of the feed end of a card showing one preferred form of my device, with no stock in the teeth. Fig. 2 is a similar view, on a somewhat larger scale, showing graphically what is believed to be the course of the stock. Fig. 3 shows a slight modification of the arrangement of rolls shown in Fig. 2. Fig. 4 shows another preferred form of my device, and Figs. 5 to 12 show other arrangements which can be used to advantage in some cases.

The constructions shown in Figs. 1 to 6 are the same as those shown in co-pending application filed by me October 9, 1918, Serial Number 257,467, for patent on Garnett worker breast for woolen cards.

In the drawings, H represents the main cylinder of a card which runs forward and has card clothing teeth which pitch forward. F is a tumbler which runs backward and is covered with card clothing having teeth which pitch backward. Both have round wire teeth.

C represents a worker which preferably takes the place of the first worker on the card or is located in front thereof, that is, in position so that the stock will reach it before it reaches the first card clothing covered worker. This worker C is covered with flat wire tooth card clothing, preferably of the saw tooth Garnett, rigid type, the teeth of which have considerable pitch and rake forward. I prefer that this should run backward but, as shown in Fig. 3, it may run forward.

65 D is a breast cylinder in position to be

stripped by tumbler F and to card with worker C. It is preferably covered with flat wire tooth clothing which, I prefer, should be of the Garnett wire tooth type. It runs forward and its teeth pitch forward.

K and L are the feed rolls of any usual construction, and E represents a lickerin which takes the stock therefrom in a well known manner. This lickerin is preferably of the burr roll type and runs forward so as to carry the stock upward, but it may be provided with any other kind of teeth.

B represents a stripper shown as of the flat Garnett wire type with teeth which pitch backward and which runs backward in position to strip worker C and to be cleared by breast cylinder D. In all the views, the main cylinder H is supposed to run with a surface speed of about 900 feet per minute, the tumbler F at from 400 to 500 feet per minute, say 440, the lickerin E about 200 feet per minute, the breast cylinder D from 200 to 300 feet per minute, say 220, the worker C at about 30 feet per minute, and stripper B at about 100 feet per minute. It is believed that such relative speeds give best results.

Referring to Fig. 2, the stock is delivered at 9 by feeding in rolls K and L and is carried upward to the point 10 by burr cylinder lickerin E. A part of the stock is pulled well into the teeth of E and remains there, as shown by the full line, and passes over E, under F and on to H. This stock is relatively small and fine and is stripped from E by F, from which it is cleared by main cylinder H.

The locks, knots, pieces of cloth, etc., which stand up above the teeth on lickerin E, as indicated by the line of long dashes and dots, is picked off at the point 10 by breast cylinder D and carried along up to the point 13 where it is mixed with other stock taken from stripper B.

When the stock reaches the point of carding contact 16 with the worker C it is divided, the locks, knots, etc., which stick up being pulled into the teeth of worker C, as shown by the line of dot, dash, dot, dash, while the smaller pieces and the stock which is better mixed and carded remains on breast D, as shown by the line of long dashes, and is stripped therefrom at the point 18 by tumbler F, from which it is stripped at the point 19 by main cylinder H.

The stock taken from tumbler F by main cylinder H is carried along to the point of carding contact 17 with worker C, where any knots, locks, etc., which stick up above the teeth of the main cylinder are pulled into the rigid or semi-rigid teeth of the worker, while the finer parts remain in the round wire teeth of the main cylinder and continue on to be further carded by

the regular card clothing workers  $W^2$  and  $W^3$  and to be acted on by the regular strippers  $S^2$  and  $S^3$ , as shown in Fig. 1.

The stock picked up by the teeth of worker C at the point 16 and at the point 17 is carried upward and back, and at the point 15 is stripped therefrom by stripper B, from which, at its point of stripping contact 13 with breast cylinder D, it is stripped and mixed with the other stock shown roughly between the points 13 and 16. The stock which is carried over by worker C is shown by a line of dashes and dots and by another line of short dashes.

In Fig. 3, all parts are the same except worker C, whose teeth pitch the same forward way but which travels forward. The result of this movement is that the stock, shown by the short dashes, taken from the main cylinder H at 17 is carried downward and backward and is re-carded at the point 16. At this point 16 it is mixed and carded with other stock which comes from the point 13. The stock which is least mixed and stands on the points of the teeth at 16 will generally be pulled into the teeth of worker C and, as shown by the line of dash, dot, dash, dot, will be carried up and back and will be stripped at the point 15 by worker B and carried back again until cleared from the stripper at 13 by breast cylinder D.

In Fig. 4, I show the same construction as Fig. 2 except that I add another worker A provided with flat wire teeth which rake forward, while this worker preferably travels backward. The operation is substantially the same as that shown in Fig. 2 except that I gain an additional carding point between worker A and breast cylinder D at 11, whereby the rough stock which sticks up on the points of the teeth D is pulled apart, and what remains on worker A is stripped therefrom at the point 12 by stripper B and returned to breast cylinder D at the point 13. This worker A may travel at about 30 surface feet per minute.

In Fig. 5, lickerin  $E^1$  is shown as covered with saw tooth Garnett wire, and I show an additional worker G which travels forward and has teeth which pitch forward and a stripper R therefor having teeth which pitch backward and which runs backward.

In this view, worker C is supposed to travel about 30 feet per minute, stripper B about 30 feet per minute, worker G about 60 feet per minute, and stripper R about 100 feet per minute.

The action of the stock on lickerin  $E^1$ , tumbler F, worker C and the main cylinder is the same as before, but stripper B serves as a transfer roll which carries the stock, shown in the line of short dashes and dash, dot, dash, dot, over from worker C to the point 14 where it is stripped by worker G and carried down to the point 11 where re-

carding takes place, some being carried back to the point 40, where all is stripped by stripper R, and carried around to the point 41 whence it is stripped by breast cylinder D.

In Fig. 6, I show a roll O, which might be called a lumpner, covered preferably with flat wire, shown as Garnett wire, with teeth which pitch backward and running backward at a slow surface speed, of perhaps 30 feet per minute, in carding contact with tumbler F and in stripping contact with lickerin E.

The effect of this roll is to pick off any rough stock which stands up on the teeth of tumbler F and to carry it, as shown by the line of three dots and a dash, from point 53 on the tumbler to the point 54 on the lickerin, by which it is carried back to the point of contact 9 with the feed rolls, from which it goes through the breast again. Roll O thus serves as a guard to keep rough stock from the main cylinder, but also prevents the stock being thrown off by centrifugal force as it pulls the stock into the teeth of the tumbler, thus causing it to hang on better.

This roll O thus serves as an additional protection to the teeth of the main cylinder and regular workers.

Whatever rough stock, such as rags, gets on to the main cylinder H, on account of its high speed, is thrown outward by centrifugal force and, as there is no stripper between worker C and H, it is caught and pulled into the teeth of C by which it is carried back to the breast cylinder D and re-worked.

Another reason why I prefer to run my lickerin E forward is that the stock is pulled apart at the point 9 and again at the point 10 so that, as it is carried up by breast cylinder D, any buttons, pieces of metal, and other substances which would injure the teeth are thrown off and gradually work along between 9 and 10 until they fall off the end of roll E on to the floor. This occurs before they are crowded between the teeth of any two rolls and at the time when the stock is enough separated so that they will fall out of it.

In Fig. 7, I show the lickerin  $E^1$  as covered with Garnett wire, as is also breast cylinder D and the backward running worker C and forward running worker G. Worker C is not in carding contact with main cylinder H, and between it and worker G is the backward running transfer roll  $B^1$ , while backward running stripper R strips worker G. Workers C and G and transfer roll  $B^1$  travel at a surface speed of 30 feet per minute, while stripper R travels at 100 feet per minute.

With this arrangement, the stock shown by a dash and a dot, forced into worker C by roll D at 16, is carried back and at

point 15 is stripped therefrom by transfer roll B, from which at point 14 it is taken by worker G, being re-worked at 11 and at 40, being stripped by stripper R and replaced on breast cylinder D at point 41; 5 mixed with other stock, it is re-worked at the point 11, some being carried back by worker G, as shown by the line of two dots and a dash, and stripped therefrom by 10 stripper R.

In Fig. 8, the rolls of my breast, including lickerin E<sup>1</sup>, are shown as of Garnett wire, and forward running worker C is out of engagement with main cylinder H and is 15 stripped by its own stripper B at the point 15. I also show another worker M, which is shown as a backward running worker with its stripper N which strips it at the point 44, returning the stock to the breast at 45. 20 Carding takes place at the points 43 and 16.

It is apparent that, if either worker C or M should become useless for any reason, the breast would still operate with the other 25 worker, and it is also apparent that three or more workers could be used if desired.

In Fig. 9, I show the lickerin E as a burr roll, and breast cylinder D<sup>1</sup>, worker C<sup>1</sup> and 30 stripper B<sup>2</sup> covered with card clothing. Worker C<sup>1</sup> runs forward and is in carding contact at the point 17 with main cylinder H. The operation is substantially the same as that shown in Fig. 2 except that card clothing instead of flat wire is used on the breast rolls.

In Fig. 10, I show the lickerin E<sup>2</sup> as covered with card clothing, as is also the breast cylinder D<sup>1</sup>, workers A and C<sup>1</sup> and stripper 35 B<sup>2</sup>. Worker C<sup>1</sup> is in carding contact with main cylinder H at 17, and its construction is substantially the same as that shown in 40 Fig. 4.

The construction shown in Figs. 9 and 10 is especially suitable for use on intermediate or finisher cards, but with some kinds 45 of stock it is also useful for the first breaker.

In Fig. 11, I show my invention reduced to the simplest possible terms. In this case, no change is made in the lickerin E nor in the tumbler F, but I simply add a Garnett 50 breast cylinder D which travels forward and has teeth which pitch forward so located that something in the nature of carding takes place at the point 10 between it and the lickerin E, and it is stripped at the point 55 18 by the tumbler F. The speed of the lickerin would be about 200 feet per minute, of the breast cylinder D slightly more as, for instance, 220, and of tumbler F perhaps 440. For some classes of stock this construction is useful, as considerable pulling 60 apart occurs at the point 10 and foreign matter falls off as it rises on breast cylinder D and gradually works along lickerin E until it falls out over the side of the card.

In Fig. 12, I show substantially the same

construction as in Figs. 4 and 10, except that the worker C is not in carding contact with main cylinder H.

The lickerin E is shown as a burr roll, breast cylinder D as of Garnett wire, and 70 workers C and A and stripper B, all as Garnett wire rolls running backward. The action is the same as shown in Fig. 4 except that there is no stock taken from main cylinder H and carried back. 75

I claim:

1. In a carding machine having a main cylinder, feeding in rolls and a forward running burr cylinder lickerin, the combination 80 of a forward running Garnett wire breast cylinder which takes part of the stock directly from the burr cylinder lickerin, a Garnett wire worker in carding contact with the main cylinder and with the breast cylinder, a stripper between such worker and 85 the breast cylinder, and a tumbler in stripping contact with the breast cylinder and the lickerin and in such contact therewith as to be stripped by the main cylinder.

2. In a carding machine having a main 90 cylinder, feeding in rolls and a forward running flat wire lickerin, the combination of a forward running flat wire breast cylinder which takes part of the stock directly from the flat wire lickerin, one or more flat wire 95 workers in carding contact with the breast cylinder, means for stripping each worker, and a tumbler in stripping contact with the breast cylinder and the lickerin and in such contact therewith as to be stripped by the 100 main cylinder.

3. In a carding machine having a main cylinder feeding in rolls and a forward running lickerin, the combination of a forward running breast cylinder which runs 105 faster than and takes part of the stock directly from the lickerin, one or more workers in carding contact with the breast cylinder, means for stripping each worker, and a tumbler in stripping contact with the breast cylinder and the lickerin and in such contact therewith as to be stripped by the main 110 cylinder.

4. In a carding machine having a main 115 cylinder, feeding in rolls and a lickerin, the combination of a breast cylinder which takes part of the stock directly from the lickerin, the lickerin and breast cylinder both running forward and having teeth which pitch forward, one or more workers in carding 120 contact with the breast cylinder, means for stripping each worker, and a tumbler in stripping contact with the breast cylinder and the lickerin and in such contact therewith as to be stripped by the main cylinder. 125

5. In a carding machine having a main cylinder, feeding in rolls and a forward running flat wire lickerin, the combination of a Garnett wire breast cylinder which runs point to point with the lickerin and 130



takes part of the stock directly therefrom, and a tumbler in stripping contact with the breast cylinder and the lickering and in such contact therewith as to be stripped by the  
5 main cylinder.

6. In a carding machine having feeding in rolls, a main cylinder, and a lickering, the combination of a breast cylinder which runs point to point with the lickering and takes  
10 part of the stock directly therefrom, the lickering and breast cylinder both running forward and having teeth which pitch forward, and a tumbler in stripping contact with the breast cylinder and the lickering and  
15 in such contact therewith as to be stripped by the main cylinder.

7. In a carding machine having feeding in rolls, a main cylinder and a forward running lickering having teeth which pitch forward, the combination of a forward running  
20 breast cylinder, having teeth which pitch forward, which runs at a faster surface speed than the lickering and runs in such contact therewith that it takes part of the  
25 stock directly therefrom, and a tumbler in stripping contact with the breast cylinder and with the lickering and in such contact therewith as to be stripped by the main cylinder.

In testimony whereof I have affixed my  
signature.

EDDO V. BATES.