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SMALL BATCH PROCESS OF MIXING FIBERS

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FIG. 1.

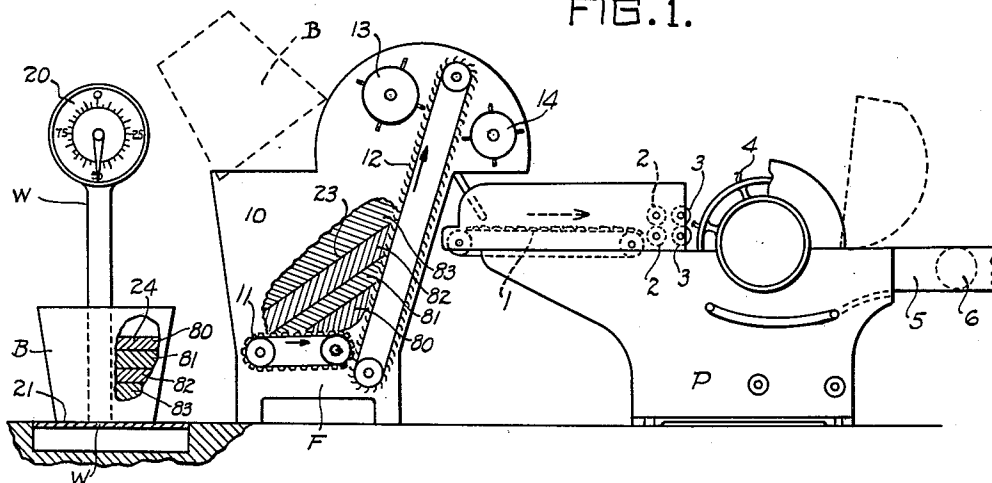


FIG. 2.

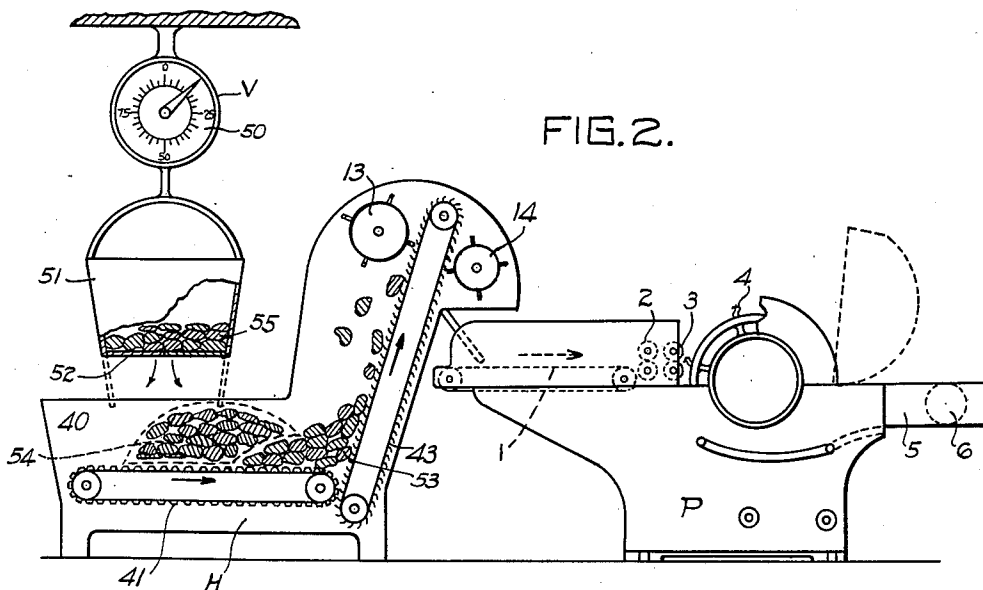
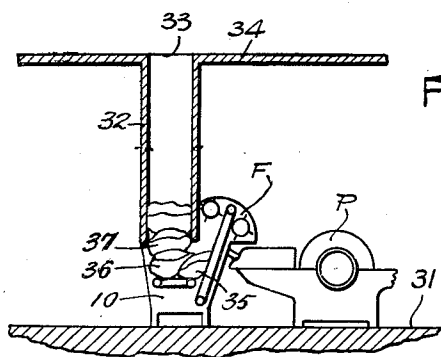


FIG. 3.



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SMALL BATCH PROCESS OF MIXING
FIBERS

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6 Claims. (Cl. 19-146)

This invention relates to the mixing and blending of textile fibers.

It is well known in the art that most textile fibers such as wool, cotton, rayon and others have different characteristics and that different kinds of wool, cotton or rayon differ in length and other characteristics. In many cases in order to produce a certain color or type of cloth, fibers of the same material but of different colors, or other fibers of different materials and of different colors must be intimately and thoroughly mixed together so as to then be formed into thread or yarn of a uniform color and texture. Such fibers are usually shipped in bales or bags. In order to secure a proper mixture, the bunches of such stock must be broken up and separated so that the fluffy, individual fibers can be mixed with other individual fibers. This process has special application to the treatment of wool fibers or wool fibers mixed with others such as cotton or rayon.

It has been and is now customary in mixing wool fibers alone or with other fibers to open the bales and then to weigh out a proportionate quantity of each different ingredient and to spread it in a layer in a very large bin. Another layer is weighed and placed on this and so on until the entire large batch is finished in the bin. Such batches may weigh from two thousand to ten thousand pounds and may occupy a space in a bin or on the floor twenty feet square and six feet high.

After the large batch has been thus prepared, armfuls are taken off from the edge with the purpose of having each armful contain as nearly as possible the desired proportion of each ingredient. Actually, however, the different armfuls vary greatly in their proportions.

The pickers, cards and other machines cannot be started until the whole large batch is prepared.

Each armful is dropped into the hopper of the feeder of a picker where it is moved along by a horizontal apron and pressed against a more or less vertical spiked apron. The horizontal apron runs in a hopper having sides and carries the stock unevenly between these sides to a spiked apron which picks up chunks and pieces with more or less irregularity and carries them up to a knock-off roll, the purpose of which is to knock off the largest and most irregular bunches. From here it is carried over and is knocked off onto the horizontal feed apron of a picker. Such picker usually consists of a horizontal feed apron and one or two pairs of rolls which take

the stock from the apron and deliver it to a toothed roll or other similar device which pulls or combs off the fibers more or less individually in thin horizontal lines, thus breaking up the lots and bunches and to some extent mixing the material.

As it is removed, the separated fibers are sometimes formed into a bat, but I prefer to have them carried into a pneumatic blower system by which they are more or less mixed together and are blown into a stationary bin. There is more or less mixing in the pneumatic conveyor but there is also more or less separating and it is evident that if the first armful was out of proportion to the next armful, the stock as delivered would differ in about the same way.

In my United States Letters Patent on Machine and method for mixing fibers, #1,929,344, October 3, 1933, I showed how layered blocks of material can be successively deposited on a horizontal conveyor apron, preferably in a pit, and carried along and pressed up against a vertical spiked apron in such a way that this spiked apron picks up the different kinds of stock in the correct proportion in a thin sheet so that it continues thereafter in a continuous stream of uniform character.

In subsequent processes, it is necessary to mix the parts more thoroughly and to keep them properly mixed.

My improved process herein described is a simplification of the process and machine shown in said Patent #1,929,344 and while the results may not theoretically be as perfect, it has the advantages of taking much less time and space and requiring less machinery. As the machines which I use, such as a feeder and a picker, are relatively small, the stock can be handled successively in one picker after another in the same space as where successive blocks are built on the long conveyor apron of said patent.

The small batches which are weighed and dumped overlap and do not follow each other successively but more or less intermingle.

In the drawing, Fig. 1 is a diagrammatic side elevation of the devices with which I carry out my process.

Fig. 2 is a view similar to Fig. 1 of a modification.

Fig. 3 is a similar view of another modification.

In the drawing, P represents a mixing picker with the usual horizontal feed apron 1, the delivery rolls 2, 2 and 3, 3 and toothed roll 4. As shown, it delivers to a pneumatic conveyor

which, by means of a fan 6, blows the stock either to a bin not shown or to any other machine.

F is a well-known type of standard picker feeder and includes a relatively small hopper 10 with an open top, a moving bottom formed by an apron 11 at the bottom and a spiked apron 12 which lifts up the stock and carries it past a knock-off roll 13 to a stripper roll 14 which strips off the stock and delivers it to the picker feed apron 1.

W represents a weighing device shown as having a dial 20 and pan 21 on which is placed a box B. The operator successively places in this box B, layers 23, 22, 21, and 20 or lots of stock, the weight being determined by looking at the dial 20. After the lots have been weighed, each in the right proportion, so that there is a batch of about fifty pounds, the box B is picked up by the operator and taken over to the feeder hopper 10 where the contents are dumped in. The box B is then returned to the weighing device W, another batch is weighed and assembled and then is dumped in after the first batch and preferably overlapping it.

Each small batch, such as 23, is carried along by apron 11 against apron 12 which picks off some of the various lots pressed against it and carries part up to roll 13 which knocks some of it off. This combined action mixes up the first batch 23 as shown and when another similar batch 24 is dumped in bin 10, as the batches overlap, they are mixed together to some extent.

In Fig. 2 is shown a slight modification. The picker P is the same but the picker feeder H has a longer feed hopper 40 and a longer horizontal apron 41. The spiked apron 43 and the rolls 13 and 14 are the same as in Fig. 1.

As shown, the weighing device V has a dial 50 and a box 51 suspended in position over the end of apron 41 of feeder H, the box having a dump bottom 52. After the component lots are weighed and each batch is completed, the entire batch is dumped through the bottom 52 into the feed box 40 in a manner similar to the one shown in my Patent #1,929,344.

The difference, however, is that the batches 53, 54 and 55 are not in rectangular blocks made up of regular layers, one block following another, but are irregular in form and overlap and merge. In fact, the stock can be weighed and thrown in in bunches without forming any layers.

Many small batches in a mixing machine are better than irregular parts of a large batch or bed. By using a scale with a dial 50, a batch of twenty-five pounds can be built up in the box 51 by throwing in lots one after the other until the total is correct.

As shown in Fig. 3, I can use a standard picker feeder such as F on one floor 31 and extend its hopper 10 up in the form of a tall, rectangular vertical stack 32 which reaches an opening 33 in the floor 34 above.

Small lots of stock can be weighed out by any means on floor 34 and dumped in small batches 35, 36 and 37 through opening 33 into hopper 10. As these are constantly cut away at the bottom and parts are turned over by aprons 11 and 12 and knock-off roll 13, these batches successively overlap or mingle and when delivered to a picker P, the stock is much more uniform than in any previous process.

The weighing and dumping should be so timed that the mixing machine will take care of each batch without hurrying and without the stock

piling up in the machine. Succeeding batches should always overlap.

To mix two thousand pounds an hour, twenty batches of one hundred pounds each might be dumped every three minutes or forty batches of fifty pounds each every ninety seconds.

In the claims where applicant uses the term "feeder hopper", he does not refer to the weighing pan of an evening feeder for carding machines of the well-known Bramwell type.

I claim:

1. The process of mixing and blending lots of textile fibers of different characteristics which consists of successively weighing proportionate lots of different ingredients; of assembling the lots in a container to form a relatively small batch; of then dumping such small batch into a feeder hopper of a continuously operating machine for separating bunches and mixing fiber; and of then weighing other similar lots to form another small batch and of then dumping such small batch into the same hopper so that it overlaps a substantial part but not all of the preceding batch.

2. The process of mixing and blending lots of textile fibers of different characteristics which consists of weighing proportionate lots of different ingredients; of assembling the lots to form a relatively small batch; of then dumping such small batch into the feeder hopper of a machine for mixing the fibers; and of then weighing other similar lots to form another small batch and of then dumping such small batch into the same hopper so that it overlaps a substantial part but not all of the preceding batch.

3. The process of mixing and blending lots of textile fibers of different characteristics which consists of weighing proportionate lots of different ingredients; of assembling the lots to form a relatively small batch; of then dumping such small batch into the feeder hopper having a moving bottom of a machine for mixing the fibres; and of then weighing other similar lots to form another small batch and of then dumping such small batch into the same hopper so that it overlaps a substantial part but not all of the preceding batch.

4. The process of mixing and blending lots of wool fibers of different characteristics which consists of weighing lots of the different ingredients; of assembling the lots to form a relatively small batch; then dumping such small batch into a feeder hopper having a continuously moving bottom and continuously operating means to pick the stock from the bottom and to lift it to a machine for mixing the fibers; and of then weighing other similar lots to form another small batch and of then dumping such small batch into the same hopper so that it overlaps a substantial part but not all of the preceding batch.

5. The process of mixing and blending lots of textile fibers of different characteristics which consists of weighing proportionate lots of the different ingredients; of assembling the lots to form a relatively small batch; of then dumping such small batch into the feeder hopper having a continuously moving bottom and continuously operating means to pick the stock from the bottom and to deliver it to other parts of a machine for mixing the fibers; and then weighing another similar lot to form another small batch and of then dumping such small batch into the same hopper so that it overlaps a substantial part but not all of the preceding batch.

6. The process of mixing and blending lots of textile fibers of different characteristics which consists of weighing proportionate lots of different ingredients; of assembling the lots to form a relatively small batch; of then placing the batch on a moving horizontal apron; of then preparing another similar batch and so placing it on the apron that it overlaps a substantial part but not all of the preceding batch; and of then continuously removing a thin web from the end of the moving mass by means which carry it in a substantially vertical direction and deliver it to mixing devices.

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