April 3, 1934. E. V. BATES 1,953,386

COMBINATION CARD CLOTHING AND FLAT WIRE CARDING MACHINE

Filed Aug. 14, 1930 2 Sheets-Sheet 1

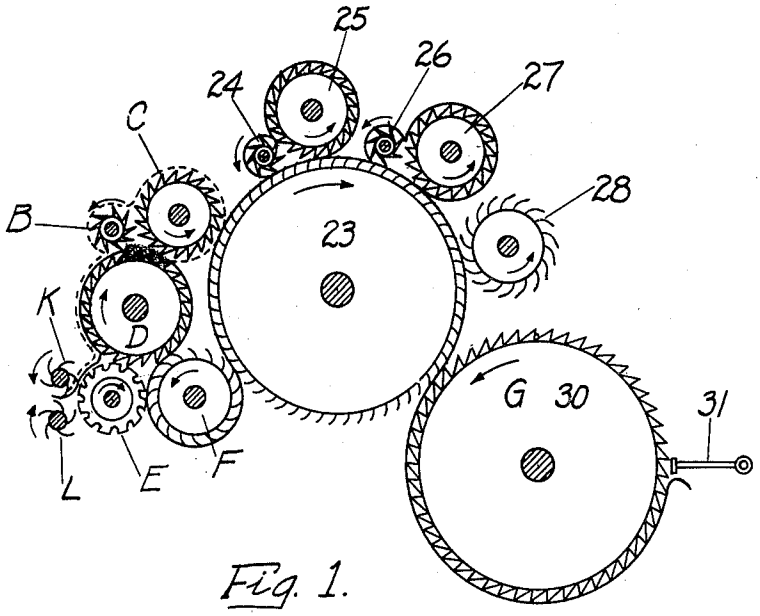


Fig. 1.

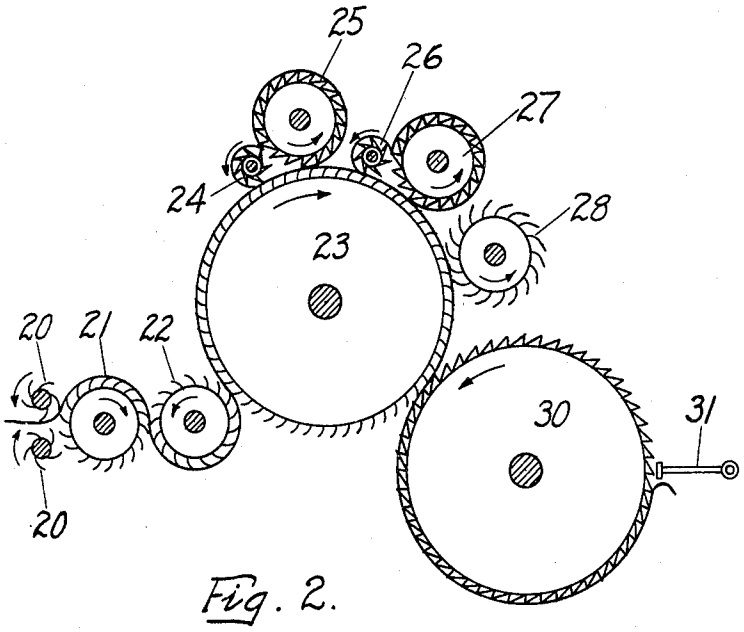


Fig. 2.

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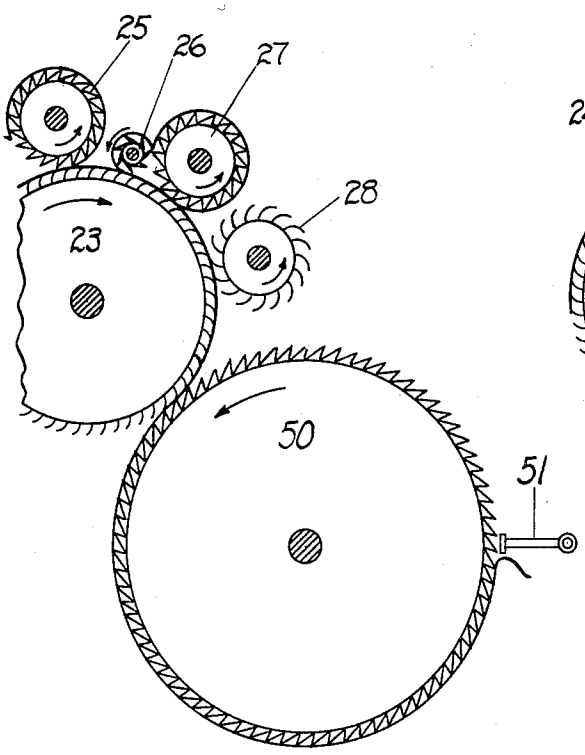


Fig. 3.

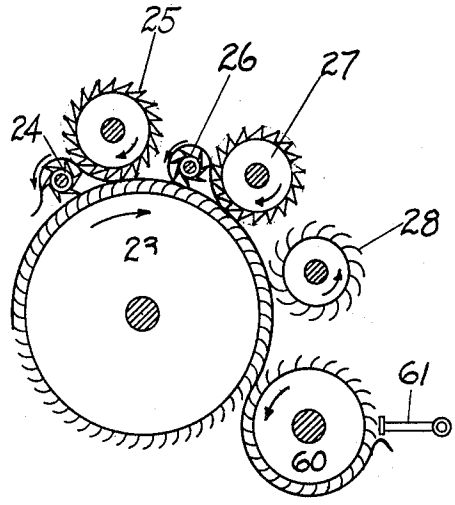


Fig. 4.

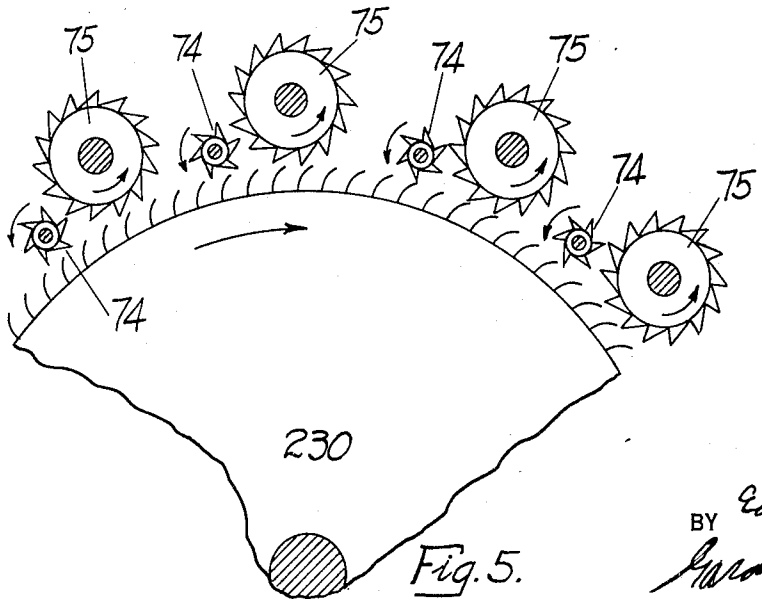


Fig. 5.

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1,953,386

UNITED STATES PATENT OFFICE

1,953,386

COMBINATION CARD CLOTHING AND FLAT WIRE CARDING MACHINE

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Application August 14, 1930, Serial No. 475,230

2 Claims. (Cl. 19—99)

This invention relates to the process known as carding in the manufacture of textile fibers.

It is well known among textile workers that the same machinery will not properly handle different fibers such as wool, cotton, silk, jute, ramie, etc.

The general object of the carding process is to take the fiber which may come in locks, such as wool, or bunches, such as cotton, or in various other forms naturally assumed and to separate it and spread it out into a thin sheet known as a fleece.

In handling certain mixed stock, such as wool, it is an object to blend or mix the stock more or less in the carding process.

In the old methods of carding wool, the first card was known as a first breaker the name being derived from the fact that it was desired to break the stock, which naturally was too long, for the other later process of spinning.

In the handling of some types of silk and rayon, this is still desirable while in carding wool to make worsted yarn, it is desirable that the fibers should be laid as near parallel and running forward and back as possible.

The carding machine of this invention is intended particularly for handling wool stock including what is known as woolen and worsted.

The wool fiber has certain scales and has a certain clinging tendency which is not found in a cotton or silk fiber.

However, the card section of this device may be used on some other fibers besides wool.

In handling various fibers for carding, there are generally in use two types of cylinders and for convenience and clearness I will specify as nearly as possible what is meant by the terms of this specification as the type of rolls is the main feature thereof.

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.

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.

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

If card teeth rake at an angle which is too acute, when they meet unusual resistance, they rise and may strike the cooperating roll.

Flat teeth can be made to rake forward at a very acute angle, but cannot rise.

Flat teeth can break, but it is substantially impossible for them to rise.

On the other hand however, short stock, dirt and grease fill in between the card clothing teeth and it is necessary to strip the card clothing cylinder quite frequently in order to make it most effective.

On the other hand, on account of the shape of the space between the flat teeth on a roll, it is very easy to clean out all such material practically at every revolution of the cylinder.

It is one of the purposes of this present invention to utilize this self-cleaning attribute of flat wire cylinders in the operation of a card.

By keeping the flat teeth clean at all times, the efficiency is greatly increased as instead of the old stock or teeth going round and round, the clean teeth are constantly in condition to act more effectively on the new stock as it comes along.

The principal feature of this invention is the use of a card clothing main cylinder, which may be very small, with a small number of sets of flat wire covered workers and strippers to work the stock.

For practical operation, I prefer to use a 20-inch main cylinder with two sets of workers and strippers in addition to a worker on a Garnett breast.

I am aware that the patent to Platt of April 16, 1929 #1,709,038 shows a construction for flat cotton cards in which apparently what is substantially flat wire is used on the straight surface of the flats.

However, it is well known that wool fiber cannot be carded on what are known as flat cards.

These flat cards have a series of connected flat plates or holders linked together so that a flat surface is presented against the cylindrical surface of a main cylinder.

Flats of card clothing have been used for years associated with a card clothing main cylinder for carding cotton and apparently Platt intends to use flat wire flats either in connection with a card clothing main cylinder or a flat wire main cylinder, probably the latter.

I believe I am the first, however, to use in connection with a main cylinder covered with card clothing sets of workers and strippers covered with flat wire, whereby two curved surfaces, or rather three curved surfaces, cooperate to card

and to clean the workers. I claim this as new particularly for use with wool fiber and also more particularly where a relatively small main cylinder is used with a relatively small number of workers and strippers.

With this combination, it is almost never necessary to strip the flat wire workers and strippers by hand or otherwise, and the fact that the workers and strippers are kept clean also keeps the main cylinder clean.

Preferably to assist in keeping the main cylinder clean, I use a relatively large doffer and I also find it desirable in many cases to use a large flat wire covered doffer.

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 toward 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 toward the delivery end of the card, and by backward pitch, I refer to the opposite pitch.

In the drawings, Fig. 1 is a diagrammatic side elevation of a single section of a wool card including a small main cylinder, a doffer which is the same size as the main cylinder and a breast feed.

This ordinarily would be what is known as a first breaker not directly delivering to a second breaker but which might be delivering to a scotch or diagonal feed not shown.

Fig. 2 is a diagrammatic side elevation of a wool card similar to Fig. 1 except that instead of a breast feed, the feed is of a well known type including feed rolls, tumbler and lickerin.

Fig. 3 is a diagrammatic side elevation of a card similar to the one shown in Fig. 1 except that the doffer is much larger.

Fig. 4 is a diagrammatic side elevation of a card similar to the one shown in Fig. 1 except that the doffer is smaller than the main cylinder and is covered with card clothing instead of flat wire.

Fig. 5 is a diagrammatic side elevation of a card with a much larger main cylinder and a much greater number of workers and strippers.

In the drawings, Fig. 1 at the left is what is known in the trade as a breast. The one shown is the same as Fig. 2 in patent on Garnett worker breast for wool cards of E. V. Bates #1,368,319, February 15, 1921. It includes feed rolls K and L, lickerin E, breast cylinder D, tumbler F, worker C and stripper B.

This breast delivers stock to main cylinder 23.

As shown, all the rolls of the breast, except tumbler F and the feed rolls K and L, are of flat wire and the teeth of all the flat wire rolls pitch forward except stripper B, while all run backward except cylinder D and lickerin E.

However, the type of breast and construction may vary, although I prefer that the main cylinder, the worker and stripper should be covered with flat wire and that the worker C should be in carding contact with the teeth on main cylinder 23.

23 represents the principal main cylinder which preferably is about twenty inches in diameter or very much smaller than those in ordinary use.

This main cylinder is covered with card clothing the teeth of which pitch forward and the main cylinder itself runs forward. The surface speed of the main cylinder may be about one thousand feet per minute.

Preferably I use a plurality of sets of stock working rolls, one set including a worker 25 covered with flat wire which pitches forward and is stripped by a stripper 24 covered with flat wire which pitches backward, and another set of workers and strippers 27 and 26 in which worker 27 is covered with flat wire which pitches forward and 26 is its stripper covered with flat wire which pitches backward.

These workers 25 and 27 are shown as running backward, their surface speed being between twenty-four and forty feet per minute, while the strippers 24 and 26 are shown as running backward at a surface speed of about three hundred feet per minute.

28 is a fancy of a well known type covered with fancy wire which preferably intersects slightly the teeth on main cylinder 23. This fancy preferably runs backward at a surface speed one-sixth to one-seventh greater than the main cylinder 23. This would make a surface speed of between eleven and twelve hundred feet per minute.

G represents a doffer which is shown as about the same diameter as the main cylinder 23 and is shown as covered with flat wire teeth which pitch forward and as running backward. Preferably this doffer should run at a surface speed of between sixty and one hundred feet per minute.

31 is the usual comb for removing the stock from the doffer.

The surface speeds of the breast rolls may conveniently be, feed rolls K and L, 20 feet per minute, lickerin E, 150 feet, tumbler F, 450 feet, breast main cylinder D, 150 feet, breast worker C, 24 feet, breast worker stripper B, 30 feet.

In Fig. 2 the construction is the same as in Fig. 1 except that in place of the breast, there will be shown the feed rolls 20, 20, lickerin 21 and tumbler 22, all of which are covered with card clothing.

Lickerin 21 is shown as having teeth which pitch forward and as running forward while tumbler 22 is shown as having teeth which pitch backward and as running backward.

The surface speeds of feed rolls 20, 20, may conveniently be 20 feet per minute, lickerin 21, 200 feet, and tumbler 22, 450 feet per minute.

In Fig. 3, the main cylinder, workers and strippers are the same as in Figs. 1 and 2 while the feed can be either that shown in Fig. 1 or Fig. 2, the only difference being that the doffer 50 instead of being the same size as the main cylinder 23 is much larger.

As shown the doffer is thirty-six inches and the main cylinder twenty inches in diameter.

It is covered with flat wire which pitches forward and runs backward, at a surface speed of from sixty to one hundred feet per minute. It is stripped by comb 51.

In Fig. 4 the construction is much the same as that shown in Fig. 3 except that the doffer instead of being much larger than the main cylinder is much smaller.

As shown, it bears the relation of a diameter of twelve inches to twenty inches diameter of the main cylinder and it is shown as covered with card clothing which pitches forward. This doffer 60 also runs backward and is cleared by a comb 61. Its surface speed may be between sixty and one hundred feet per minute.

In Fig. 4, the workers 25 and 27 are shown as turning forward or in the opposite direction to those in the other views, and some stock is picked

up and carried back and under to the stripper instead of forward and over.

In all the views the supposed course of the stock is shown by lines which cross or run along with the teeth on the various rolls.

In Fig. 5, I show a large card clothing covered main cylinder 230 which runs forward associated with a plurality of sets of stock working rolls, each set including a backward running flat wire covered worker 75 and a backward running flat wire covered stripper 74. These rolls 75 and 74 are substantially the same as 25, 24 and 27, 26.

The surface speeds of rolls 75, 75, may be about 24 feet per minute, and of rolls 74, 74, about three hundred feet per minute.

The surface speeds of main cylinders 23 and 230 may be 1,000 feet per minute, and of fancies 28, between 1,100 and 1,200 feet per minute.

I claim:

1. In a wool carding machine section, the combination of a main cylinder which runs forward and is covered with card clothing having teeth which pitch forward; with stock feeding mechanism consisting of a flat wire tooth breast which includes a main breast cylinder, a lickerin, a tumbler, a worker and a stripper; a plurality of sets of stock treating rolls, each set including a worker covered with flat wire teeth which pitch forward and a stripper covered with flat wire teeth which pitch backward; a fancy covered with fancy wire; and a doffer covered with flat wire teeth which pitch forward, the surface speed of the doffer and workers being the slowest, of the strippers being faster, of the main cylinder faster than the strippers and of the fancy, the fastest.

2. In a wool carding machine section, the combination of a main cylinder which runs forward and is covered with card clothing having teeth which pitch forward; with stock feeding mechanism consisting of a flat wire tooth breast; a plurality of sets of stock treating rolls, each set including a worker covered with flat wire teeth which pitch forward and a stripper covered with flat wire teeth which pitch backward; a fancy covered with fancy wire; and a doffer covered with flat wire teeth which pitch forward.

EDDO V. BATES.