Dec. 4, 1951 M. D. RUST 2,577,367

COTTON PICKING MACHINE DOFFER

Filed July 16, 1949

FIG_1_

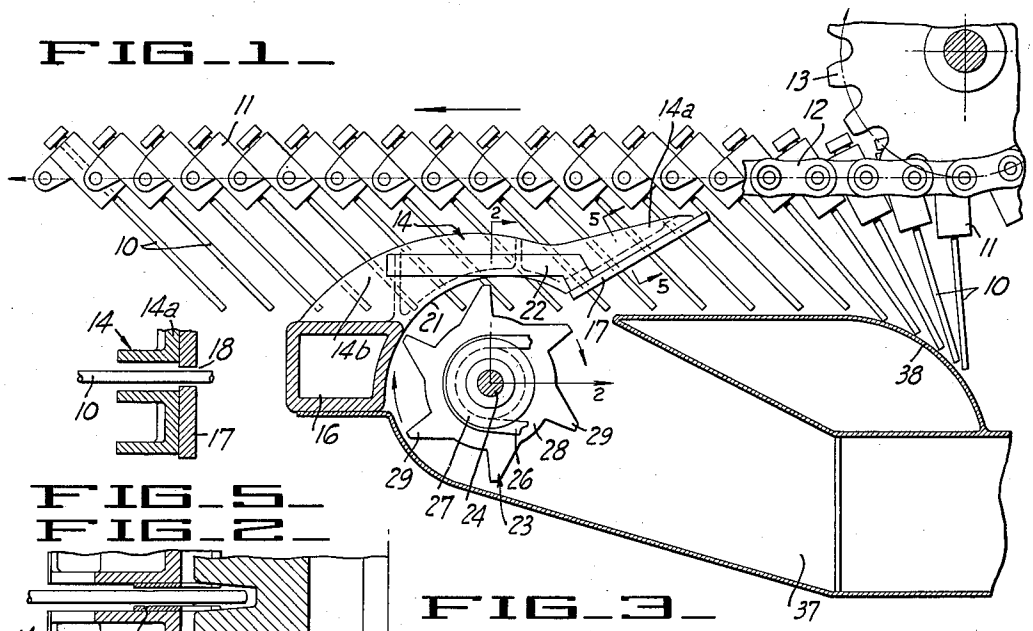


FIG_5_

FIG_2_

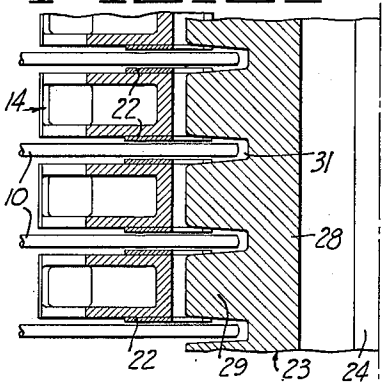


FIG_3_

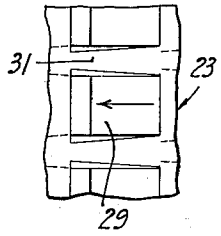
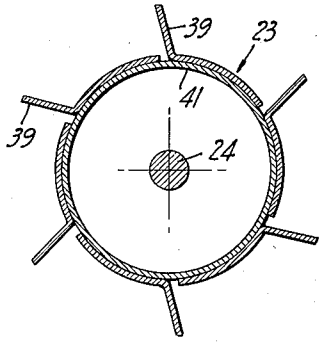


FIG_4_



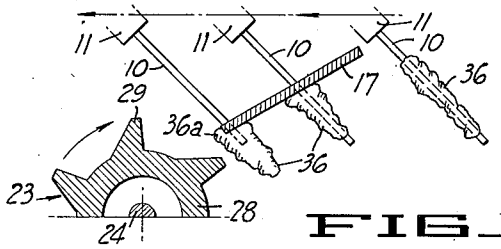


FIG_6_

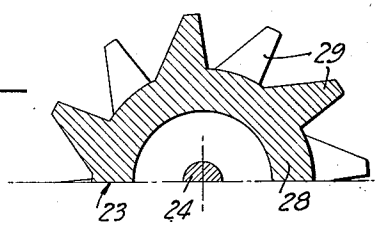
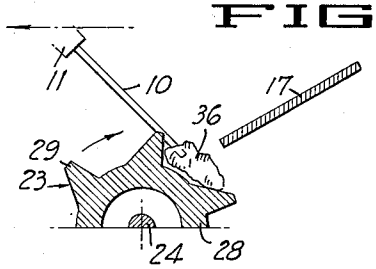


FIG_7_

FIG_8_



INVENTOR.
Mack D. Rust
BY Fleher & Swain
ATTORNEYS

Patented Dec. 4, 1951 2,577,367

UNITED STATES PATENT OFFICE

2,577,367

COTTON-PICKING MACHINE DOFFER

Mack D. Rust, Coalinga, Calif.

Application July 16, 1949, Serial No. 105,085

3 Claims. (Cl. 56—42)

1

This invention relates generally to cotton picking machines of the type making use of a plurality of rotating spindles for the romoval of cotton fiber from the boll.

Cotton picking machines of the rotatable spindle type, such as have been used commercially, have employed a large number of rotating spindles arranged in vertically spaced rows, and adapted to progress successively through a picking zone in which the spindles are thrust into the plants, a stripping zone in which cotton carried by the spindles is removed, and a moistening zone for applying moisture to the spindles before returning them to the picking zone. Such machines are disclosed for example in Patents 1,894,198, 2,058,513, and 2,085,046. A critical and important part of such machines is the means employed in the stripping zone for removing cotton fiber from the spindles. For this operation it has been common practice to use vertically spaced stripping bars, through which the spindles are caused to pass. Such bars are arranged to act upon the full length of the spindles, in an effort to completely strip off all of the fiber before the spindles pass to the moistening operation. Rotary doffing devices have been used with such strippers to facilitate discharge of fiber to suitable collecting or conveying means after removal by the stationary stripping bars.

All of such prior art stripping means have been defective and inefficient with respect to the stripping action afforded. Cotton fiber tends to accumulate on the stationary stripping bars, particularly near the ends of the stripping bars between which the free ends of the spindles pass. Such accumulations of cotton fiber tend to block free passage of the spindles, with the result that as the spindles are pulled between the bars they tend to be bent backwardly by an increasing amount as the accumulations increase. Unless operation of the machine is interrupted and the stripping bars cleared of accumulated fiber, sufficient fiber may accumulate so that the spindles are permanently bent, thus requiring shutdown of the machine for replacement of the bent spindles as well as for clearing the stripping bars. Inefficient stripping action may also result in some fiber being left upon the spindles, and this tends to impair the efficiency and general performance of the machine, particularly because such cotton accumulates in the moistener. Such accumulations are troublesome and objectionable because frequent shutdowns of the machine are required to clean out the moistening means, and because of other detrimental effects, such as possible interference with proper operation of the moistening means.

2

It is an object of the present invention to generally improve upon cotton picking machines of the above type, particularly with respect to the means employed for removing cotton from the picking spindles.

More specifically it is an object of the present invention to provide an improved cotton picking machine which will overcome the above described defects and disadvantages of prior machines and which will enable continuous and complete removal of cotton from the spindles without accumulation of cotton in the stripper slots.

Another object of the invention is to provide improved stripping means characterized by the use of stationary stripping bars, together with rotary means which serves to perform both stripping and doffing functions.

Additional objects of the invention will appear from the following description in which the preferred embodiments of the invention have been set forth in detail in conjunction with the accompanying drawing.

Referring to the drawing:

Figure 1 is a plan view in section, illustrating a cotton picking machine incorporating the present invention.

Figure 2 is a cross-sectional detail on an enlarged scale, taken along the line 2—2 of Figure 1.

Figure 3 is a detail illustrating one construction for the paddle-like members carried by the rotary stripping and doffing device.

Figure 4 is a cross-sectional view illustrating a modified form of stripping and doffing device.

Figure 5 is an enlarged cross-sectional detail, taken along the line 5—5 of Figure 1.

Figure 6 is a view like Figure 4, and showing another embodiment of the stripping and doffing device.

Figures 7 and 8 are diagrammatic views serving to illustrate the mode of operation of my invention.

Referring to Figure 1 of the drawing, I have shown a portion of a cotton picking machine of the type disclosed in said patents, and including the rotary picking spindles 10, together with the vertical spindle carrying slats 11. The slats are shown being carried by upper and lower endless chains 12, which engage the sprockets 13. As viewed in Figure 1, the spindles are passing through the stripping zone, after which they are moistened, and then thrust into the plants for the picking operation.

The stripping means consists of a plurality of

vertically spaced fingers 14, which are relatively rigid in construction, and which have their corresponding ends carried by the vertical support post 16. The portions 14a of these fingers serve to mount the stripping bars 17. The spaces 18 between these bars are dimensioned to be slightly greater than the diameter of the spindles, as shown in Figure 5. The right hand sides of bars 17 as viewed in Figure 5 are positioned toward the direction from which the spindles are moving and thus may be termed the stripping faces of the bars 17. It will be noted from Figure 1 that the bars 17 are inclined toward the path of movement of the spindles, whereby the base of each spindle enters between the right hand ends (i. e. the entrant ends) of the bars as viewed in Figure 1, and leaves the left hand ends (i. e. egress ends) of the bars.

Between the left hand or egress ends of the stripping bars 17, and the support post 16, the portions 14b of the fingers are arched around the curved contour line 21, to accommodate a rotary stripping and doffing device as will be presently explained. In order to properly guide the spindles as they pass between the finger portions 14b, the upper and lower faces of these portions carry the guide strips 22 (Figure 2) which serve to provide slots comparable in height to the openings 18 between the stripping bars 17.

In conjunction with the stationary stripping bars I provide a rotary stripping and doffing device 23. This device is mounted upon the vertical rotatable shaft 24, which is driven by suitable means, such as the belt 26, and the pulley 27. The device in this instance consists of a hub 28 which extends the complete height of the stripping bars, and which has a plurality of circumferentially spaced paddle-like members 29 mounted upon its periphery. The members 29 are disposed in vertically spaced sets, separated by the annular spaces 31, which are proportioned to accommodate the end portions of the spindles 10, as illustrated in Figure 2. Preferably the upper and lower side faces of the members 29 are divergent in a direction outwardly with respect to the radius of rotation, as shown particularly in Figure 2, and in addition they are divergent backwardly with respect to the direction of rotation, as illustrated particularly in Figure 3. This construction aids in permitting fiber to free itself from the members 29, when they are performing their stripping and doffing operations. It will be evident from Figure 2 that the paddle-like members 29 in their rotation sweep through substantially the entire vertical spaces between the free ends of the spindles 10, and that they pass in such proximity to the free ends of the spindles that they may perform a stripping operation.

As illustrated particularly in Figure 1, the stripping bars are so disposed, and the spindles 10 are of such length, that the bars 17 act over the major portion but not all of the length of each spindle. Particularly an end portion of each spindle passes beyond the egress ends of the bars 17, rather than between the same. As will be presently explained with reference to Figures 7 and 8, this enables the free end portion of each spindle to function as a cotton retaining portion.

The length of each spindle which is permitted to pass beyond the stripping bars 17 may vary in practice but in general it should not be less than about 1.5 times the diameter of the spindle. In practice from 1.5 to 2 times the spindle diameter can be employed with good results. For example where the spindle diameter is $\frac{3}{16}$ of an inch, the end portion of the spindle which passes beyond the egress ends of the bars 17, can be about $\frac{3}{8}$ of an inch in length.

It will be noted from Figure 1 that as the spindles are presented to the zone of operation of stripping and doffing device 23, they are substantially tangential to the periphery of this device, and the paddle-like members 29 operate over an end portion of each spindle which is substantially greater in length than the length of the end portion which passes beyond the stripping bars.

Operation of the machine as described above can be better explained by reference to Figures 7 and 8. In Figure 7 a spindle 10 has been illustrated in three different operating positions. In the first right hand position the spindle is shown with a quantity of cotton fiber 36 wrapped indiscriminately about the same, and the base of the spindle is about to enter between the stripping bars 17. In the middle position the spindle has passed part way through the stripping bars, and the cotton has been forced toward the free end of the spindle. In the third or left hand position of the spindle, all of the fiber has been stripped to the end portion of the spindle, as the spindle is leaving the egress end of the stripping bars, and the cotton is shown being generally held or retained by the end (i. e. unstripped) portion of the spindle, which is passing beyond the egress ends of the stripping bars 17. A portion 36a of the cotton is shown expanding beyond the egress ends of the stripping bars 17, thus tending to loosen the fiber following any tightening which might result from the preceding stripping action.

From the position shown in Figure 7, the spindle 10 moves only a short distance to bring the cotton into the zone of operation of the stripping and doffing device 23. The paddle-like members 29 of this device engage the cotton above and below the spindle, thus stripping the same from the tip end of the spindle, and delivering the cotton to conveying or receiving means.

It will be evident that the mode of operation, as described with reference to Figures 7 and 8, will not be repeated in every instance. In some instances the cotton may readily slide from its spindle and be discharged without the aid of the stripping and doffing device 23. However where the fiber clings to the spindle more tenaciously, the machine operates as illustrated in Figures 7 and 8, and the stationary bars 17 perform only a part of the stripping operation, with the final stripping operation being performed by the stripping and doffing device 23.

It will be evident that the improved features described above greatly contribute to the efficiency and performance of the machine. Because of the limited zone of operation of the stationary stripping bars 17, fiber does not tend to accumulate between the bars. Since there is no accumulation or build-up of fiber, there is no tendency for the stripping bars to block or interfere with free movement of the spindles between the bars, and therefore there is no tendency for the spindles to be bent backwardly to the point of causing injury. In general the stripping action is relatively complete, the cotton is continuously removed from the spindles without accumulating in the stripper slots, and fiber left upon the spindles is reduced to a minimum. Elimination of cotton left on the spindles contributes to the efficiency and performance of the machine, particularly because the absence of remaining fiber contributes to better continuity of operation of the machine by reducing time lost in

shutdowns for removal of accumulated cotton in the moistener. In addition substantially complete removal of cotton before the moistening operation greatly facilitates operation of the moistening means and avoids possible injury to the spindles while passing through the moistening means.

In Figure 1 the features just described have been illustrated in conjunction with additional parts of a complete cotton picking machine. Thus an air duct **37** has been shown extending from the stripping and doffing device **23**, and is arranged to receive the cotton delivered from device **23**, and to convey the same to a suitable receiver. A wall **38** is also shown interposed in the path of movement of the spindles before they enter the stripping zone. This wall performs a bumping or tapping operation upon the ends of the spindles, which is desirable in that it tends to loosen the fiber, and to facilitate removal of cotton. In addition the wall is extended to the region of the stripping zone to cause all of the spindles to lag back or assume an angle such as shown in Figure 1, for proper entry and passage between the stripping bars **17**.

It will be evident that the stripping and doffing device **23** can be modified in various ways. Thus as shown in Figure 4 the paddle-like members can be in the form of members **39**, formed of pressed metal, and attached to a metal cylindrical hub **41**. Likewise as shown in Figure 6 the vertically spaced sets of paddle-like members can be staggered, whereby as viewed in plan, one set of members **29** will be spaced circumferentially and intermediate the adjacent set of members. This arrangement is advantageous in that it tends to prevent accumulation of fiber between adjacent vertically spaced members **29**.

This application is a continuation-in-part of my copending application Serial No. 594,985, filed May 21, 1945, now abandoned, entitled "Cotton Picking Machines."

I claim:

1. In a cotton picking machine of the type having vertically spaced rows of rotatable cotton picking spindles movable successively through cotton picking and stripping zones, a plurality of vertically spaced stripping bars mounted upon support fingers in the stripping zone and inclined to the path of movement of the spindles, said stripping bars being so disposed that their egress ends are spaced from the path of travel of the free ends of said spindles a substantial distance in the direction of the other ends of said spindles whereby the free ends of said spindles clear the egress ends of the bars with a free end portion of each spindle projecting beyond the stripping faces of the bars to thereby provide a cotton retaining spindle portion, and a rotary stripping and doffing means disposed adjacent the egress ends of the stripping bars and serving to strip cotton from said cotton retaining portions of the spindles, said stripping and doffing means having elements movable along paths extending between said rows of spindles.

2. In a cotton picking machine of the type having vertically spaced rows of rotatable cotton picking spindles movable successively through cotton picking and stripping zones, a plurality of vertically spaced stripping bars mounted in the stripping zone and inclined to the path of travel of the spindles, said stripping bars being so positioned that their egress ends are spaced from the path of travel of the free ends of said spindles a substantial distance in the direction of the other ends of said spindles whereby the free ends of said spindles clear the egress ends of the bars with the free end portion of each spindle projecting beyond the stripping faces of the bars to thereby provide a cotton retaining spindle portion, and rotary stripping and doffing means disposed adjacent but spaced from the egress ends of the stripping bars and serving to strip cotton from said cotton retaining portions of the spindles, said last means comprising a rotating device having circumferentially spaced rigid paddle-like members disposed to sweep through vertically spaced annular zones extending substantially the entire vertical distance between the rows of spindles, said zones overlapping the free ends of the spindles for a length which is substantially greater than the length of said cotton retaining spindle portions.

3. In a cotton picking machine of the type having vertically spaced rows of rotatable cotton picking spindles movable successively through cotton picking and stripping zones, a plurality of vertically spaced stripping bars mounted in the stripping zone and inclined to the path of movement of the spindles, said stripping bars being so disposed that their egress ends are spaced from the path of travel of the free ends of said spindles a substantial distance in the direction of the other ends of said spindles whereby the free ends of said spindles clear the egress ends of the bars with a free end portion of each spindle projecting beyond the stripping faces of the bars to thereby provide a cotton retaining spindle portion, and a rotary stripping and doffing means disposed adjacent the egress ends of the stripping bars and serving to strip cotton from said cotton retaining portions of the spindles, said last named means comprising a rotating device having circumferentially spaced rigid paddle-like members disposed to sweep through vertically spaced paths defining annular zones extending for substantially the entire vertical distance between the rows of spindles, said zones also overlapping the free ends of the spindles for a length which is substantially greater than the length of said cotton retaining spindle portions, the paths of said paddle-like members being adjacent to but spaced from the egress ends of the stripper bars in the direction in which said spindles move relative to said stripper bars.

MACK D. RUST.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
685,441	Campbell	Oct. 29, 1901
840,367	Piper	Jan. 1, 1907
1,008,229	White	Nov. 7, 1911
2,200,303	Rust	May 14, 1940