June 3, 1941. E. CLARK 2,244,446

MECHANISM FOR DRIVING THE WORKER ROLLS OF WOOL CARDS

Filed April 18, 1939 2 Sheets-Sheet 1

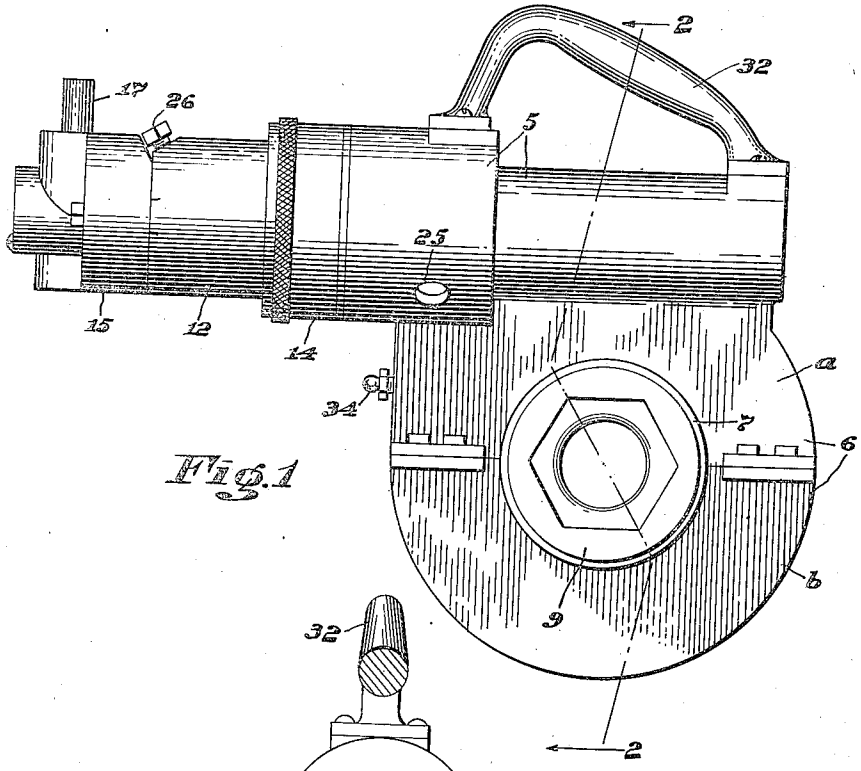


Fig. 1

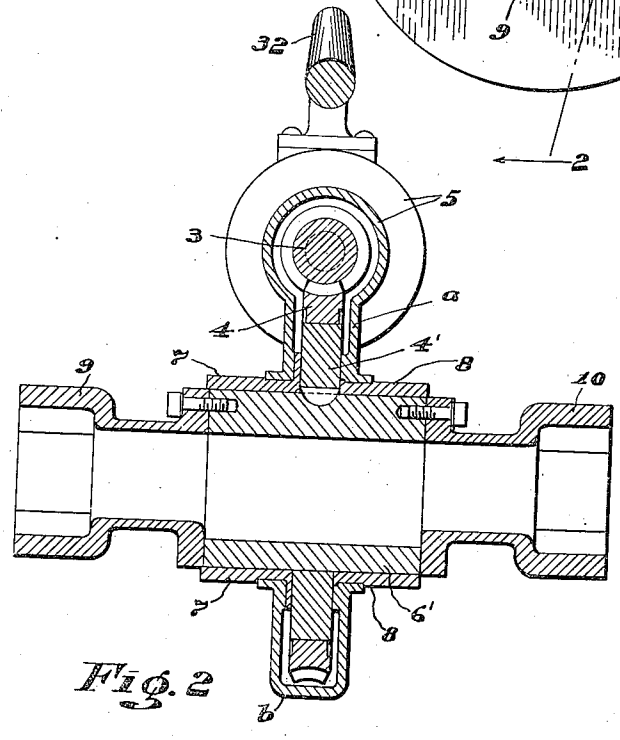


Fig. 2

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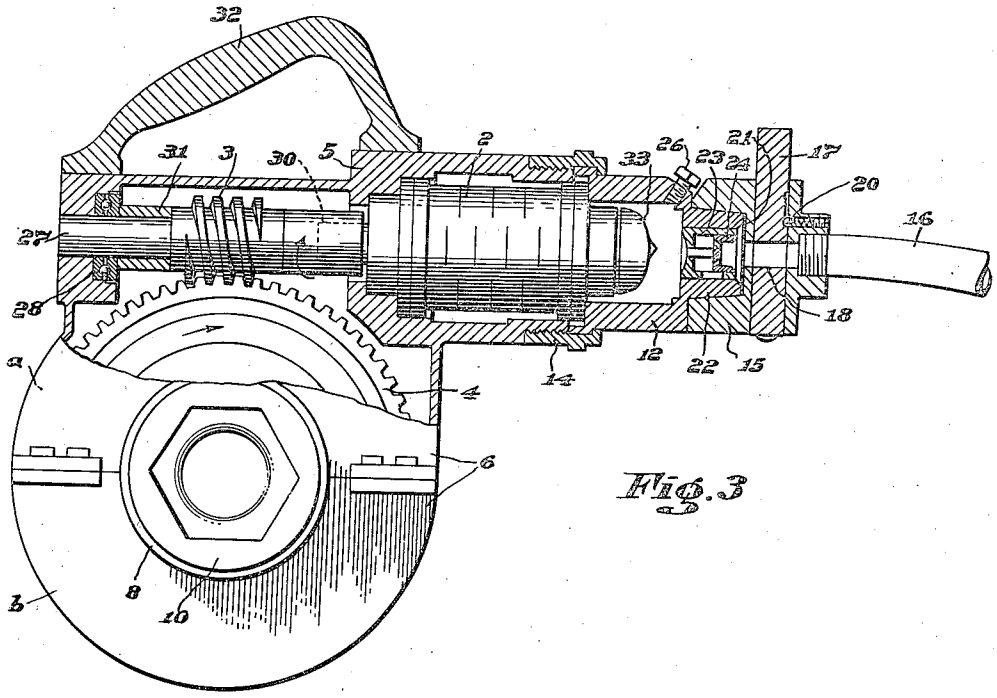


Fig. 3

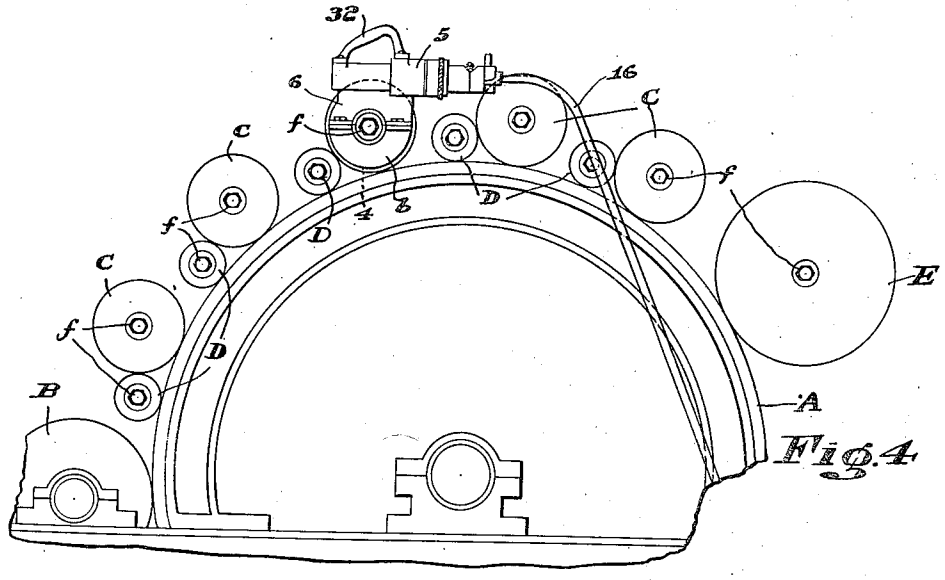


Fig. 4

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Patented June 3, 1941 2,244,446

UNITED STATES PATENT OFFICE

2,244,446

MECHANISM FOR DRIVING THE WORKER ROLLS OF WOOL CARDS

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Application April 18, 1939, Serial No. 268,599

1 Claim. (Cl. 81—57)

This invention relates to apparatus for use in stripping the workers and other small rolls of a wool card during the operation of cleaning such machines.

The fundamental purposes in carding wool are to free the fiber from foreign materials and to arrange the fibers in a more or less parallel relationship to each other. As this operation progresses the rolls and workers become loaded with lint, dust and other foreign materials which must be removed from time to time, since otherwise they would make proper carding impossible. This cleaning operation is commonly known as "stripping." While the length of the runs between stripping operations necessarily will vary with the nature of the work, it must usually be performed at the end of every eight or ten hour intervals, and in many cases more frequently. Also, since the machine is necessarily out of production during the time occupied by stripping, it is important to reduce the time consumed by this operation so far as possible.

In recent years the stripping operation on the larger cylinders, such as the main and doffer cylinders, has been greatly facilitated by the application of vacuum stripping apparatus permanently installed on the machine. It is still impractical, however, to make such installations for stripping the smaller rolls, such as the workers and stripper rolls. Accordingly, it is necessary to strip them by hand. A common method of performing this operation is for the workmen to push the rolls around manually while they comb out the waste material with a hand card. If, however, the machine is equipped for vacuum stripping, then provision is made for attaching a hand nozzle to the vacuum apparatus and one workman revolves a worker or stripper roll by means of a hand crank, while another runs the suction nozzle over the peripheral surface of the roll and removes the foreign material in this manner.

Both these hand methods necessarily are slow, and they involve extremely arduous labor. Furthermore, it is impossible for a man to revolve a worker or stripper by hand at the speed best adapted for vacuum stripping. By either of these hand methods, therefore, the work is performed inefficiently and the machine necessarily is kept out of production for a substantial percentage of each working day.

The present invention is especially concerned with the foregoing considerations and it aims to devise an apparatus with the aid of which both the time and labor involved in stripping the smaller rolls of a wool card can be substantially reduced.

A typical embodiment of the invention is illustrated in the accompanying drawings, in which

Figure 1 is a side elevation of a power unit adapted to revolve the worker or stripper shafts of a wool card at a speed suitable for the stripping operation;

Fig. 2 is a sectional view approximately on the line 2—2, Fig. 1;

Fig. 3 is a view, partly in side elevation and partly in section, showing features of the internal structure of the apparatus; and

Fig. 4 is a diagrammatic view illustrating, in side elevation, a portion of a wool card and showing the manner in which the power unit provided by this invention may be used.

Referring first to Fig. 4, the main cylinder of a typical wool card is there shown diagrammatically at A, the licker-in at B, the worker rolls at C, the stripper rolls at D, and a fancy at E. Since this invention is particularly concerned with the stripping of the auxiliary rolls that cooperate with the main cylinder, such as the workers, strippers, fancy and others, they will all, for convenience, be hereinafter included in the term "workers" or "worker rolls."

The present invention provides a portable power unit designed to be applied directly to any worker roll shaft to revolve that element at a sufficiently high speed for the stripping operation. Because the power unit must be held in place by a workman and must be shifted at very frequent intervals from one worker roll to another, it is important that it be very light in weight. In addition, the unit must be capable of driving the workers in either direction since it will be applied to some machines at the right-hand ends of the workers, whereas in other machines it must be used on the left-hand ends of these elements. A further and important requirement is that such a unit shall revolve the worker shaft at a considerably higher speed than is possible with manual operation. This is desirable not only to produce a more efficient stripping action and to reduce the time required by it, but it is also essential in order to accomplish a satisfactory stripping of the workers by the vacuum process when these elements have been operating on some long staple stocks.

Referring now to Figs. 1 and 2, the apparatus there shown comprises a small high speed rotary compressed air motor 2, Fig. 3, driving a worm 3 which, in turn, drives a worm gear 4. All of these parts are supported by, and are enclosed

in, a casing comprising a tubular portion 5 which houses the motor and the worm and a relatively thin and flat portion 6 in which the gear 4 is located. Preferably this part 6 is split on the horizontal axial plane of the gear into upper and lower sections *a* and *b*, the former being made integral with the casing part 5. In the particular design shown the gear is made up of a toothed rim, which usually is made of brass or bronze, and an intermediate web portion 4' of aluminum or an aluminum alloy. The latter is keyed or otherwise secured to a cylindrical hub 6' for the gear, and this member is rotatably mounted in brass or bronze bushings 7 and 8 which are split on the same plane as the casing 6. Fittings 9 and 10 are secured rigidly to the opposite ends of the hollow hub 6, each of these fittings having a socket of hexagonal form in the outer end thereof.

The motor 2 is of a form readily obtainable on the market as an independent unit, a satisfactory design being supplied by Ingersoll Rand Company of New York city. A small, compact unit of this type is capable of delivering approximately one horsepower at a speed of from four thousand to six thousand R. P. M. when supplied with compressed air of from eighty to one hundred pounds pressure. For convenience in manufacture and assembly this motor is removably mounted in the casing 5 and it is held in place by a sleeve 12, Fig. 3, abutting against the end of the tubular casing member 5, while a shoulder bears against the end of the unit 2, this sleeve being releasably held in place by a nut 14 threaded on to the casing member 5 and having an internal shoulder to bear against a corresponding part of the sleeve 12.

Screwed to the outer end of the sleeve is a valve casing 15 having a hole extending centrally therethrough to conduct air into the sleeve 12 and this casing has provision for the connection thereto of an air supply hose 16. Mounted in the valve casing is a slidable valve 17 provided with a hole 18 to register with the air passage through the casing so that the operator may start and stop the motor 2 merely by moving the valve 17 up or down, as the occasion may require. The spring pressed ball 20 cooperates with the slide 17 to hold it yieldingly in either its open or closed position. After the air passes through the valve port 18 it flows through a screen 21, clamped between the end of a plug 22 and the bottom of the socket in the casing in which socket said plug is mounted, and the air then passes through a valve structure 23 of a form commonly used with motors of this type. It includes a valve plunger 24 normally held off its seat by the action of the air itself, its position, however, being controlled by the centrifugally actuated governor element 33. The exhaust air escapes from the motor 2 through a hole 25, Fig. 1, in the casing 5. Oil may be admitted to the chamber in the sleeve 12 through an opening normally closed by the screw-threaded plug 26.

The worm 3 usually is made integral with the shaft 27 and one end of this shaft is mounted in a ball bearing 28, set into a recess in the casing, while its other end has a splined or other suitable slip connection with the motor shaft 30, Fig. 3. Thus the motor can be removed and replaced by another without disturbing the worm or its shaft. A collar 31, encircling the shaft, bears against the inner race of the ball bearing 28 and enables this bearing to support the shaft both radially and also against the axial thrust which it exerts in driving the gear. Since the shaft 30 is supported in ball bearings in the unit 2 and also supports the right-hand end, Fig. 3, of the worm shaft, these revolving units are completely supported in anti-friction bearings. Lubricant may be introduced into the casing through the fitting 34, Fig. 1, where it will supply all of the friction surfaces between the motor 2 and the fittings 9 and 10. A handle 32 is secured to the side of the casing 5 opposite to the gear casing 6.

In using this apparatus it is customary to equip each of the worker roll shafts with a sleeve rigidly secured to its end and fitting snugly over the shaft, the outer surface of the sleeve, however, having a cross-sectional shape complemental to that of the sockets in the fittings 9 and 10. This enables the operator to connect the power unit instantly to any worker shaft or to disconnect it therefrom, since either fitting may be slipped on or off the sleeve. In Fig. 4 some of these sleeves are indicated at *f*.

Preparatory to starting the stripping operation on a card, the workman shuts down the machine and disconnects the usual driving chain or belt which ordinarily is employed to operate the workers. He then applies the unit to the end of one of the worker roll shafts, as shown in Fig. 4, slipping one of the sockets 9 or 10 over the sleeve *f* on the end of said shaft. He next opens the valve 17, thus admitting compressed air to the motor 2, and he holds the power unit in this position while it revolves the roll and while another workman goes over the surface of the roll with a vacuum nozzle. As soon as the stripping operation has been completed on one worker, the workman shuts off the motor, withdraws it from its engagement with the worker roll shaft, and moves to the next one. He repeats the operations above described on each successive worker until the entire stripping operation has been completed.

Thus the workman is enabled to proceed rapidly with the stripping of all of the workers of the entire set. He can perform this operation much more rapidly than would otherwise be possible because of the fact that the power unit drives the worker at a faster speed than is possible manually and at a rate better adapted to efficient stripping. For example, in many cases it is desired to use a stripping speed of between four hundred and six hundred R. P. M. and any such speed obviously is impossible to produce by hand.

By employing light weight alloys wherever possible in the manufacture of this unit and using the light weight high-speed motor 2, the entire assembly can be made so light in weight that the handling of it required in performing the stripping operation is not arduous. Also, by shifting ends of the apparatus the worker roll may be driven in either direction necessary. This is a substantial convenience in enabling the operator to work from either side of the machine.

While I have herein shown and described a preferred embodiment of my invention, it will be understood that minor modifications may be made without departing from the spirit or scope thereof.

Having thus described my invention, what I desire to claim as new is:

A power unit for driving the worker rolls of a wool card comprising, in combination, a high speed rotary compressed air motor, a worm

driven by said motor, a worm gear meshing with said worm and driven thereby, a casing enclosing said parts, said worm being mounted on a worm shaft in line with and directly but releasably connected with the shaft of said motor and said casing including a tubular section housing said motor and said worm and a relatively thin portion extending laterally from one side of said tubular section and enclosing said gear, a sleeve at the outer end of said section cooperating with the latter to enclose said motor, said motor being adapted to be installed in and removed from said casing as a unit, screw-threaded means cooperating with said casing section and said sleeve to releasably secure the motor in its operative position in the casing, a fitting on said worm gear adapted to be releasably engaged with the end of the worker roll shaft to drive the latter, and a handle secured to the opposite side of said tubular portion from said thin casing section enclosing the gear, whereby the unit may be held in its operative position on a worker roll shaft by grasping the handle in one hand and said thin casing section in the other.

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