Nov. 3, 1964 W. M. JONES 3,155,320

ROTOR AND ROVING CUTTER MOUNTING MEANS FOR A SPRAY GUN

Filed Feb. 27, 1963 2 Sheets-Sheet 1

Fig. 1.

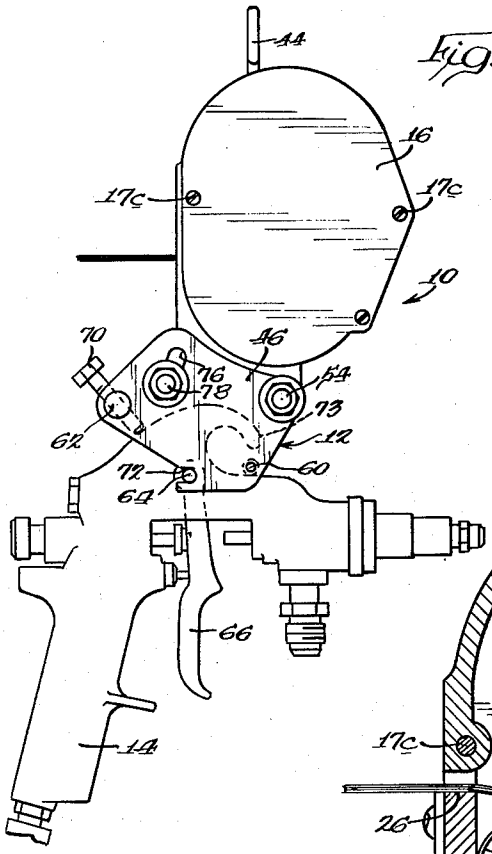
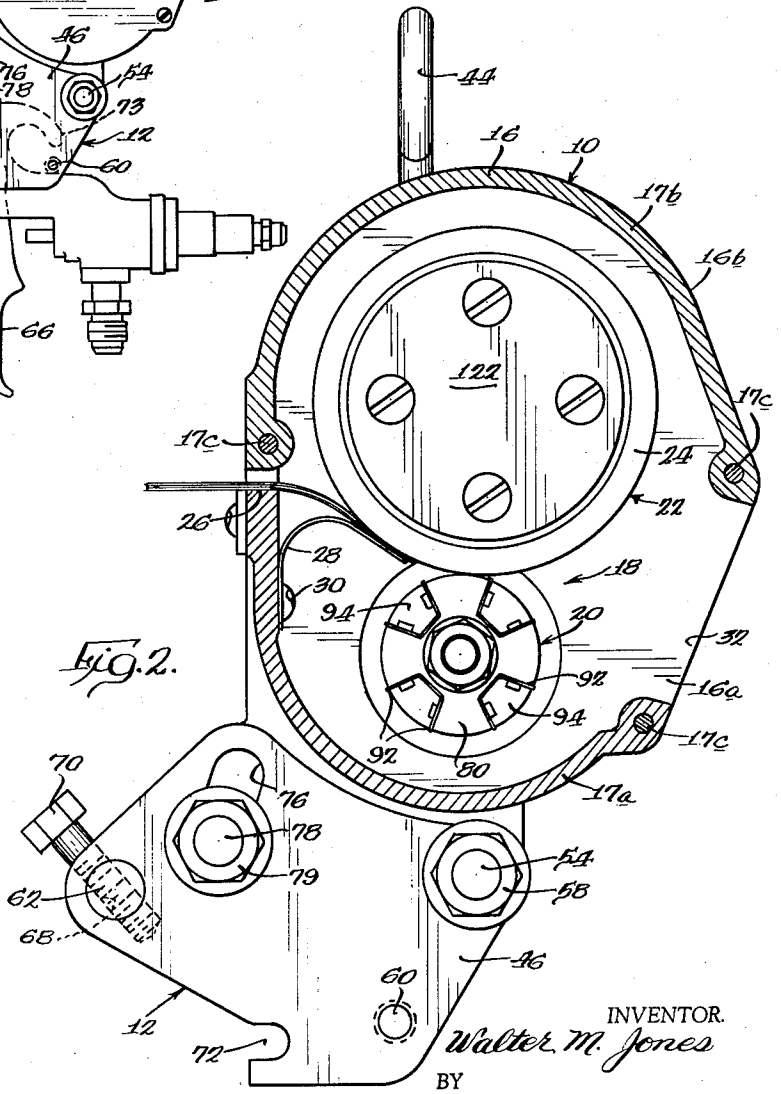


Fig. 2.



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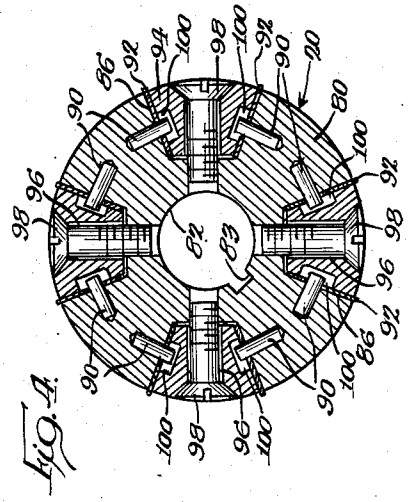


Fig. 4.

Fig. 3.

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United States Patent Office 3,155,320 Patented Nov. 3, 1964

3,155,320

ROTOR AND ROVING CUTTER MOUNTING MEANS FOR A SPRAY GUN

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Filed Feb. 27, 1963, Ser. No. 261,365
6 Claims. (Cl. 239—289)

This invention relates to roving cutters and more particularly to apparatus for cutting or chopping fiberglass roving into a plurality of strands or ends.

In the initial stages of the art, roving cutters were separate devices and were used in conjunction with spray guns to spray resin coated fiberglass strands onto a form for making articles of fiberglass reinforced resin. A disadvantage of the arrangement was that the movement of the roving cutter had to be coordinated with the movement of the spray gun for effective coating of the strands as they were fed onto the surface of the form. To overcome the disadvantage, roving cutter attachments have been made for resin spray guns, but these attachments have suffered the disadvantages of requiring special spray gun constructions or modification of existing guns to accommodate the cutter, and of being inflexible with respect to the collision angle of the strands and the liquid resin. Known roving cutter attachments generally could not be adjusted to suit the individual requirements of a particular operator, required removal of at least the conventional gun hook to accommodate securing the attachment in position, and once secured in position could not readily be removed.

An object of the present invention, therefore, is to provide a roving cutter which can be conveniently attached to and removed from a conventional spray gun without alteration of the gun and which can be adjusted for varying the angle of collision of the strands with the liquid resin.

In addition to the foregoing, it is an object of the invention to provide an improved cutter rotor for roving cutters including means facilitating replacement of worn cutter blades.

A further object of the invention is the provision of an improved rotor as above defined wherein the blades comprise standard injector razor blades so mounted that insertion and removal of the same is greatly facilitated.

Now, in order to acquaint those skilled in the art with the manner of making and using my improved roving cutter, I shall, describe, in connection with the accompanying drawings, a preferred embodiment of the cutter and the preferred manner of making and using the same.

In the drawings:

FIGURE 1 is a side elevation of a roving cutter made in accordance with the present invention shown in operative position on a spray gun;

FIGURE 2 is an enlarged side view, partly in elevation and partly in section, of the roving cutter of FIGURE 1 together with the mounting assembly therefor;

FIGURE 3 is an end view, partly in elevation and partly in section, of the roving cutter and mounting assembly of FIGURE 2; and

FIGURE 4 is a cross-sectional view of the cutter rotor taken substantially on line 4—4 of FIGURE 3.

Referring now to the drawings, and particularly to FIGURES 1 and 2, the roving cutter of the present invention is indicated by reference numeral 10 and is secured by means of a mounting assembly 12 to a spray gun 14. Continuous rovings of fiberglass or the like are fed to the cutter 10 from the left and cut strands or ends are discharged to the right (as viewed in FIGURE 1) into the spray pattern of the spray gun 14

where they are coated by and carried along with a spray of liquid resin for deposit on a form or mold to make a reinforced coating.

The cutter 10 includes a housing 16 within which is mounted a cutting assembly 18 including a cutter rotor 20 and a cooperating roll 22 having a resilient rim or tire 24 of rubber, neoprene or the like. The roving passes into the housing 16 through an inlet 26 and is pressed into engagement with the periphery of the rim 24 by means of a flat spring 28 secured to the housing 16 by a screw 30. The roving is fed into the bight between the rotor 20 and the roll 22 where it is cut into ends or strands by the rotor 20 and then discharged from the housing 16 through an outlet 32.

Referring to FIGURE 3, the rotor 20 is illustrated as being driven by an air motor 34 having a shaft 35. Compressed air is supplied to the motor 34, from a suitable source, to an inlet 36. The flow of air is controlled by a metering valve 38 and a thumb or finger actuated on-off valve 40. Noise is suppressed by means of a muffler 42. The combined roving cutter and spray gun as illustrated in FIGURE 1 may be conveniently stored by the use of an eye-bolt 44 shown in FIGURES 2 and 3.

According to the present invention, the roving cutter 10 may be quickly and easily attached to and detached from the spray gun 14. To this end, the mounting assembly 12 includes spaced parallel mounting plates 46 and 48 of generally rectangular form which are apertured near their upper front corners at 50 and 52 respectively for reception of a bolt 54 which passes through a bore 56 in the housing 16 and is provided with a nut 58, thereby pivotally and detachably to mount the assembly 12 on the housing 16. The mounting plates 46 and 48 are secured together adjacent their lower front corners by a pin 60 and adjacent their lower rear corners by a stud 62 rotatably engaged in the plates. The stud 62 is provided intermediate its ends with a diametric threaded bore 68 in which is threadedly received a setscrew 70.

The assembly 12 is attached to the spray gun 14 by means of the conventional pintel pin 64 which extends through the body of the spray gun and constitutes a pivot for the gun trigger 66. Each of the mounting plates 46 and 48 is formed with a rearwardly open slot 72 in the intermediate area of its lower edge portion in which is received a respective end of the pintel 64.

To secure the roving cutter 10 in the position illustrated in FIGURE 1, the mounting assembly is arranged so that the ends of the pintel pin 64 are received in the slots 72. The setscrew 70 is then tightened to rotate the mounting assembly 12 about the axis of the pintel 64, until the pin 60 is brought into firm engagement with the top of the spray gun 14. During tightening, the stud 62 is free to rotate so that the set screw will set up effectively against the adjacent surface of the gun body, specifically the upwardly and forwardly sloped rearward surface of the hook 73, thereby to force the pin 60 against the top of the gun, to force the plates rearwardly into firm engagement with the pintel 64 and to lock the screw against the hook 73. By virtue of the upstanding plates 46 and 48 of the assembly, the roving cutter of the present invention may thus be mounted on any conventional spray gun 14 without the necessity for removal of the hook 73 or any other modification of the gun. To remove the roving cutter 10 from the gun it is necessary only to back off the setscrew 70 until the mounting plates 46 and 48 may be slipped away from the pintel 64.

According to another important feature of the present invention, the roving cutter 10 is angularly adjustable with respect to the spray gun 14 so that the angle of collision of the strands discharged from the outlet 32 of the hous-

ing 16 with the spray pattern of the resin sprayed from the gun may be adjusted at will to suit the requirements of a particular job or to satisfy the desire of a particular operator. To this end, the mounting plates 46 and 48 are pivotally connected adjacent their upper front corners to the cutter housing 16 by the bolt 54 and are provided adjacent their upper rear corners with generally vertically disposed arcuate slots 76, the axis of curvature of which is the bolt 54. A bolt 78 provided with nut 79, extends through the slots 76 and an intervening portion of the cutter housing 16. As will be obvious, the cutter 10 may be pivoted in a clockwise direction about the axis of the bolt 54, as viewed in FIGURES 1 and 2, by loosening the bolt and nut 78–79. After pivotal adjustment of the cutter 10 has been effected, within the limits permitted by the slots 76, the cutter may be secured in its adjusted angular position merely by tightening the fastener 78–79.

A further important feature of the present invention is the provision of a new and improved cutter rotor for the cutter 10. Referring particularly to FIGURE 4, the rotor 20 has a body portion 80 and a central bore 82 having a keyway 83 for a key 84 (see FIGURE 3). The body portion 21 is generally cylindrical in configuration and is formed with a plurality of circumferentially spaced longitudinally extending slots 86 each having radially extending side walls and being of substantially frusto-conical configuration in cross-section. Projecting perpendicularly from each side wall of each slot are a pair of longitudinally spaced pins 90, each pair of which mounts a suitably apertured blade 92. Each blade 92 has a sharp edge projecting slightly beyond the periphery of the body section of the rotor 20. As the roving passes into the bight between the rotor 20 and the roll 22 the projecting edges of the blades act against the resilient rim 24 of the roll 22 to effect severance of the roving into indivdual strands. The blades 92 are preferably readily available razor blades of the injector type which are economical and which may be easily and conveniently replaced when worn.

To facilitate installation and replacement of the blades, there is provided in each of the slots 86 a plug 94 also of substantially frusto-conical configuration but having an arcuate outer surface conforming to the curvature of the periphery of the body portion 80 of the rotor 20. Formed in each of the plugs 94 are a pair of longitudinally spaced radially extending bores 96 which each receive a cap-screw 98, that threadedly engages in a tapped bore in the bottom wall of the respective slot 86. To facilitate placing of the plugs 94 as illustrated in FIGURE 4, each side wall of each plug is formed with a longitudinally extending slot 100 within which are received the respective pair of pins 90.

By virtue of the above described construction, the blades 92 and the plugs 94 are positively retained by the pins 90 against disassociation from the rotor even if the screws 98 come loose, whereby the blades cannot fly off the rotor during operation of the cutter.

To facilitate access to the rotor, the cutter housing 16 is formed in two parts, namely, a main body 16*a* and a removable wall section 16*b*. The body 16*a* includes a relatively thick side wall which mounts the rotor 20, the roll 22 and the air motor 34, a bottom section to which the assembly 12 is connected, and a partial peripheral wall 17*a* enclosing the lower side of the cutting assembly 18. The wall section 16*b* is comprised simply of an exterior side wall (seen in FIGURE 1) and a partial peripheral wall 17*b* enclosing the upper side of the cutting assembly; the section 16*b* being secured to the section 16*a* by three screws 17*c*.

To replace the cutter blades when the same are worn, it is only necessary to remove the housing section 16*b* by removal of the screws 17*c*. The rotor 20 is then exposed at the front of the cutter assembly, whereby the rotor may be rotated sequentially to dispose the plugs 94 to the front, in which position the screws 98 may readily

be removed. The respective plug 94 may then be slid sidewardly (to the left as viewed in FIGURE 3) to remove the same from the pins 90, after which the two respective blades 92 may be removed and replaced by fresh blades. By sliding the plug 94 in between the two new blades and re-associating the plug with the two sets of pins 90, the blades and plug are loosely retained in place to facilitate re-assembly of the screws 98 and rigid securement of the blades, plug and screws. By repeating the described operations at each of the plugs 94, the entire set of blades may conveniently be renewed, after which the housing section 16*b* may be re-assembled and the cutter put back in use.

In addition to the foregoing, the plugs 94 facilitate use of any desired number of blades thereby to facilitate cutting or chopping of the roving into any desired length. With a rotor 1¼ inches in diameter having four plugs 94 so assembled as normally to mount eight equally spaced blades 92 (as shown in FIGURE 4), the cutter may readily be adjusted (by use of all or less than all of the blades) to discharge strands or ends having a length of approximately ½, 1, 2 or 4 inches. Also, a combination of such strand lengths could be provided for, e.g., strands of both ½ inch and 1 inch in length.

Further in accordance with the present invention, the cutter rotor 20 is of particularly economical construction in that both the rotor body 80 and the plugs 94 comprise continuous extrusions cut to appropriate lengthwise dimension.

The rotor is conveniently mounted on the shaft 35 of the air motor 34 by the key 84 engaging in the keyway 83 and a nut 102 threaded on the outer end of the shaft and confining the rotor between itself and a shoulder on the shaft. The motor 34 in turn is detachably mounted in the cutter housing by means of an adapter 104 secured to the motor by set screws 106, and a lock screw 108 locking the adapter in the housing.

The cooperative rubber tired roller 22 is also detachably mounted in the housing by a shaft 110 which bolts the inner race of a bearing 112 to the housing body 16*a*. Preferably, the shaft 110 extends through an enlarged hole in the housing and a set screw 114 is provided for adjusting said shaft in said hole radially of the rotor 20 and roller 22 to adjust the cutting pressure between the two. The outer race of the bearing 112 has press-fitted thereto a cylindrical sleeve 116 having a pair of annular grooves in its periphery, each of which receives a friction ring 118. Frictionally coupled to the sleeve 116 by the rings 118 is a tubular backing 120 for the rubber tire 24, the backing member being retained in place by a face plate 122 detachably secured to the sleeve 116. The tire 24 is preferably vulcanized to its backing tube. By removal of the face plate 122, the tire 24 and tube 120 may readily be replaced whenever it is deemed desirable.

The roving cutter of the present invention thus exhibits important advantages over roving cutters heretofore known; notably, the unique and economical rotor structure in which the cutting blades may be quickly and conveniently replaced, and the novel construction and mounting of the cutter components for ease of assembly and repair. Furthermore, the present roving cutter may be used as an attachment for a conventional spray gun, without modification of the gun, and when so used, is quickly and easily secured to and detached from the gun and its angular relation to the gun is easily adjusted for optimum convenience. Consequently, the objects and advantages of the invention have been shown herein to be attained in a convenient, economical and practical manner.

While a presently preferred embodiment of the invention has been described for purposes of disclosure, changes in details of construction and arrangement of parts may be made without departing from the scope of the invention as defined by the appended claims.

I claim:

1. A rotor for a roving cutter comprising a body, a plurality of circumferentially spaced longitudinally ex-

tending slots in the periphery of said body, a pair of pins projecting from each side wall of each slot, a blade in at least one of said slots engaging a side wall thereof, said blade having an edge extending beyond the periphery of said body and a pair of openings in register with and receiving the respective pair of said pins, a plug mounted in each of said slots, each of said plugs having a cross-section substantially conforming to the cross-section of said slots, having at each side thereof a longitudinally extending recess in register with and receiving the adjacent pair of pins and having a bore therethrough for reception of fastener means for securing said plug to said body.

2. A rotor for a roving cutter comprising a substantially cylindrical body having a central bore for reception of a drive shaft, a plurality of circumferentially spaced longitudinally extending slots in the periphery of said body, said slots being substantially frusto-conical in cross-section, a pair of pins projecting from each side wall of each slot substantially normal thereto, a blade in at least one of said slots engaging a side wall thereof, said blade having an edge extending beyond the periphery of said body and having a pair of openings in register with and receiving the respective pair of said pins, a plug in each of said slots, each plug being of a cross-section substantially conforming to the cross-section of said slots, each plug having at each side thereof a longitudinally extending slot in register with and receiving the adjacent pair of pins and a plurality of longitudinally spaced radial bores, and fasteners extending through said bores into said body for securing each plug to said body.

3. Means for mounting a roving cutter attachment atop a standard spray gun, comprising a pair of spaced parallel mounting plates connected to the attachment and adapted to receive the spray gun therebetween, a pin connecting said plates and adapted to rest upon the top of the spray gun, each of said plates having a slot for reception of the trigger pintels extending oppositely outwardly from the sides of the spray gun, a stud extending between said mounting plates, and a set screw threaded through said stud adapted to engage the spray gun to pivot said mounting plates about the pintels to force said pin into engagement with the top of the spray gun.

4. Means for mounting a roving cutter attachment atop a spray gun having a gun supporting hook, comprising a pair of spaced parallel mounting plates connected to the attachment and adapted to receive the spray gun therebetween and to space the attachment above the gun, a pin connecting said plates and adapted to rest upon the top of the gun forwardly of the hook, each of said plates having a rearwardly open slot for reception of the gun trigger pintels extending oppositely outwardly from the sides of the gun, a stud journalled between said mounting plates rearwardly of the hook, and a set screw threaded through said stud adapted to engage the rear surface of the hook to pivot said mounting plates about the pintels

to force said pin into engagement with the top of the spray gun and to move said plates rearwardly into firm engagement with the trigger pintels.

5. A combined spray gun and roving cutter wherein the gun has at the top thereof an integrally formed hook including an upwardly and forwardly sloping rear surface and a trigger including pintels projecting outwardly from opposite sides of the gun forwardly of and below said surface, and wherein the roving cutter has a cutter housing disposed above the gun, a mounting assembly connected to said housing including a pair of spaced parallel plates receiving therebetween the upper portions and the hook of said gun, a pin extending between and connecting said mounting plates and engaging the upper surface of the gun forwardly of said hook, each of said mounting plates having a rearwardly open slot receiving one of said pintels, a stud journalled between said mounting plates rearwardly of said hook, and a set screw threaded through said stud and engaging said rear surface of said hook to swing said pin into engagement with the top of said gun frame and to force said plates rearwardly into firm engagement with said pintels.

6. A combined spray gun and roving cutter comprising a gun having at the top thereof an integrally formed hook including an upwardly and forwardly sloping rear surface and a trigger including pintels projecting outwardly from opposite sides of the gun forwardly of and below said surface, a roving cutter having a cutter housing, a mounting assembly pivotally connected to said housing including a pair of spaced parallel plates receiving therebetween the upper portions and the hook of said gun, a pin extending between and connecting said mounting plates and engaging the upper surface of the gun forwardly of said hook, each of said mounting plates having a rearwardly open slot receiving one of said pintels, a stud journalled between said mounting plates rearwardly of said hook, and a set screw threaded through said stud and engaging said rear surface of said hook to swing said pin into engagement with the top of said gun frame and to force said plates rearwardly into firm engagement with said pintels, each of said mounting plates having an elongate arcuate slot the axis of curvature of which coincides with the pivotal connection of said housing and said mounting assembly, and a fastener extending through said housing and said slots for angularly adjusting said housing with respect to said mounting assembly and said gun.

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