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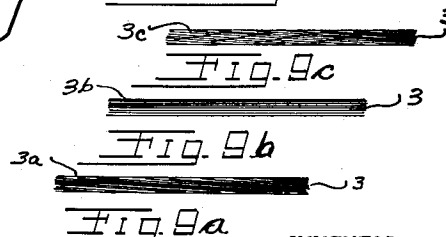
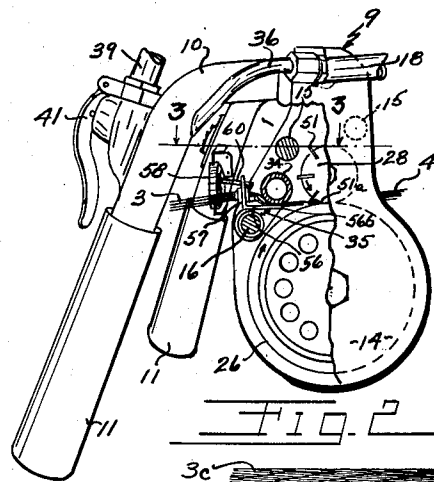
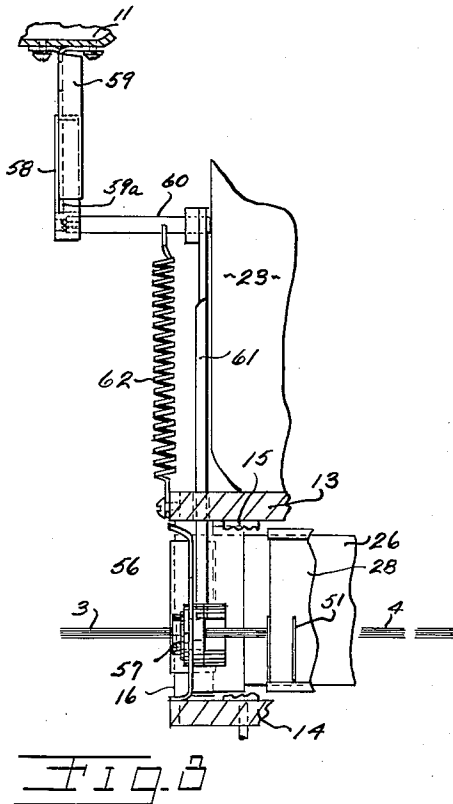
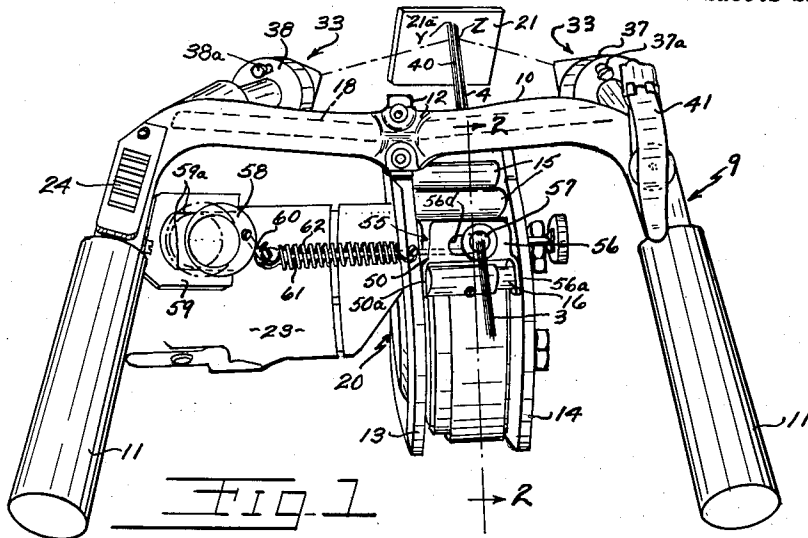
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3,117,376

MEANS FOR DEPOSITING ROVING IN FIBER-RESIN LAMINATE

Filed April 18, 1960

2 Sheets-Sheet 1



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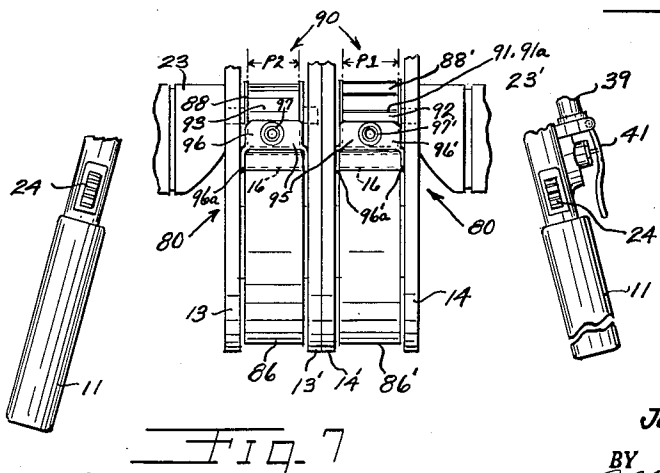
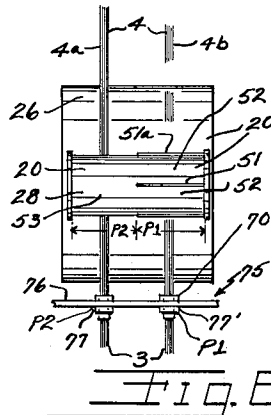
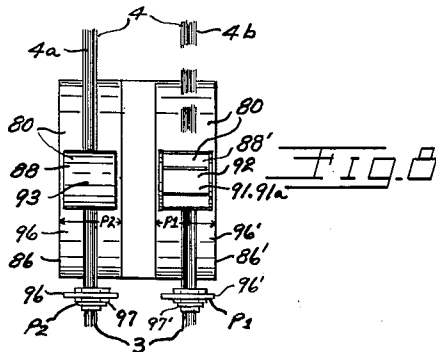
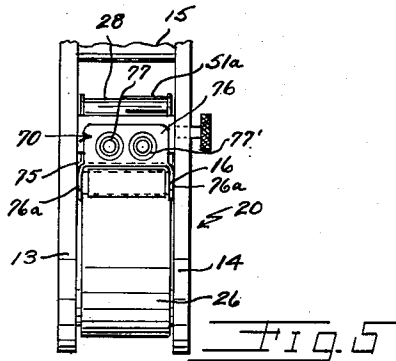
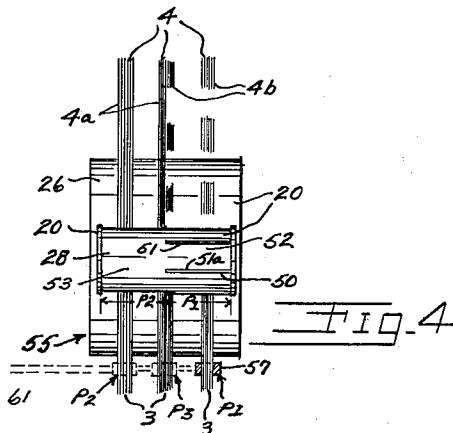
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MEANS FOR DEPOSITING ROVING IN FIBER-RESIN LAMINATE

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2 Sheets-Sheet 2



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MEANS FOR DEPOSITING ROVING IN FIBER-RESIN LAMINATE

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This invention relates to improvements in a fiber depositor apparatus.

One of the objects of the present invention is to provide a fiber depositor apparatus or gun for making from incoming continuous roving, having a plurality of fiber strands, a reinforced plastic laminate by depositing on a surface with a liquid plastic this aforesaid roving either as a dispensed continuous roving as one type fibers or as dispensed chopped lengths of said strands as other type fibers.

A further object of the present invention is to provide the aforementioned features, and many other features, in a single portable fiber depositor gun or apparatus.

A further object of the present invention is to provide a fiber depositor gun with manually controlled means for controlling the relative quantity of each of the aforesaid type fibers fed by the gun.

A further object of the present invention is to provide a fiber depositor apparatus or method for feeding incoming continuous roving, having a plurality of fiber strands, toward a surface as dispensed continuous, closely bunched roving strands; laterally dispersed, continuous roving strands; or short lengths of fiber strands.

A further object of the present invention is to provide a fiber depositor apparatus characterized by its structural simplicity, economy of manufacture, multiplicity of operating features, and feature of receiving continuous roving and depositing this roving as either continuous roving or chopped lengths of roving in any desired pattern on a surface.

Other features of this invention reside in the arrangement and design of the parts for carrying out their appropriate functions.

Other objects and advantages of this invention will be apparent from the accompanying drawings and description and the essential features will be set forth in the appended claims.

In the drawings,

FIG. 1 is a perspective view of a first form of fiber depositor gun or apparatus;

FIG. 2 is a right side elevational view of this gun with portions vertically sectioned generally along line 2—2 in FIG. 1;

FIG. 3 is a horizontal sectional view taken generally along the line 3—3 in FIG. 2;

FIG. 4 is a schematic enlargement of a portion of FIG. 3;

FIG. 5 is an enlarged view of a portion of FIG. 1 but with the fiber depositor apparatus having a second form;

FIG. 6 is an enlarged top plan view of a portion of FIG. 5;

FIG. 7 is a perspective view of a portion of FIG. 1 but with the fiber depositor apparatus having a third form;

FIG. 8 is a top plan view of a portion of FIG. 7; while

FIGS. 9a, 9b and 9c illustrate three different types of continuous roving adapted to be handled as incoming roving by any form of this apparatus.

Before the apparatus here illustrated is specifically described, it is to be understood that the invention here involved is not limited to the structural details, arrangement of parts, or method step here shown or described since an apparatus, structure, or method embodying the

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present invention may take various forms. It is also to be understood that the phraseology or terminology herein employed is for purposes of description and not of limitation since the scope of the present invention is denoted by the appended claims.

Apparatus 9 is disclosed herein as a fiber depositor gun or apparatus 9 for making a dispensed roving 4 (shown generally as roving 4) from incoming continuous roving (shown generally as roving 3), having a plurality of longitudinally extending, closely bunched, continuous fiber strands. Apparatus 9 forms a reinforced plastic laminate by depositing in zone Y on surface 21a with liquid plastic this dispensed roving 4 in the form of either dispensed continuous roving 4a as one type fiber or dispensed chopped lengths 4b of said strands as another type fiber.

This apparatus is especially designed to replace the hand lay-up method of making glass fiber reinforced plastic products.

Satisfactory results have been obtained with fiber glass roving 3 having approximately 60 fibers, fiber strands, or ends with each of these strands having approximately 202 filaments each having a diameter of approximately 0.00039 inch. The strands and fibers extend generally longitudinally in the continuous roving. It is desirable that each strand have good "integrity" so as to hold its filaments in a single strand. Integrity depends upon the finish on the filaments and strands. Good strand integrity is desirable for many purposes. Good strand integrity may be defined as the finish on the fibers and filaments resisting wetting. The incoming continuous roving 3 received by the apparatus may have its strands twisted into twisted roving 3a in FIG. 9a, may have generally straight strands shown as straight roving 3b in FIG. 9b, or may have its strands interlocked in random orientation in spun roving 3c in FIG. 9c. Each roving 3a, 3b and 3c has generally longitudinally extending strands. The helix formed by the twisted strands in roving 3a may be of any suitable pitch. Good results have been obtained with a twist of one twist per one foot length of roving.

Fibers 4a and 4b are shown in the drawings, only for purposes of illustration, as formed with a straight line pattern from straight roving 3b. However, it should be apparent that fibers 4a and 4b can instead take the pattern shown by rovings 3a and 3c.

It should be apparent that not only fiber glass fibers but also any other suitable fibers may be used in the apparatus.

The apparatus 9 has a frame in FIGS. 1 and 2. Tubular handle 10, having two handle grip handles 11 secured at its opposite ends, is secured at its mid-portion by screws 12 to left side wall 13 of the frame. Right side wall 14 is secured in parallel relationship to wall 13 by suitable spacers 15, 15 and 16 in FIGS. 1 and 2 detachably secured at opposite ends to these walls by screws. Spray nozzle manifold tube 18 is clamped intermediate its ends in wall 13 by screws 12.

Feeding means or unit 20 on gun 9 feeds continuous fiber roving 3 from a supply into gun 9 and directs its fibers toward surface 21a on article 21 to be coated, as shown in FIG. 1. Electric motor 23, either a constant speed motor or an adjustable and variable speed motor whichever is preferred, is mounted in FIG. 1 on wall 13 and is controlled by electric switch 24 on handle 11. Switch 24 may be of the two position, on-off type or may be a variable speed control switch for controlling the speed of motor 23. Motor 23 is drivingly connected to and rotates smooth metal feed roll 28 in FIGS. 1 and 2, which roll rotates feed roll 26, having a rubber outer sleeve, by peripheral contact friction. These power

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driven feed rolls 26 and 28, rotatably supported on parallel shafts respectively extending between walls 13 and 14, feed through their bight roving 3 toward surface 21a.

Continuous fiber glass roving 3 is fed in FIG. 2 into the apparatus by having this continuous roving (either as twisted roving 3a in FIG. 9a, straight roving 3b in FIG. 9b, or spun roving 3c in FIG. 9c) threaded through roving guide ring hole 57 on roving guide shoe plate 56 having turned down opposite ends 56a pivotally carried on spacer 16 and straddled by side walls 13 and 14 to prevent endwise movement of plate 56 along spacer 16; then between rubber sleeve 34, rotatably mounted between walls 13 and 14, and portion 56b of plate 56 biased counterclockwise in FIG. 2 into tangential contact with sleeve 34 by tension spring 35, secured at opposite ends to portion 56b of plate 56 and to spacer 16, to provide frictional drag on the roving; and then between feed rolls 26 and 28. As motor 23 is driven, feed rolls 26 and 28 rotate in the direction of the arrows in FIG. 2 to draw roving 3 therebetween to feed the fibers toward the right in FIG. 2.

Although feed rolls 26 and 28 are specifically disclosed herein for feeding the roving, it should be readily apparent that any suitable feeding means may be provided for feeding continuous roving 3 toward surface 21a.

Control means or unit 50 is provided on the frame of gun 9 for controlling the relative quantity of each type fiber fed from the gun with these types including dispensed continuous roving 4a and dispensed chopped lengths 4b in FIG. 4. This unit 50 includes a suitable roving guide means or unit 55 on frame for guiding incoming roving 3 into the bight of feed rolls 26 and 28. Unit 55 includes the aforementioned guide hole 57 through which roving 3 is threaded. Also, control unit 50 includes a cutting edge 51a carried by one roll portion in a first position P1 in FIG. 4 for forming chopped length fibers 4b upon rotation of the feed rolls, and includes another roll portion 53 without a cutting edge in a second position P2 in FIG. 4 for providing continuous type roving 4a. The aforementioned guide hole 57 guides incoming roving 3 to the bight of feed rolls 26 and 28 in the appropriate position P1 or P2 for dispensing the desired type fibers 4a or 4b.

Now, it should be apparent that a single gun or fiber depositor apparatus 9 feeds several types of fibers 4a or 4b selected by suitable manual control. As will be more apparent hereinafter, the gun 9 will feed only continuous type fibers 4a, only chopped type fibers 4b, or will feed simultaneously both type fibers 4a and 4b. These chopped fibers may be of any suitable length determined by the construction and operation of gun 9.

Spray unit 33 is provided on gun 9 in FIG. 1. Air tube 18 supplies air from a source through line 39, valve 41 and lines 36 and 18 to spray heads 37 and 38 for dispensing respectively accelerated resin and catalyzed resin, which comprises the plastic compound or liquid plastic, flowing under pressure from resin sources through inlets 37a and 38a respectively on spray heads 37 and 38 with the discharge rates of these heads independently controllable by conventional adjustable fluid controls to correspond with the amount of fibers deposited. Control of spray air to these heads is obtained by on-off air valve 41, normally spring biased to off position, located between lines 39 and 36. Spray heads 37 and 38 have conventional adjustable air throttle valves to regulate the amount of air from line 18 for breaking up the fluid in each head into droplets.

In operation, the operator supports the fiber depositor apparatus or gun 9 by hand grip handles 11 and depresses switch 24 and valve 41 so gun 9 receives incoming roving 3 and feeds out dispensed roving 4 to lay up a reinforced plastic laminate on surface 21a. The liquid plastic fluid streams, fed from heads 37 and 38, converge at zone Z in FIG. 1 on the travel path 40 of the fiber strands of dispensed roving 4, and then the wetted fibers thereof

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are deposited beyond zone Z in a desired pattern (determined by suitable movement of gun 9) in zone Y over surface 21a in FIG. 1 in a fiber-resin laminate with the fibers embedded therein for making a reinforced plastic laminate. After each layer is deposited on article 21, it is rolled down by hand to make an air free laminate.

This dispensed roving 4 includes only continuous type fibers 4a, only chopped type fibers 4b, or both type fibers 4a and 4b.

Continuous type fibers 4a have desirable uses. These fibers 4a, of long uncut lengths, are generally grouped together on surface 21a and directionally oriented in the same direction so that they produce finished parts with higher flexural modulus, structural bursting strength, and flexural strength than chopped type fibers. Such type fibers may be desirably used on the bottom of a fiber glass boat to give it a rock penetration resistance with the tough continuous roving 4a imbedded therein.

Chopped length fibers 4b have desirable uses. These short lengths of fiber strands, when generally uniformly spread over surface 21a, give a generally uniform strength to the laminate. The random orientation of these fibers provides the finished part with a high mechanical strength, and a generally homogeneous construction. This contrasts with the directional strength characteristics obtained by using continuous roving 4a. Chopped length 4b are also desirably used when spraying on a vertical wall surface 21a because the continuous roving 4a would tend to be pulled downwardly by the weight of the fibers. Therefore, when constructing a boat, it may be desirable to construct the boat upside down with continuous roving 4a sprayed onto the horizontal top surface forming the bottom of the boat, and chopped lengths 4b sprayed onto the side walls.

It may also be desirable under some conditions to simultaneously dispense from gun 9 both type fibers 4a and 4b to get a desirable combination of the aforementioned features of these two type fibers.

When the desired length of continuous roving 4a has been dispensed, it may be cut by a scissors, knife, cutting edge 51a in FIG. 4, or any suitable blade.

Spray heads 37 and 38 are mounted by ball and socket joints to opposite ends of tube 18 so that the angle of the heads may be adjusted to suit the shape of travel path 40 followed by the fibers of the dispensed continuous roving 4.

Of course, if desired, the fibers of continuous roving 4 may be deposited by gun 9 on a previously or subsequently wetted surface 21a without using spray heads 37 and 38 by keeping valve 41 in off position.

It will be apparent hereinafter that the description of the structure and mode of operation in the preceding paragraphs apply generically to the same named parts, positions, directions movements, etc. in all illustrated forms of the invention, including the first form in FIGS. 1-4, the second form in FIGS. 5 and 6, and the third form in FIGS. 7 and 8. The variation between these different forms lies solely in the construction of their feeding means or unit; control means or unit; and roving guide means or unit shown respectively as units 20 and 80; 50, 70 and 90; and 55, 75 and 95 in FIGS. 1-8.

The first form in FIGS. 1-4 has feeding unit 20 and has control unit 50 including roving guide unit 55.

FIGS. 1-4 and FIGS. 5 and 6 illustrate the first and second forms of the invention. Each of these forms has identical feeding unit 20. This unit includes motor 23, controlled by switch 24 on handle 11, for driving feed roll 28 so that this roll 28 drives feed roll 26 by peripheral friction. Both of these feed rolls 26 and 28 are rotatably mounted between side walls 13 and 14. The feeding unit includes only two parallel feed rolls 26 and 28 with each of these rolls having a portion, such as portions 52 and 53 on roll 28, located in each of the positions P1 and P2.

FIGS. 1-4 illustrate control unit 50 for controlling

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the relative quantity of each type fiber fed by the first form of gun. A plurality of blades 51 are arcuately spaced apart on feed roll 53 with their individual cutting edges 51a projecting outwardly from roll portion 52 on feed roll 28 in first position P1 for forming chopped lengths of fibers 4b. Roll peripheral portion 53 on feed roll 28 is smooth so as to feed continuous roving type fibers 4a. An examination of FIGS. 5 and 6 of the drawings will reveal that the preceding description of the structure in this paragraph also applies to corresponding control unit 76 to be described in more detail hereinafter.

Control unit 50 includes roving guide unit 55 in FIGS. 1-4. This unit 55 includes a manually controllable means for moving roving guide ring 57 between positions P1 and P2 in FIG. 4. Guide ring 57 is movable along the length of shoe plate 56 and transverse to the direction of travel of roving 3 between these positions, by a suitable guide track construction herein shown as grooves in the top and bottom outer surfaces of guide ring 57 straddling the upper and lower edges of horizontal slot 56d in shoe plate 56 so that the movement of guide ring 57 is restricted to generally horizontal reciprocating movement parallel to the axis of spacer 16 and the axes of feed rolls 26 and 28.

Unit 55 has suitable manually controllable means provided for moving guide ring 57. This includes a hand actuated ring member 58, movable by a finger on the operator's hand on left handle 11 in FIG. 1, rigidly connected through rod 60 and link 61, extending through a guide hole in side wall 13, to guide ring 57. This guide ring 57 is moved from position P1 to position P2 when ring 58 is pulled from the solid line to the dot-dash line position in FIG. 1. A bracket 59 is secured at its left end in FIG. 1 to handle 10 and has parallel guide tracks 59a received in parallel grooves in the top and bottom surfaces of ring 58 in FIG. 1 to guide ring 58 in this movement. Resilient spring 62 is connected at opposite ends to rod 60 and side wall 13 for moving guide ring 57 from position P2 back to position P1 upon release of the finger pressure upon the finger or hand actuated ring 58.

Now, it should be apparent that a wide variety of fiber types may be dispensed by this gun. First, when ring 58 is pulled toward the left so as to place roving guide ring 57 in position P2 in FIG. 4, only continuous roving type fibers 4a will be dispensed. Second, if ring 58 is released so that spring 62 returns guide ring 57 to position P1, only chopped length type fibers 4b will be dispensed. Third, if ring 58 is pulled only far enough to move guide ring 57 to position P3 in FIG. 4, both type fibers 4a and 4b will be dispensed simultaneously. In position P3, some of the fibers extend across cutting edges 51a while others extend across non-cutting roll peripheral portion 53. It should be apparent that these results, obtained in position P3, could also be obtained in position P1 if blade 51 were an intermittent edged cutter instead of having straight edge 51a extending parallel to the axis of rotation of feed roll 53. This intermittent edged cutter, whether it has a saw tooth edge or has one or more grooves in its cutting edge, would permit the peaks of the saw tooth edge or the tops of its cutting edge to cut the roving to form chopped length type fibers 4b while the fibers received in the grooves of the intermittent edge cutter would not be cut but would be dispensed as continuous type roving 4a. Fourth, the chopped length type fiber, slightly longer in length than fibers 4b, may be dispensed by reciprocating ring 58 so that guide ring 57 dwells in position P2 long enough to develop a longer length type fiber but is periodically reciprocated to position P1 for cutting this fiber to proper length by cutting edge 51a.

FIGS. 1-4 show a finger reciprocated ring 58 and spring 62 for moving roving guide ring 57 between positions P1 and P2, but it should be apparent that roving guide ring 57 may be reciprocated by other suitable type mechanisms, such as a finger controlled electric solenoid, a cam mechanism or other suitable mechanism.

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The second form of the invention is shown in FIGS. 5 and 6. This form has feeding unit 20, and roving control unit 70 with roving guide unit 75.

Roving control unit 70 has feed rolls and cutting blades the same as described in FIGS. 1-4, as earlier mentioned.

Roving guide unit 75 has a shoe plate 76 with turned down opposite ends 76a, and has secured thereto two roving guide rings 77 and 77' respectively in positions P2 and P1. Hence, this guide unit 55 includes two guides 77 and 77' spaced axially along the bight of feed rolls 26 and 28 with one guide ring 77' located for guiding its fibers 3 into position P1 for forming and dispensing chopped length type fibers 4b and with the other guide ring 77 located for guiding its fibers 3 into the second position P2 for dispensing continuous type roving 4a.

Now, it should be apparent that several types of fibers may be dispensed by this second form of the invention shown in FIGS. 5 and 6. First, if roving 3 is fed through only guide ring 77, only continuous type roving fibers 4a will be dispensed. Second, if roving 3 is fed through only guide ring 77', only chopped length type fibers 4b will be cut and dispensed. If roving 3 is simultaneously fed through both guide rings 77 and 77', both type fibers 4a and 4b will be dispensed simultaneously.

FIGS. 7 and 8 illustrate a third form of the invention having feeding unit 80, and having roving control unit 90 including a roving guide unit 95.

Feeding unit 80 feeds continuous glass fiber rovings 3 from a supply and directs its fibers toward the surface to be coated, as shown in FIGS. 7 and 8. Two electric motors 23 and 23' each only partially shown in FIG. 7 and each being either a constant speed motor or an adjustable and variable speed motor whichever is preferred, are mounted in FIG. 7 respectively on walls 13 and 14 and are controlled by electric switches 24 and 24' respectively on handles 11. Each switch 24 and 24' may be of the two position, on-off type or may be a variable speed control switch for controlling the speed of its motor. These switches 24 and 24' are manually controllable members operable by the fingers of the operator's hands gripping handles 11. As will be apparent, these switches 24 and 24' control the relative speed of motors 23 and 23' so that the total quantity of all type fibers 4a and 4b dispensed and the relative quantity of each of the two type fibers 4a and 4b can be varied. Motors 23 and 23' respectively are drivingly connected to and rotate smooth metal feed rolls 86 and 88', which rolls rotate respectively feed rolls 86 and 86', each having a rubber outer sleeve, by peripheral contact friction. These power driven feed rolls 86 and 88 are rotatably supported on parallel shafts respectively secured to and extending between walls 13 and 14'. Power driven feed rolls 86' and 88' are rotatably supported on another pair of parallel shafts respectively extending between and secured to walls 13' and 14. Therefore, each pair of rolls 86 and 88 or 86' and 88' can be driven independently by its own motor.

Roving control unit 90 is shown in FIGS. 7 and 8. In position P1, a plurality of blades 91, each having a cutting edge 91a, are carried in the peripheral roll portion 92 of feed roll 88'. In position P2, smooth, non-cutting roll portion 93 is on feed roll 88.

Roving control unit 90 has a roving guide unit 95. Roving guide unit 95 has two shoe plates 96 and 96', each having two turned down opposite ends shown on these respective plates as ends 96a and 96a', with these ends having holes telescoped over spacer 16, which spacer 16 is rigidly secured to and spaces apart in proper parallel relationship the four side walls 13, 13', 14 and 14'. Shoe plates 96 and 96' respectively have roving guide rings 97 and 97' secured therein. Ring 97 is adapted to guide roving 3 in position P2 through the bight of feed rolls 86 and 88 for dispensing continuous roving 4a. Ring 97' guides roving 3 in position P1 into the bight

of feed rolls 36' and 38' for dispensing chopped length type fibers 4b.

Now, it should be apparent that the third form of the invention in FIGS. 7 and 8 is adapted to dispense a plurality of types of roving. First, if roving 3 is fed through only guide ring 97, only continuous type fibers 4a will be dispensed. Second, if roving 3 is fed through only guide ring 97', only chopped length type fibers 4b will be dispensed. Third, if roving 3 is simultaneously fed through both guide rings 97 and 97', both type fibers 4a and 4b will be dispensed simultaneously.

Independent control of the relative speeds of motors 23 and 23' in FIGS. 7 and 8 provides advantageous features. First, this construction is especially adapted for dispensing large quantities of fibers since each type of dispensed fiber is independently formed and dispensed by an independent motor. Second, variation in the relative quantity of each type fiber 4a or 4b simultaneously dispensed is easily obtained by merely varying the speed of either motor 23 or 23'. This quantity can easily be varied, by adjusting motor speed, even though the same number of roving strands in roving 3 is fed through each guide ring 97 and 97'.

However, it should be apparent that it is possible to change the relative quantity of each type fiber 4a or 4b simultaneously dispensed in any of the guns shown in FIGS. 5-8 by merely changing the number of strands of roving 3 fed through ring 97' in position P1 and through ring 97 in position P2 to provide simultaneous fiber dispensing from the guns.

In each of the three forms of the invention in FIGS. 1-8, different gun operating conditions will give different characteristics to the dispensed continuous roving 4a earlier fed into the gun as continuous roving 3 with a plurality of closely bunched and longitudinally extending fiber strands of either twisted roving 3a, straight roving 3b, or spun roving 3c with interlocked strands. The different operating conditions will include the feeding speed of the dispensed roving, temperature, electrostatic charge condition, strand integrity, roving integrity, humidity, etc. It has been found that at lower roving feeding or dispensing speeds, such as around 20 linear feet of roving 4a fed per minute, with good integrity and with proper operating conditions, continuous roving 4a is deposited on surface 21a in a closely bunched pattern, similar to roving 3, with the strands laterally spaced close together. If roving 3 is twisted roving 3a, this close bunching of the fibers in dispensed fibers 4a will be easier to maintain than if the roving is straight roving 3b. At faster roving feed speeds, such as around 1200 linear feet of roving 4a fed per minute, the feed rolls act as a dispersing means for rovings 3a and 3b to substantially increase the lateral distance between the roving strands in the dispensed roving 4a over the corresponding distance in the incoming roving 3a or 3b to open up the closely bunched roving fiber strands fed into the gun. The interlocked strands of spun roving 3c, even when dispensed at 1300 linear feet per minute, are deposited as roving 4a on surface 21a in a closely bunched pattern with the strands laterally spaced close together.

It should be apparent that these closely bunched fibers, obtained by feeding roving 3a and 3b at slower speeds and obtained by feeding roving 3c at any speed, give greater strength in localized areas in the finished part while the more dispersed fiber strands in roving 3a and 3b, obtained by feeding them at higher speeds, provide a more uniform strength and homogeneous condition in the finished part.

Although the feed rolls are shown as providing the dispersing action here for roving 3a and 3b, it should be readily apparent that any suitable type dispersing means could be provided for substantially increasing the lateral distance between the roving strands in dispensed roving 4 over the corresponding distance in the incoming roving 3.

Suitable changes in construction are submitted as being within the scope of the present invention. First, each motor 23 or 23' and switch 24 or 24' may, if desired, be respectively an air motor and throttle valve with each valve connected between source line 39 and each air motor for varying the air pressure to each air motor for controlling the speed of each motor and rate of dispensing of fibers 4. Second, the portion of each motor driven feed roll 28 or 38 and idler, rubber feed roll 26 or 36 for feeding continuous roving 4a may be replaced respectively by a knurled, power driven, metal feed roll and an idler, metal feed roll. The advantage in making the idler roll of metal instead of rubber for feeding fibers 4a is that the rubber roll may become tacky in continuous operation for the following reasons: (1) for a mechanized operation, the rubber can become worn and tacky, and (2) there is also a tackiness that develops from the binder on glass fiber roving 3 when the friction with the rubber roll causes an increase in temperature. Third, one side wall, such as side wall 14 in FIG. 1 or side walls 14 and 14' in FIG. 7 may be eliminated of the pair of side walls 13 and 14 or 13' and 14' straddling each pair of feed rolls so that the feed rolls are mounted in cantilever relationship to the remaining side wall 13 or 13'. Now, it is easier to place the fed roving 3 into the bight between the rolls by movement of the roving along the axes of the rolls instead of requiring that roving 3 be fed in the direction of roving feed through the bight of the rolls during loading of the apparatus.

Various changes in details and arrangement of parts can be made by one skilled in the art without departing from either the spirit of this invention or the scope of the appended claims.

What is claimed is:

1. A fiber depositor gun for making from incoming continuous roving having a plurality of fiber strands a reinforced plastic laminate by depositing on a surface with liquid plastic said roving either as a dispensed continuous roving as one type fibers or as dispensed chopped lengths of said strands as other type fibers, comprising a frame, feeding means on said frame for feeding continuous roving from a supply into said gun and for directing said fiber strands toward said surface, and control means on said frame for controlling the relative quantity of each type fiber fed toward the liquid plastic and said surface, said feeding means including mutually engaging power driven feed rolls on said frame for feeding said fiber strands through the bight of said rolls toward said surface, a first portion of said rolls having fiber cutting means carried by at least one of said rolls whereby to feed said chopped fibers in one position of roving feed, a second portion of said rolls having generally cylindrical engaging surfaces whereby to feed said continuous roving toward said surface in a second position of said roving feed, and roving guide means on said frame for guiding the strands of said incoming roving into the bight of said rolls in said positions.

2. A fiber depositor gun, as set forth in claim 1, wherein said roll portions about each other with said guide means including a guide for the strands of said incoming roving overlapping said two positions for simultaneously guiding some of said strands into said first position and other of said strands into said second position.

3. A fiber depositor gun, as set forth in claim 1, with said frame having a hand grip handle; said guide means including a guide for the strands of said incoming roving, and including a manually controllable means for moving said guide between said positions; said manually controllable means including a hand actuated member movable by the operator's hand on said handle, and operatively connected to said guide for moving said guide from one to another of said positions.

4. A fiber depositor gun, as set forth in claim 1, with said feeding means including only two parallel feeding

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rolls, each of said rolls having said portions located respectively in said first and second positions.

5. A fiber depositor gun, as set forth in claim 1, with said feeding means including four feed rolls arranged in pairs with two rolls in one pair having their bight in said first position and with two rolls in another pair having their bight in said second position.

6. A fiber depositor gun, as set forth in claim 5, with said frame having hand grip handle means, with said feeding means including two motors on said frame, means drivingly connecting one motor to said one pair of rolls, means drivingly connecting the other motor to said other pair of rolls, and separate control means for each motor located on said handle means.

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7. A fiber depositor gun, as set forth in claim 6, with said motor control means adapted to vary the speed of at least one of said motors so that the total quantity of all type fibers dispensed and the relative quantity of chopped and continuous fibers can be varied.

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