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COMBINED CARDING AND WEAVING

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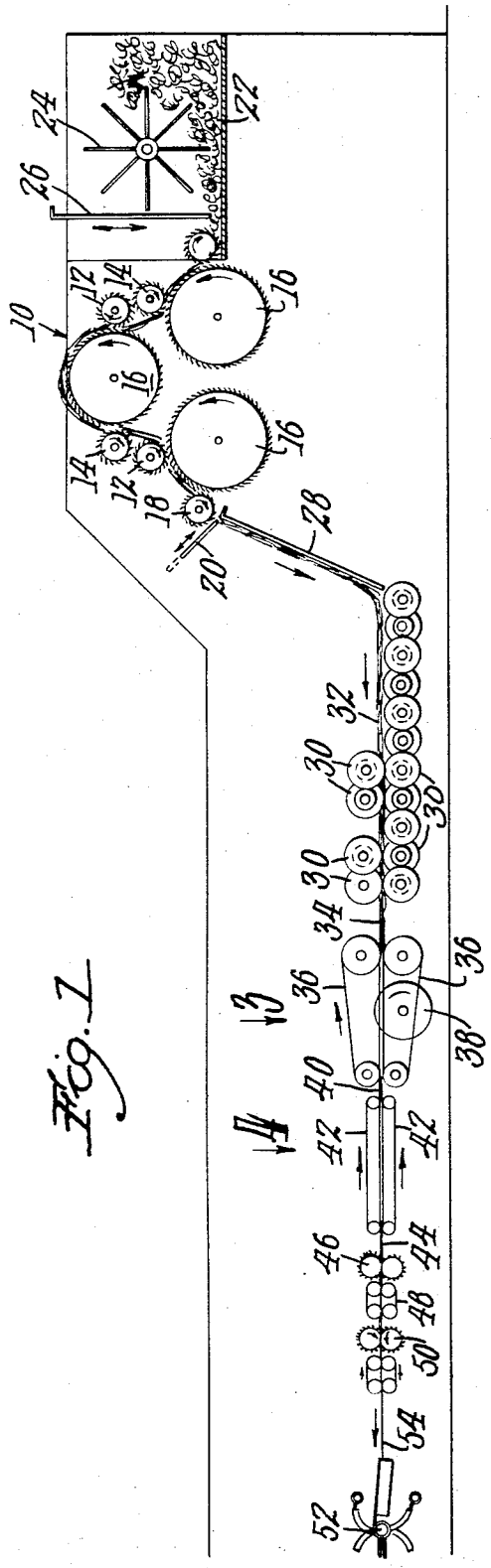


Fig. 1

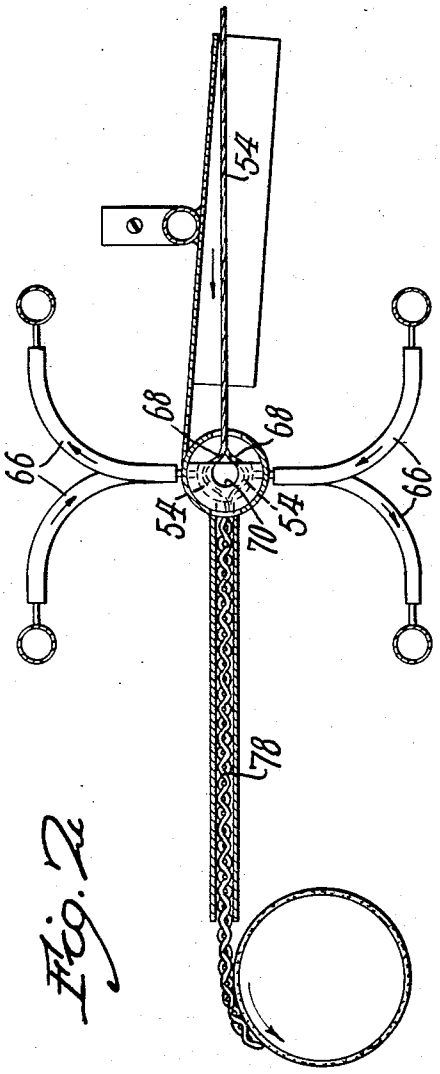


Fig. 2

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Fig. 3

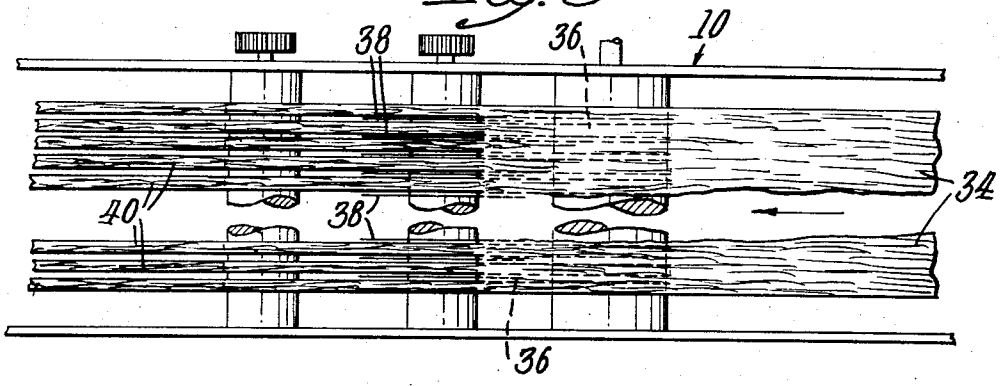


Fig. 4

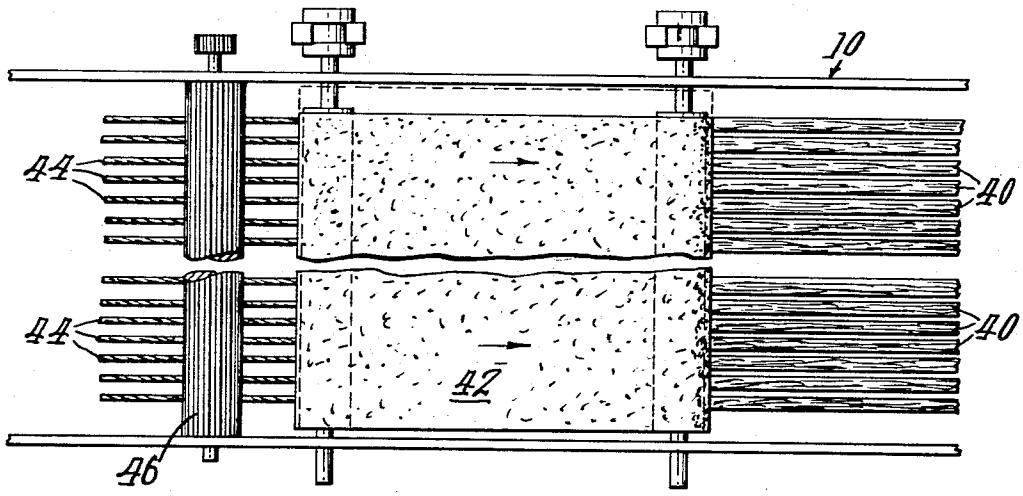
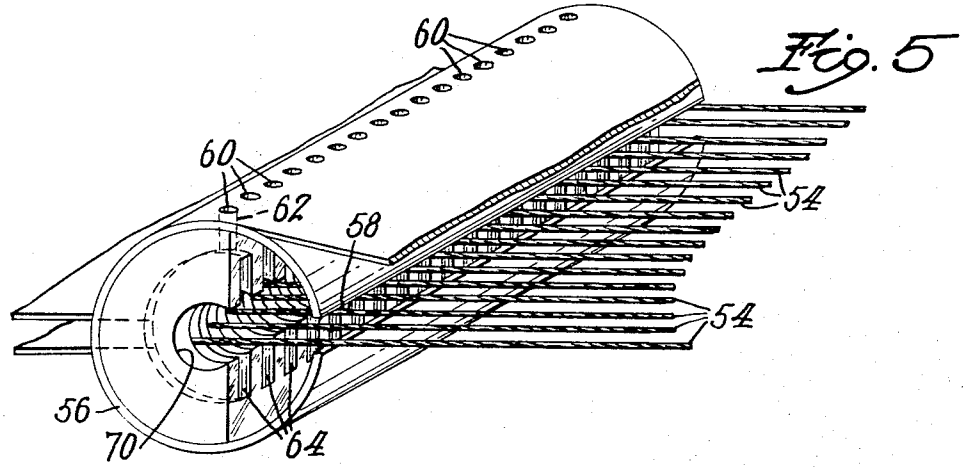


Fig. 5

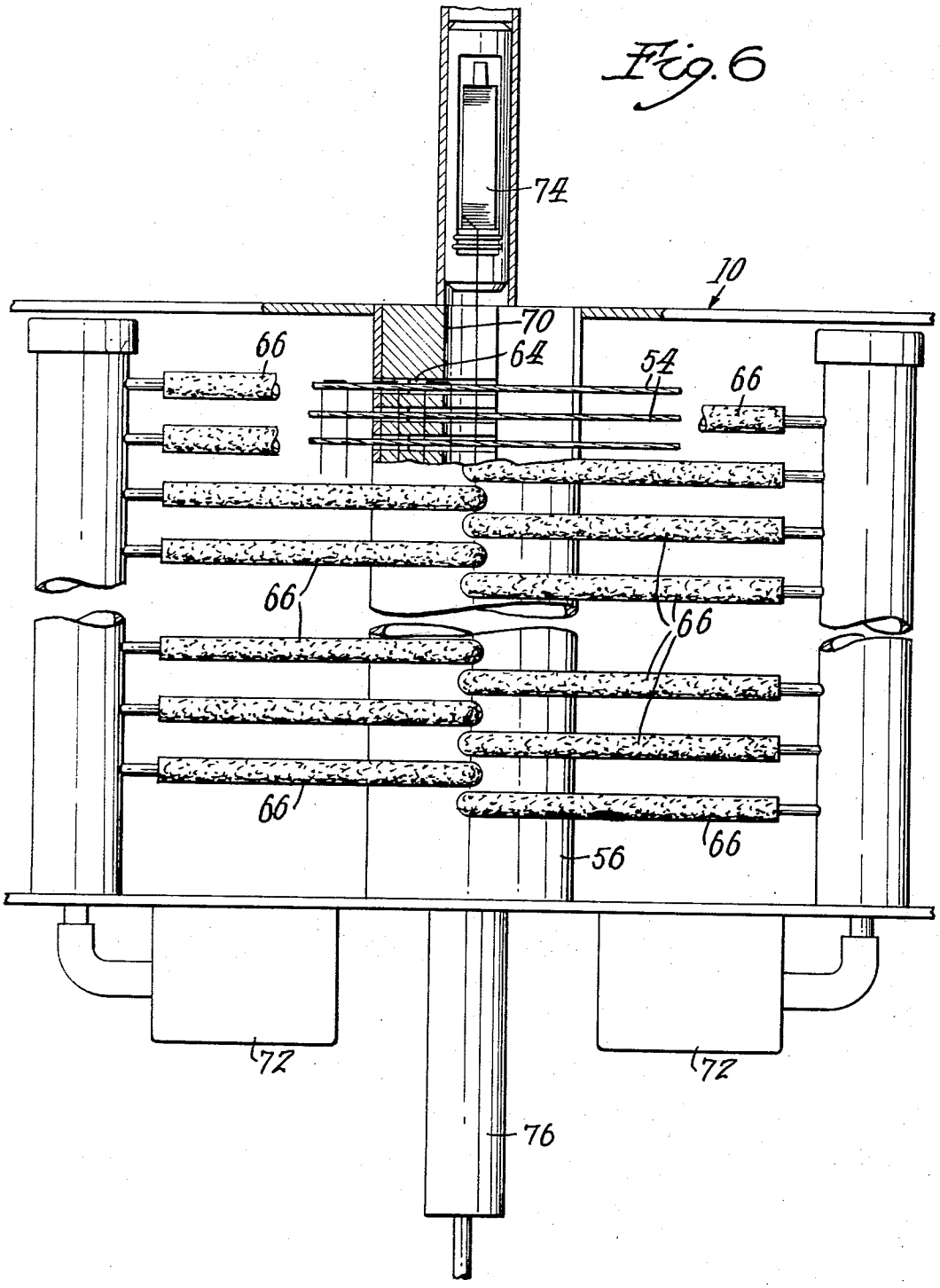


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Fig. 6



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Patented Sept. 26, 1967

3,343,569

COMBINED CARDING AND WEAVING

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Filed Dec. 17, 1965, Ser. No. 514,554
5 Claims. (Cl. 139—11)

ABSTRACT OF THE DISCLOSURE

A weaving machine which accepts loose slive-like warp fibers and forms a shed thereof using pneumatic means to alternately raise and depress the individual warps in order to provide for the application of the filler which passes through the shed on alternate motions of the warp fibers under influence of said pneumatic means.

This invention relates to a machine for weaving a fabric of generally untwisted loose, fluffy yarns in the nature of rovings, so that the fabric is soft and thick and has a high insulative valve providing an inexpensive relatively thick light weight insulating material usable for any purpose and suitable to be secured to a thin strong backing to prevent shredding.

The invention contemplates carding the loose fibers of the material to be processed, compacting said fibers in a wide sheet-like form which is slit or divided into a number of ends in which the fibers are only loosely associated; these ends then passing through a device which operates to roll the ends somewhat into loose cord-like members in the nature of rovings somewhat stronger than the sheet material; and then weaving these loose ends in a new and improved weaving chamber and weaving apparatus including a shuttle applying the filler so that the loose roving-like ends are actually woven into an inseparable layer; and then uniting the loose woven layer with a strong, thin layer such as a continuous plastic, or other textile such as cotton, linen, etc.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which:

FIG. 1 is a view in side elevation illustrating the machine diagrammatically;

FIG. 2 is a view on an enlarged scale illustrating the weaving chamber;

FIG. 3 is a plan view illustrating the ends during the slitting operation;

FIG. 4 is a similar view showing the rolling operation of the ends;

FIG. 5 is a perspective view illustrating the weaving chamber, and

FIG. 6 is a plan view of the weaving chamber with parts broken away in order to better illustrate the construction.

First referring to FIG. 1, there is indicated in general by the reference numeral **10** the carding mechanism having working rolls **12** and stripping rolls **14**, the cylinders being shown at **16**, a doffer at **18** and a comb at **20**. As will be understood by those skilled in the art, the stuff in the box **22** will be fed by the apparatus **24** under the adjustable gate **26** more or less in the usual manner and will be applied to the cylinder and processed more or less in the usual manner to progress forwardly down the incline at **28** in a thin flimsy carded sheet of fibers which are very loosely entangled, the sheet however having a single entity.

In the present case this sheet is somewhat compacted by passing through a series of heavy rolls **30** which are arranged in a manner as to be overlapping toward the front and rear but having enough of them in the direction of the arrows in FIG. 1 so as to compact the entire sheet of material which is here indicated at **32**.

Progressing from the heavy rollers at **30** the sheet at **34** is fed by a pair of belts **36**, **36** through a plurality of parallel spaced knife-like slitters or the like **38** to form a series of separate ends **40**, see FIG. 3. It is to be understood that these ends are simply divided ends from a flimsy sheet of lightly felted fibers as it comes from the carding machine.

The next step in the operation is shown in FIG. 4 where the ends **40** are led between a pair of belts **42**, these belts being driven in the direction of the arrows and oscillated transversely with respect to the length of the machine by means not shown but comprising cams, etc. and in this way the loose ends **40** are somewhat compacted as has been illustrated at **44** in FIG. 4 where the widths of the ends can be compared at **40** and **44**. The ends **40** are substantially rectangular or square in cross section and extremely loose while those at **44** have been rolled by the belts **42** and are more or less circular but are still loose in the nature of rovings or the like, but are now somewhat compacted over the ends at **40**.

Next the ends pass between the nip of a pair of toothed rolls **46**, through drawing belts **48** and a further set of toothed rolls **50**. The speed of the rolls **50** is greater than that at **46** so as to stretch the ends **44**, further compacting the same just prior to the weaving operation to be described. In FIG. 1 the weaving chamber is generally indicated at **52** and is shown in detail in FIGS. 2, 5 and 6.

The compacted drawn ends are indicated in FIG. 2 for instance by the reference character **54** and they are fed through the weaving chamber **56**, see FIG. 5, as for instance through a narrow slot therein at **58**. The weaving chamber is provided with a series of relatively small vertical through openings as at **60**, FIG. 5, these openings leading to through passages **62** going from top to bottom of the chamber, and the interior of the chamber is preferably formed of a kind of a honey-combed construction **64** for a purpose to be described.

Each of the openings **60** at top and bottom of the weaving chamber is provided with a tube such as indicated at **66**, and these tubes are connected to sources of pressure alternating with suction provided by commercial means not shown but well known. As shown in FIG. 2, when one tube at the bottom is under condition of pressure, its corresponding tube at the top of the weaving chamber is connected with suction and vice-versa. There is a pressure and suction opening for each of the openings in the honeycomb **64** through which the ends **54** pass so that a shed is formed by air pressure. This shed is indicated at **68** and of course the ends **54** are alternately moved up and down forming the shed which is coextensive with the longitudinal central through opening **70** in the weaving chamber as indicated in FIGS. 2 and 5.

Referring now to FIG. 6, there are shown in diagrammatic form the electric valves **72** which control the pressure and the suction in alternate arrangement as is required to form the alternate up and down motion of the ends **54** to form the shed, and through this shed the filling material can be passed more or less in the manner of a loom.

Any means can be utilized for moving the filler as for instance a shuttle which may contain ordinary yarn, or loose material comparable to the ends **54**, can be moved through the opening **70** from one side to the other. Also, cutoff means at each side can be used to cut off the filler, the shuttle then being moved through in a direction to pick up a supply at the opposite side of the machine, these supply areas being indicated at **74** and **76**.

After the material has been woven as indicated at **78** in

FIG. 2, it can be spooled or it can have directly applied thereto as by adhesives, sewing or the like a backing member such as a cotton or linen cloth, plastic sheet, etc. and this therefore will be seen to provide for a very insulative light weight very inexpensive woven material.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. A machine for weaving a textile fabric which comprises separate, loose, entangled warp fibers in filaments, in the nature of slivers, said machine including means for carding stock and traveling the carded material in the form of a loose filmy sheet of entangled fibers, dividing the sheet into a plurality of ends, slightly compacting the ends while still substantially retaining their characteristic of being loose, means forming a shed of the ends by alternately raising and depressing the individual ends in an alternative relationship, and means providing a filler material passing through the shed at each alternate motion thereof, wherein said shed is formed by a weaving chamber having a series of vertical openings therein, and means providing for alternate pneumatic pressure and suction with respect to each opening so that air pressure is applied to the sides of the individual ends alternately with suction being applied at the opposite sides thereof in an alternate relation.

2. The machine of claim **1** wherein said weaving chamber is substantially closed from side to side of the machine, apertures admitting the ends to pass generally diametrically through said weaving chamber, the pneumatic means being applied to the chamber at a right angle to the general plane of the ends.

3. The machine of claim **1** wherein the weaving chamber includes a wall having a through opening from side to side of the machine for the reception of filler material, apertures in said chamber wall at a right angle to the opening, alternate suction and pressure means being applied to said apertures, in alignment in pairs in alternative relationship with respect to the ends, and means guiding the ends as they pass through the weaving chamber past the apertures thus forming the shed by the suction and pressure means.

4. A machine for weaving a textile fabric composed of separate loose and entangled fibers in the form of separate ends, said machine comprising a weaving chamber, the ends passing through said weaving chamber from side to side thereof, and pneumatic means in the weaving chamber forming a shed of the ends by applying gas under pressure directly onto alternate ends and thereby alternately raising and depressing the individual ends in an alternate relationship.

5. The machine of claim **4** wherein the weaving chamber is substantially closed but has a through aperture from end to end thereof admitting filler, the shed being provided at either side of said aperture and the pneumatic means being applied to the sides of the chamber diametrically across the filler opening and alternately applying suction and pressure with respect to the ends within the chamber to form the shed.

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