June 26, 1934. A. ALLWOOD ET AL 1,964,656

METHOD OF AND APPARATUS FOR FORMING FILLED TEXTILE TUBES

Filed Jan. 7, 1933 5 Sheets-Sheet 1

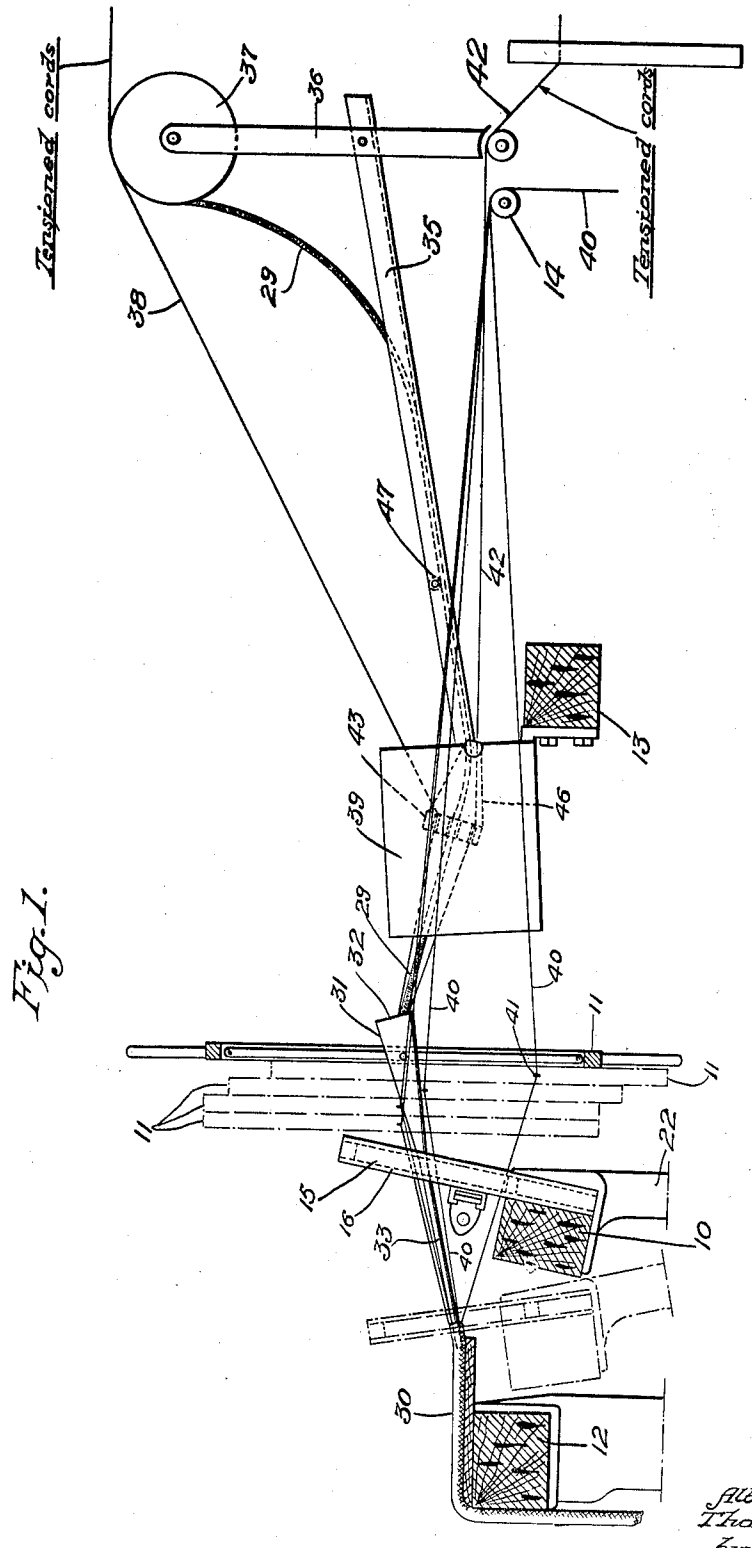


Fig. 1.

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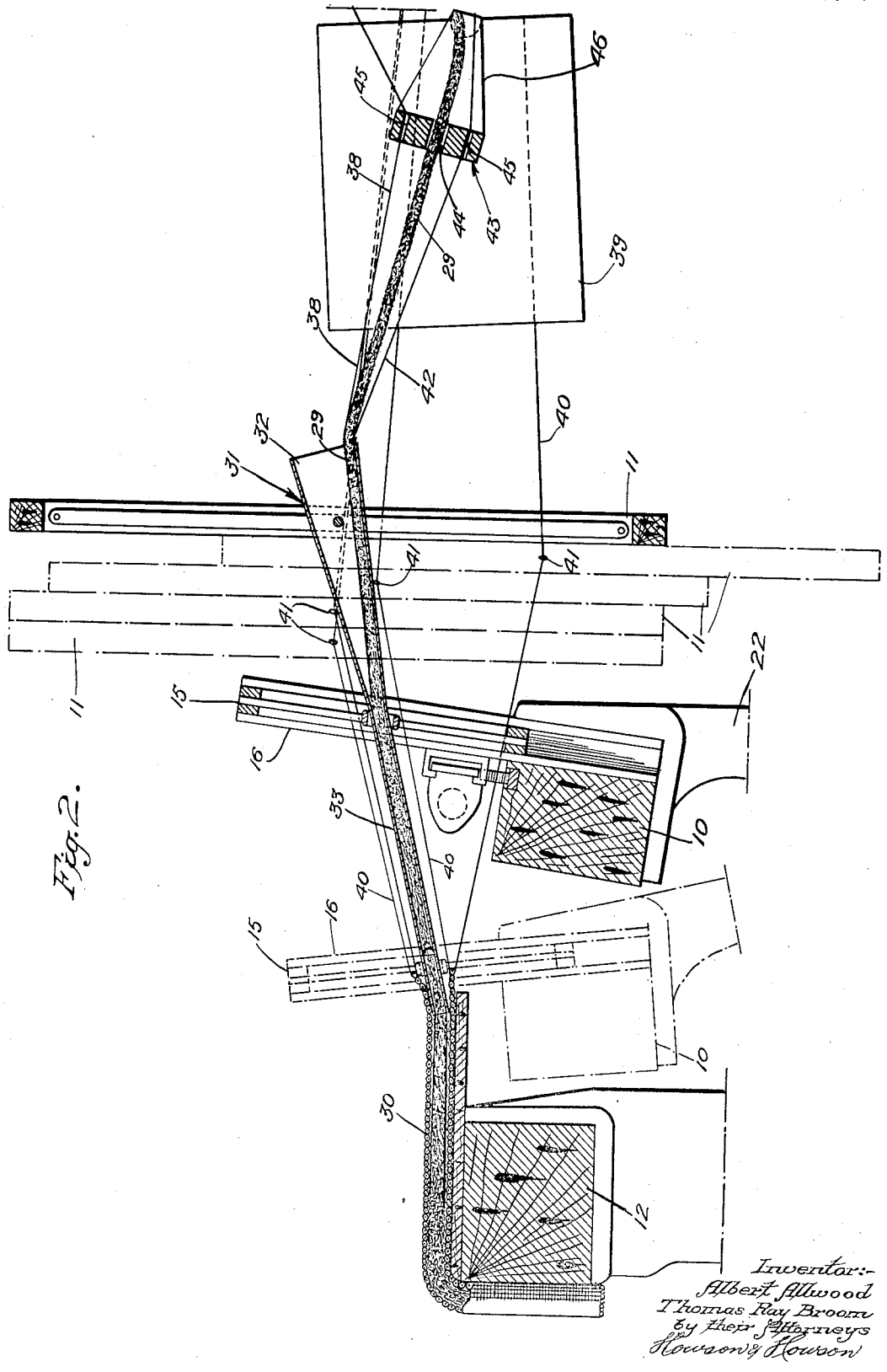


Fig. 2.

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METHOD OF AND APPARATUS FOR FORMING FILLED TEXTILE TUBES

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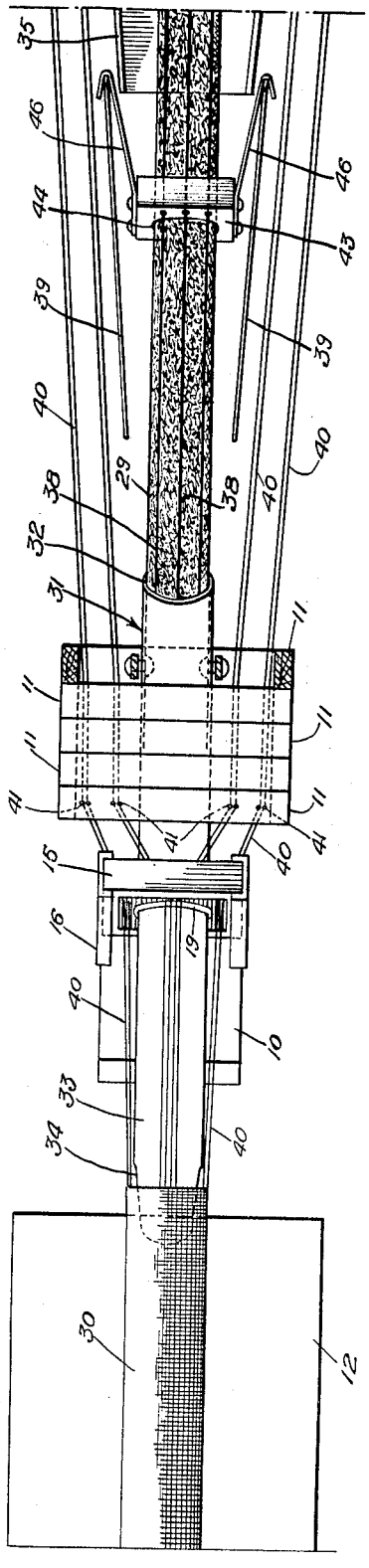


Fig. 3.

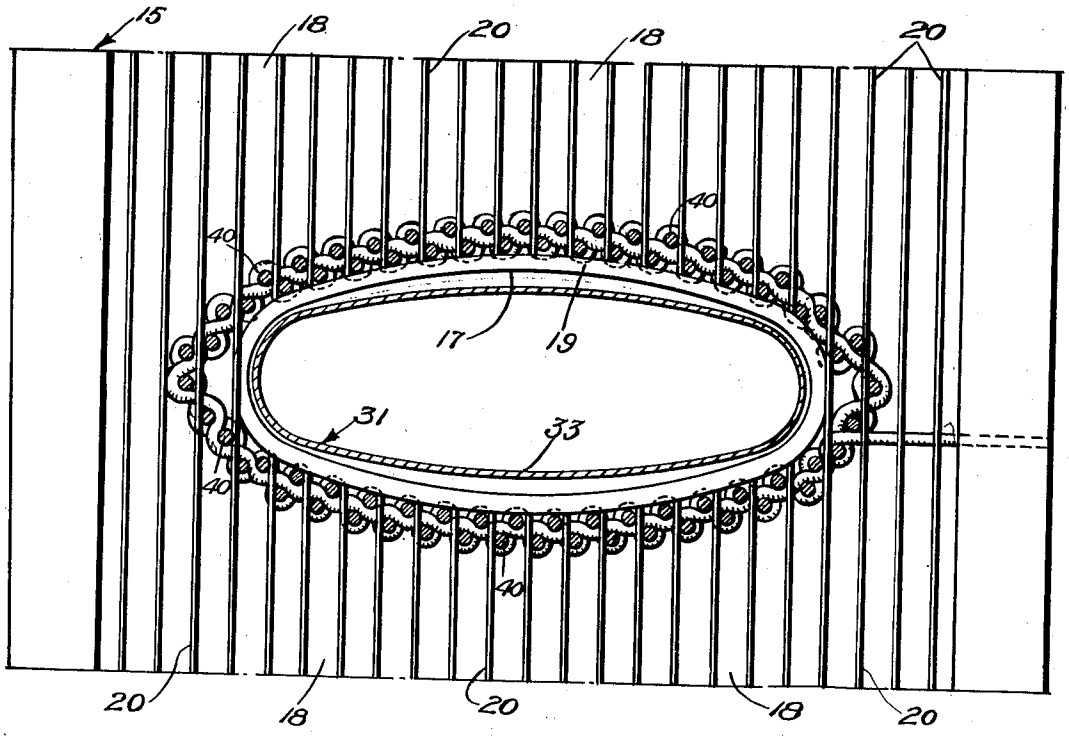
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METHOD OF AND APPARATUS FOR FORMING FILLED TEXTILE TUBES

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Fig. 4.



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METHOD OF AND APPARATUS FOR FORMING FILLED TEXTILE TUBES

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Fig. 6.

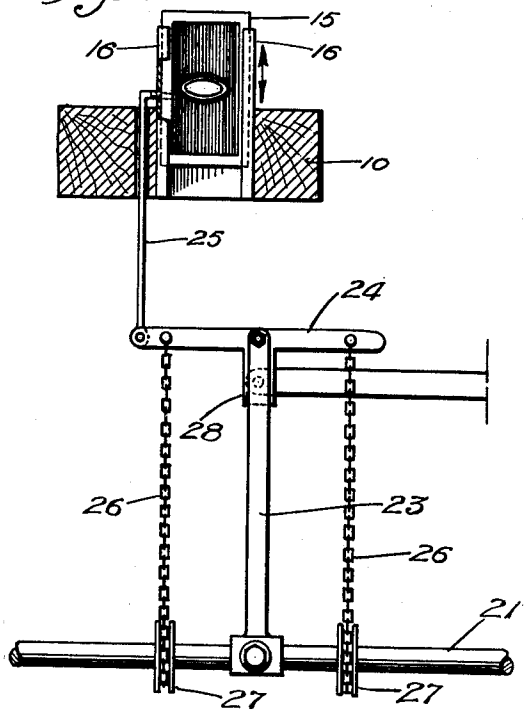


Fig. 5.

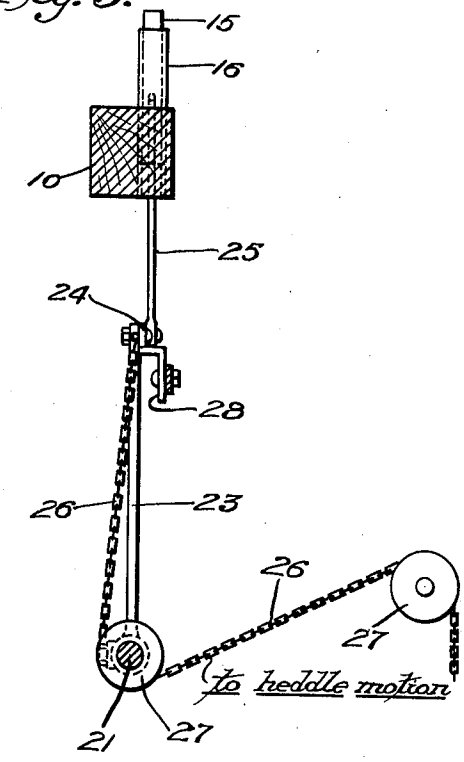
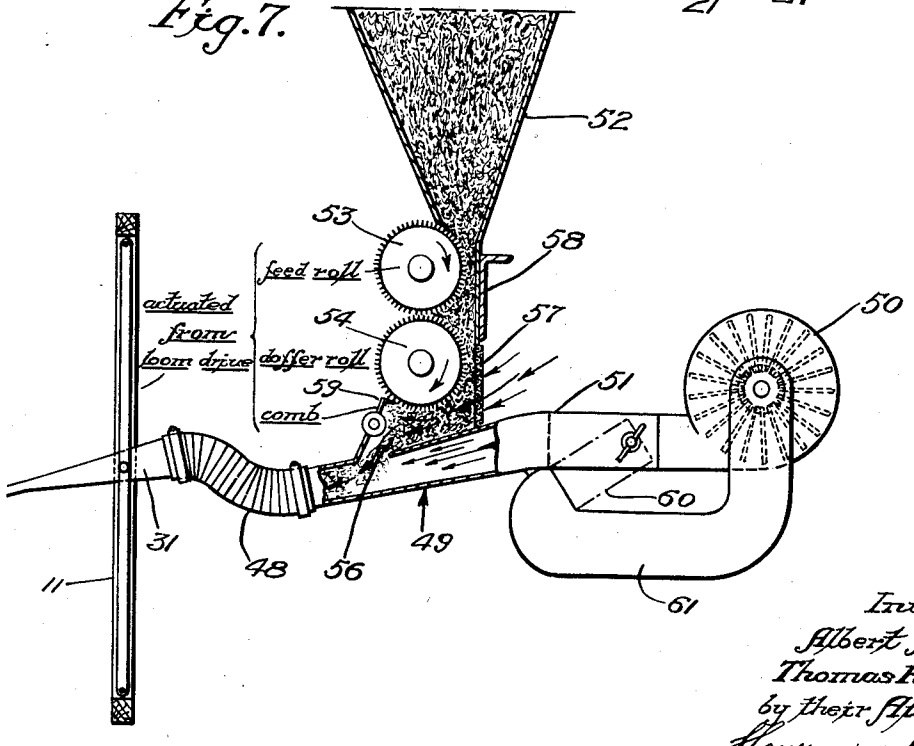


Fig. 7.



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UNITED STATES PATENT OFFICE

1,964,656

METHOD OF AND APPARATUS FOR FORMING FILLED TEXTILE TUBES

Albert Allwood and Thomas Ray Broom, Charlotte, N. C., assignors to Southern Asbestos Company, Charlotte, N. C., a corporation of Delaware

Application January 7, 1933, Serial No. 650,728

13 Claims. (Cl. 139—11)

This invention relates to a method of and apparatus for making roving-filled textile tubes, and more particularly to a method of and apparatus for producing asbestos insulating tapes.

As pointed out in the prior application of George S. Fable, for Heat insulation tape and method of making the same, filed December 17, 1932, Serial No. 647,797, the production of such tapes gives rise to many problems. The tapes are formed of an outer asbestos textile tube with a filling of asbestos fibre. Asbestos fibre, when unpacked and in a fluffy state, has little or no tensile strength so that it is impossible by any ordinary method to place the same in a preformed tube. For this reason, it has been common practice to either bind the roving employed as a filling with strengthening cords before placing it in the textile tube, or to form the textile tube originally as a strip of material which is pasted, stitched or otherwise secured about the roving. Either of these methods is disadvantageous, the first packing the material of the roving to an extent such that a great deal of its efficiency as a heat insulation is destroyed, while the second method produces joints which are either unsatisfactory or offer difficulties in application.

An important object of this invention is the provision of a method and apparatus whereby the tube may be formed directly about the roving and yet be entirely free from seams.

A further object of the invention is the provision of means whereby a textile tube free from weaving defects may be produced on a flat loom.

A further object of the invention is the provision of an arrangement whereby the forming of the tube and roving may be simultaneously effected.

A further object of the invention is the production of an apparatus for handling a preformed roving of asbestos fibres whereby the roving may be properly supported and guided to prevent undue longitudinal strain thereon during its delivery to a point where the tube is being formed thereabout.

Other objects and advantages will become apparent in the course of the following description.

In the drawings:

Fig. 1 is a semi-diagrammatic view of a loom arranged for use in producing roving-filled textile tubes;

Fig. 2 is an enlarged sectional view showing the method of manipulating the filled-tube-forming elements in the loom;

Fig. 3 is a plan view of the forming section of the loom;

Fig. 4 is a front elevation of the reed;

Fig. 5 is a semi-diagrammatic side elevation illustrating a further method of controlling movement of the reed;

Fig. 6 is a rear elevation thereof; and

Fig. 7 is a diagrammatic view showing a method of forming the roving simultaneously with the tube.

Referring now to the drawings, the numeral 10 generally designates the lay beam of a flat loom; 11, heddle frames; 12, the breast beam; 13, the whip rail; and 14, the back rail, all of which may be of any standard or preferred construction. Upon the lay beam, a reed 15 is mounted, suitable guides 16 being supplied in order that the reed may have vertical sliding movement with relation to the beam. The reed 15, as more clearly shown in Fig. 4, has a barrier 17 which interrupts the dents 18, this barrier being at present shown as a marginal rim 19 to which the ends of the interrupted reed blades 20 are secured.

It will be obvious that with warp ends directed through the reed as illustrated in Fig. 4, and controlled in upper and lower sets from the shedding mechanism comprising the heddle frames 11, it will be possible to produce upon a flat loom a tubular fabric while controlling the diameter of the tube through the rim 19. Under these circumstances, the movement of the reed 15 in its guides 16 must, of course, be controlled by the shedding mechanism. As shown in Fig. 5, the rocker shaft 21 controlling the oscillation of lay beam 10 through arms 22 has secured thereto a standard 23 upon the upper end of which a lever 24 is pivoted intermediate its ends, lever 24 extending in the same general direction as the lay beam and being at one end connected to the reed 15 through a link 25. Flexible elements 26 are connected between opposite end portions of this lever and the heddle control mechanism so that the reed is caused to rise and fall in timed relation to the movement of the heddles. These flexible elements may be conveniently trained about sheaves 27 mounted upon rocker shaft 21. By providing lever 24 with an arm 28, the movement of this lever can be transmitted to similar levers of reeds of the remaining units of a multi-unit loom.

For the purpose of guiding the roving or filling 29 from the textile tube 30 thus formed into position in the tube, we provide a metallic feed tube 31, which feed tube at its forward end rests upon

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the breast beam and at or adjacent its rear end is connected to the heddle frame 11 for vertical movement thereby. This tube comprises a rearwardly disposed funnel mouth 32 tapering to a flatly ovate main section 33. The sides of the main section 33 are cut away for a short distance from their forward end, as more clearly shown in Fig. 3 at 34 so that the roving 29 in passing from the forward end of the tube extends from the tube at the sides thereof and is so exposed to the constriction of the textile tube 30 at the lay that it is frictionally engaged thereby at least as to its side portions. The tube 31 is interiorly smooth so that it will offer as little friction as possible to the passage of the roving, and the main section 33 thereof is directed through the opening 17 of the reed.

It will be obvious that with this arrangement the rise and fall of the reed may be obtained from the tube, but use of some mechanism such as that illustrated in Figs. 5 and 6 is preferred in that it will permit the reed to be vertically shifted without exerting too great a friction against the walls of the tube.

Rearwardly of the tube we provide a supporting trough 35 at the rear end of which vertically-extending standards 36 support a spool 37 upon which the roving 29 is wound. Roving 29 is fed from its spool 37 to the trough by a suitable means causing the feed to be at the rate of formation of tube 30. In the present instance we have illustrated tensioned cords 38 as engaging the surface of the roving upon the spool, these cords being drawn through the loom at the same rate of speed as the completed tube 30. At the forward end of the trough vertically-extending guard or fender plates 39 are provided, these plates serving to guard the roving against contact with the warps 40 in their passage to heddle eyes generally designated at 41. Heddle eyes 41, as more clearly shown in Fig. 3, are grouped at opposite sides of tube 31. The forward end of trough 35 and plates 39 can be conveniently supported from the whip rail 13 or any other stationary portion of the machine.

Tensioned cords 38 may be employed to assist in supporting roving 29 between the end of the trough and the adjacent end of the tube 31 and in reducing the friction and tensional strain placed on this roving. To this end the cords 38 have associated therewith a second set of cords 42 which pass beneath trough 35 and underlie the roving after it leaves the end of the trough. Cords 38 and 42 may be guided into proper relation to the roving by means of a guide 43 comprising a block having an opening 44 for the passage of the roving, and openings 45 for the passage of the cords. This block may be connected to the fender plates 39 in any suitable manner which will permit rise and fall thereof in response to operation of the shedding mechanism. In the present instance, the guide is shown as having hangers 46 pivotally engaging the rear edges of these plates. Since cords 38 and 42 will extend into the completed tube 30, they will be subjected to strains placed on this tube and to the strains of the take-up mechanism and will move in accordance with the formation of the tube. Since cords 38 bear against the surface of the roving wound upon reel 37, this roving will be fed from the reel at the rate of formation of the tube. Obviously, any other suitable mechanism could be employed for obtaining the feed of the roving 29 at this speed. Trough 35 is preferably equipped with a roller 47 bearing upon the roving to hold the same in proper position for entrance in the opening of guide 43.

It will be obvious that by use of mechanism of this character a roving incapable of any appreciable tensional strain may be fed directly to the weaving point and a tube woven thereabout. The cords 38 and 42 may be withdrawn from this tube, tests having indicated that this may be accomplished without disturbing the roving even though the cord be knotted. By this method it is, therefore, possible to economically produce the highest grade of insulating tapes containing an asbestos roving which is very loose and fluffy and, accordingly, has good insulating characteristics.

Employing apparatus of this character it is, likewise, possible to deliver the roving in disintegrated form as indicated in Fig. 7. In this figure the rear end of the tube 31 is indicated as connected through a flexible tubing 48 with a blower feed mechanism generally designated at 49. This blower feed mechanism comprises a blower 50 having its outlet 51 extended beneath a hopper 52 adapted to contain a loose fibrous mass of asbestos. From this hopper, through a feed roll 53 and doffer 54, asbestos may be fed downwardly to an opening 56 in the wall of the blower discharge tube 51. The hopper outlet preferably contains a foraminous wall section 57 for the admission of air, the size of this wall section being controlled by a gate 58. Air entering through this wall section and about the comb 59 of the doffer, as indicated by the arrows, will, through the suction created by the passage of the blast from the blower between opening 56, enter the discharge passage and so move to the tube 31 carrying with it the material delivered in regulatable quantities by the feeding mechanism. In order that the operation of the blower may be discontinued at any time that operation of the loom is temporarily discontinued without actually stopping the blower, a valve section 60 is provided in the exhaust tube of the blower between the blower casing and the hopper mechanism. This valve section when shifted, places the exhaust tube in a closed circuit with the intake of the blower through a conduit 61. By utilizing a structure of this character, the blower may be continuously operated at the desired speed and will deliver the proper quantity of material immediately upon shifting of the valve 60 which may, of course, be correlated with the control of the loom mechanism in any suitable manner. The density of the filling thus provided will be determined both by the pressure generated by blower 50 and the quantity of material fed by the feeding mechanism.

As the invention is capable of considerable modification without departing from the spirit of our invention, we do not wish to be understood as limiting ourselves thereto except as hereinafter claimed.

We claim:

1. In a loom, a reed having an opening in the comb thereof for passage of a roving, means closing the dents of the reed at opposite sides of said opening, a shield for the roving passing through said opening and shedding mechanism connected to said shield to raise and lower the same.

2. In a loom, a reed having an opening in the comb thereof for passage of a roving, means closing the dents of the reed at opposite sides of said opening, a shield for the roving passing through said opening, shedding mechanism connected to said shield to raise and lower the same, and

means connecting the shedding mechanism and reed for raising and lowering the reed.

3. In a loom, shed-forming mechanism comprising a reed controlling movement of a portion only of the warps in shedding and heddles controlling all of said warps and said reed

4. In a loom, shed-forming mechanism comprising a reed controlling movement of a portion only of the warps in shedding and heddles controlling all of said warps and said reed, the reed having an opening therethrough for the passage of a roving about which a tube comprising said warps is to be woven.

5. In a loom, a reed comprising a barrier interrupting certain of the dents of the comb thereof, means to reciprocate the reed toward and away from the fell, shedding mechanism, and a connection between the reed and said shedding mechanism to reciprocate the reed in a direction perpendicular to the first-named reciprocation thereof.

6. In apparatus for forming loosely filled textile tubes, the combination with tube-forming apparatus comprising a loom, of a reed having an opening therein, a tube extending from the fell through the reed and rearwardly through the shed, shedding mechanism and an operative connection between the shedding mechanism and the tube to raise and lower the rear end of the tube.

7. In apparatus for forming loosely filled textile tubes, the combination with tube-forming apparatus comprising a loom, of a reed having an opening therein, a tube extending from the fell through the reed and rearwardly through the shed, shedding mechanism, an operative connection between the shedding mechanism and the tube to raise and lower the rear end of the tube, and means for blowing filling fibres through the tube.

8. In apparatus for forming loosely filled textile tubes, the combination with tube-forming apparatus comprising a loom, of a reed having an opening therein, a tube extending from the fell through the reed and rearwardly through the shed, shedding mechanism, an operative connection between the shedding mechanism and the tube to raise and lower the rear end of the tube, and an operative connection between the shedding mechanism and the reed for raising and lowering the reed.

9. In apparatus for forming loosely filled textile tubes, the combination with tube-forming apparatus comprising a loom, of a reed having an opening therein, a tube extending from the fell through the reed and rearwardly through the shed, shedding mechanism, an operative connection between the shedding mechanism and the tube to raise and lower the rear end of the tube, an operative connection between the shedding mechanism and the reed for raising and lowering the reed, and means for blowing filling fibres through the tube.

10. In apparatus for forming loosely filled textile tubes, the combination with tube-forming apparatus comprising a loom, of a reed having an opening therein, and means for delivering filling material through the opening of the reed to the tube immediately adjacent the fell, means to reciprocate the reed toward and away from the fell and means to hold the delivery means from movement toward and away from the fell.

11. In apparatus for forming tubular fabrics, the combination with a flat bed loom of a reed for the loom having a barrier interrupting certain of the dents of the comb thereof, shedding mechanism, a connection between the shedding mechanism and the reed for raising and lowering the reed, means to reciprocate the reed toward and away from the fell and means for feeding a roving through the reed held against movement toward and away from the fell.

12. In apparatus for forming filled tubular fabrics, the combination with tube-forming mechanism comprising a flat bed loom of a reed for the loom having an apertured barrier interrupting certain of the dents of the comb thereof, shedding mechanism, a connection between the shedding mechanism and the reed for raising and lowering the reed, and means for feeding a roving through the aperture of the barrier while shielding the roving from the warps.

13. A flat bed loom employing two vertically superposed groups of warps and other groups of warps arranged at opposite sides of the first-named groups, a reed controlling the first-named groups to alternately displace said groups from the shed and shedding mechanism controlling the warps of all of said groups and said reed.

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