

Oct. 13, 1936.

K. W. HUFFINE

2,057,191

ROLL FORMING DEVICE

Filed Aug. 27, 1931

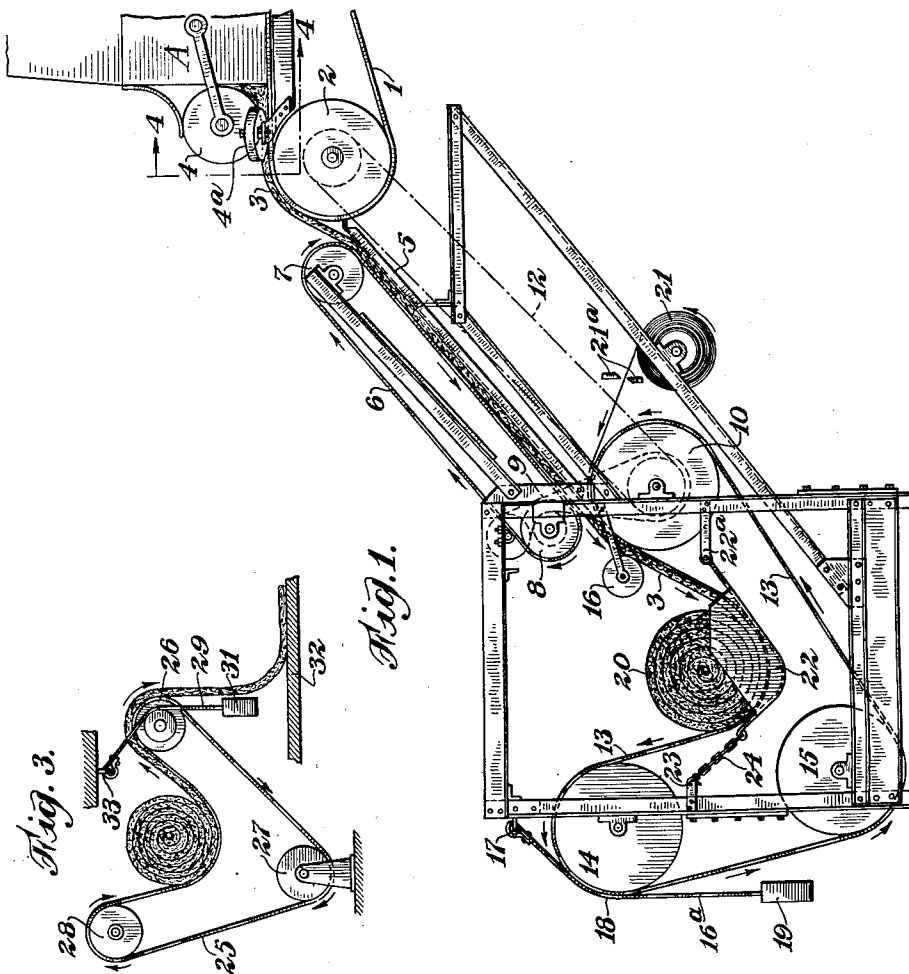


Fig. 1.

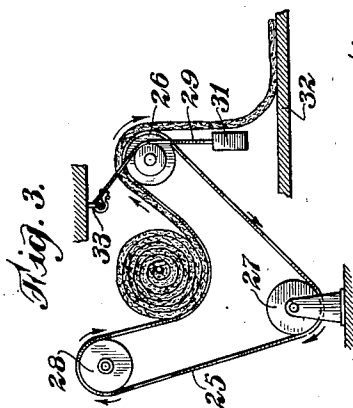


Fig. 3.

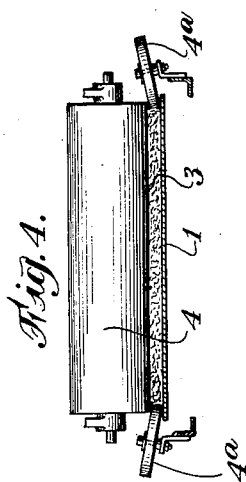
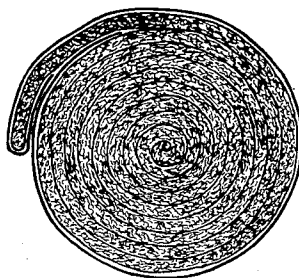


Fig. 4.

Fig. 2.



INVENTOR
Kenneth W. Huffine.

BY *D. H. Halstead*
ATTORNEY

UNITED STATES PATENT OFFICE

2,057,191

ROLL FORMING DEVICE

Kenneth W. Huffine, Alexandria, Ind.

Application August 27, 1931, Serial No. 559,684

3 Claims. (Cl. 19—162)

This invention relates to an apparatus and method for winding or unwinding felted material and is particularly adapted for the production of rolls from sheet material of inherently low tensile strength, such as felted sheets of frangible non-textile fibre.

Heretofore numerous difficulties have been encountered in forming into rolls felts of mineral wool such as slag wool or rock wool, for example, in which the fibers are present in a loosely associated form. This difficulty has been particularly pronounced in connection with aeriformed felts such as are produced in rock wool blow chambers of the felting type such as is described in U. S. patent to Powell #1,656,828. The felt thus formed comprises fibers relatively loosely associated. The felt possesses little tensile strength and may be readily pulled apart. A principal object of the present invention is the provision of means whereby such felt may be formed into rolls or unrolled readily, without substantial tension and without stretching the felt to such an extent that its continuity is broken. Other objects will appear from the description that follows.

Referring to the drawing which illustrates diagrammatically the preferred embodiment of the invention, Fig. 1 is a side view of the felt rolling device in combination with a blow chamber of the felting type such as described in the above mentioned Powell patent.

Fig. 2 is an end view of a roll of felt as produced by the device of Fig. 1.

Fig. 3 is an end view of a modification of the unwinding and winding device particularly adapted for unwinding the roll.

Fig. 4 is a cross sectional view on line 4—4 of Fig. 1 in the direction of the arrows.

In Fig. 1 the outlet of a felting blow chamber such as is described in the above mentioned patent is indicated generally at "A". In this chamber the rock wool is collected as an aeriformed felt on an endless belt 1 which forms a floor of the chamber. The felt is somewhat smoothed over its upper surface by a roll 4 as it emerges from the chamber. In accordance with my invention the winding device is preferably disposed adjacent the outlet of the chamber so that the felt may be fed directly thereto by suitable felt feeding means. The felt is passed between edge rollers 4a and to the slide 5 suitably inclined and is positively moved along the slide by an endless belt 6 disposed adjacent thereto. The rollers 4 and 4a serve to shape the felt to a certain degree, as by trueing it up and roughly

squaring up the edge. Belt 6 is stretched between pulleys 7 and 8. The pulleys 8 and 10 are driven by the chain 9. Pulley 10, in turn, is driven by the chain 12 from the shaft of pulley 2. The felt 3 is delivered from the slide 5 to an endless and very flexible belt 13, suitably of chain wire mesh, which passes over the pulleys 10, 14, and 15 and under the roll 16 for slightly compressing and smoothing the felt. The conveyor supports 10 and 14 are spaced horizontally from each other, suitably at fixed distances.

The belt has extra length over that required to pass around the system of conveyor supports including the three pulleys. Between the two pulleys 10 and 14, or conveyor supports spaced horizontally from each other, the belt has a depending portion of cradle-like configuration, the length of the depending portion and the spacing of the supports being such that the felt will remain in the depending portion due to its own weight during movement of the conveyor, and is folded back on itself during the course of its travel along the depending portion and progressively wound into roll form. A drag or brake is applied continuously to the belt as it passes over pulley 14. The braking means may consist of a piece of fabric belting 16a, hanging from the support 17 in such manner as to rest on the belt 13 at point 18, and tautened by the weight 19. The brake provides means for applying frictional resistance to a suitable part of the conveyor so as to maintain the reaches of the conveyor between the various supports, except the reach comprising the depending portion between the horizontally spaced supports, in a substantially taut condition.

As the sheet of felt 3 comes into this cradle and starts up the steep outlet side, the end of the sheet falls over, or is folded over manually, to start the roll 20 which becomes progressively larger. When the diameter becomes as great as desired, the roll is severed, as by hand, from the sheet of incoming felt. The linear speeds of the felt fed to the cradle and of the portion of the cradle in contact with the felt may be identical.

The roll may be wrapped in paper, burlap, tarpaper, or other wrapping material tougher than the fibre in the roll. This wrapping or lining material may be fed in by hand or from the roll 21, on to the depending portion of the conveyor simultaneously with the felt, and cut as desired by the cutters 21a. As shown in Fig. 2, the paper is preferably applied only to the last one or two convolutions of the felt, and is lapped over the end of the felt so that the assembly may be

clearly marked and prevented from being pulled apart.

The roll is then removed from the cradle and the process repeated. During the forming of the roll 20, guide plates 22, one at each end of the roll, serve to keep the ends of the roll more or less true. The guide plates are supported as at points 22a and 23 and may be lowered out of position by unhooking chain 24 from the support 23.

The winding, it will be observed, is accomplished without substantial compression of the felt, that is, without severe crushing of the fibres, the only pressure on the felt during its formation into a roll being that due to the mass of the fibres themselves.

The contour of the cradle formed between rolls 10 and 14 may be varied. I have found satisfactory such a contour that the depth of the cradle is in excess of the diameter of the roll of rock wool which it is desired to form in the cradle. The steepest part of the upward side of the cradle, leading to pulley 14 may have a portion of substantial length and substantially uniform pitch that, may be nearly vertical, say at a pitch of not less than 60°, suitably 70 to 85°. The downward slope of the cradle, on the side adjacent to pulley 10, should have a more gentle slope. I have used satisfactorily a cradle of a total depth, below the highest point over which the belt 13 passes, that is approximately equal to the distance between the two nearest points of the supporting pulleys 10 and 14. The length of the portion of the belt depending as the cradle is substantially constant.

The cradle supports the felt during the rolling and thus relieves it of tension.

The width of the sheet of felt to be rolled may be varied within limits. I have used to advantage a width of 24 to 30 inches. The diameter of the finished roll may well be 1 to 2 feet, suitably 1½ feet.

The rolls formed as described have no core of foreign substance; however such a core may be employed.

The rock wool or other fibre to be felted and rolled may contain a binder, as for example, a small amount of well distributed wax, oil, or asphalt. In many cases, the presence of this binder facilitates the felting and rolling process.

In Fig. 3 is shown a side view of a modified device for unwinding or unrolling a roll of rock

wool felt, formed as described above. The roll, untied, is placed in the cradle of a flexible belt 25 passing over the pulleys 26, 27, and 28, the hub of the pulley 26 being provided with a drag or brake 29, consisting suitably of a piece of fabric belting suspended from the support 33, and tautened by the depending weight 31. The unwound felt, after passing over the pulley 26, leaves the supporting belt and may then be laid directly on an article 32 to be insulated.

What I claim is:

1. An apparatus for forming into a roll a shaped felt of frangible fibres, of the type of mineral wool, comprising two spaced supports, a flexible conveyor member passing over the said supports and depending therebetween, to form a portion of cradle-like configuration, means moving the conveyor, braking means acting upon the conveyor at a position adjacent to the portion of cradle-like configuration and posterior thereto, with respect to the direction of movement of the conveyor, and means for supplying the shaped felt continuously to the said portion.

2. The method of forming a roll of a felt of frangible fibres, of the type of mineral wool, which comprises forming and shaping the felt, continuously feeding the felt into a depending portion of cradle-like configuration of a moving conveyor belt, passing the felt between side guide members to true up the edges of the felt, and forming the felt into a roll in the said depending portion, while at all times maintaining the felt under no substantial compression.

3. An apparatus for winding felts of frangible fibers of mineral wool or the like which comprises a system of supports including two pulleys spaced horizontally from each other, an endless conveyor carried by the said supports, a depending portion of the conveyor between the said spaced pulleys, means for supplying a felt to the conveyor, means for moving the conveyor on the supports, and means for applying frictional resistance continuously to the conveyor to maintain the reaches of the conveyor substantially taut except in the said depending portion, the length of the depending portion being substantially greater than the distance between the said spaced pulleys and adapting the depending portion to fold the felt back on itself and to progressively wind the felt into a roll.

KENNETH W. HUFFINE.