

May 23, 1950

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2,508,968

MANUFACTURE OF FELTED MATERIAL

Filed Nov. 29, 1946

2 Sheets-Sheet 1

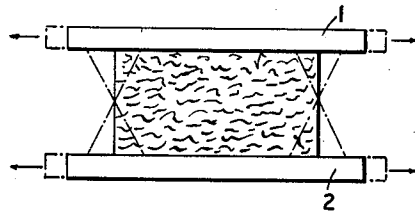


Fig. 1.

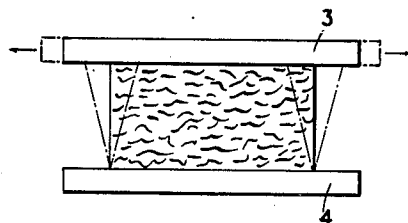


Fig. 2.

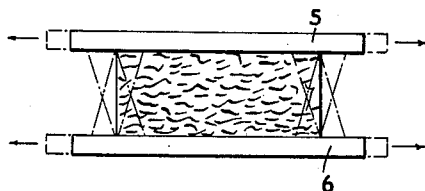


Fig. 3.

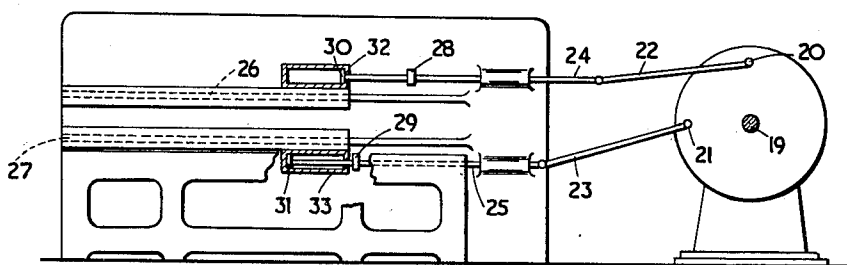


Fig. 6.

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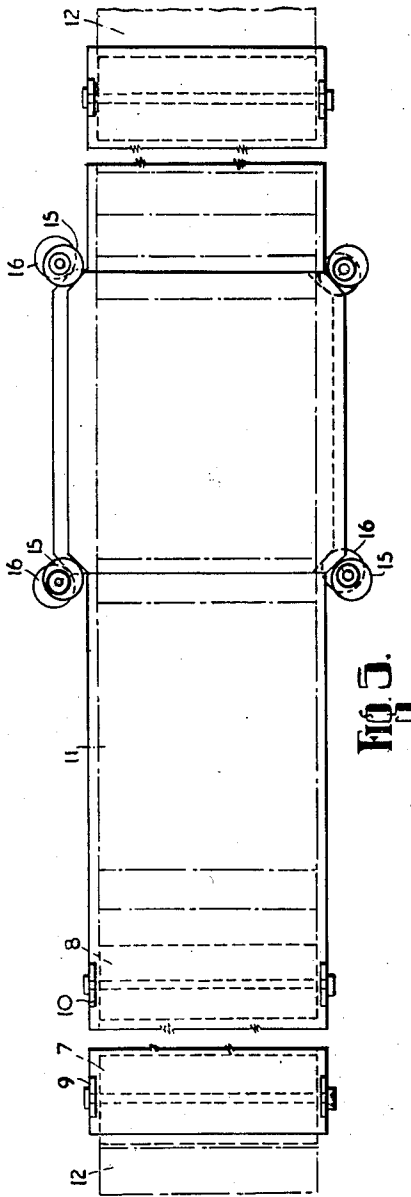
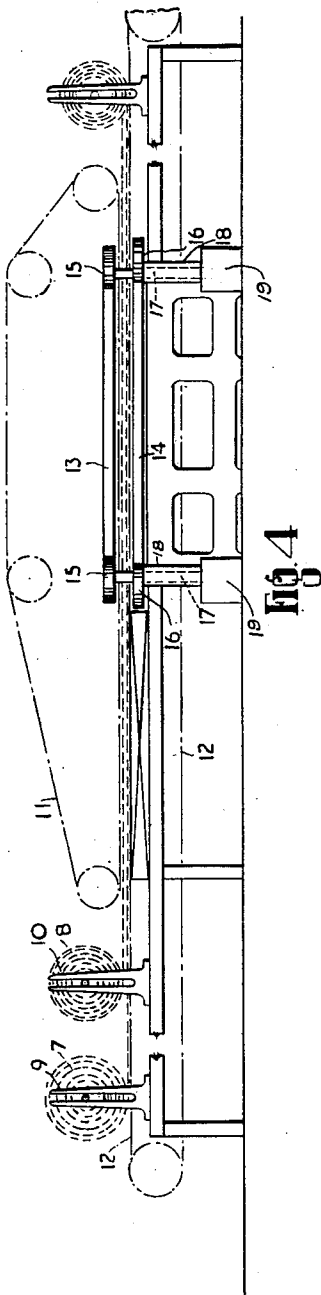
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MANUFACTURE OF FELTED MATERIAL

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2 Sheets-Sheet 2



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MANUFACTURE OF FELTED MATERIAL

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Patent expires October 26, 1965

5 Claims. (Cl. 28—14)

1

The present invention relates to improvements in the manufacture of felted material from textile fibre, including animal, vegetable or mineral fibre, such as wool, cotton, asbestos or glass.

In the manufacture of felted material it has been usual to form a lap or batt on a carding engine and then subject a number of such laps or batts to a hardening process.

In one such hardening process, the unfelted laps or batts are constrained between two plates or groups of rollers as the case may be, or a plate and group of rollers, the plates or the two groups of rollers being oscillated in their own planes simultaneously in opposite directions.

Such processes have the effect of hardening or condensing the outer layers of the lap or batt, whilst, however, the interior remains loose due to the absence of movement of, or partial movement of the fibres in the interior of the lap or batt. In another of such hardening processes, the unfelted laps or batts are constrained between two plates, one of which is oscillated or otherwise displaced in its own plane, whilst the other remains stationary. In a further known hardening process, the unfelted laps or batts are passed between a series of nip rolls, the rollers on one side rotating about their axes, whilst at the same time oscillating axially, whilst the other group of rollers on the opposite side of the lap or batt rotate about stationary axes.

In these latter two cases, that side of the felt in contact with the movable element will receive the maximum amount of fibre disturbance which becomes progressively reduced towards the other side.

According to the present invention one or more laps or batts of fibre to be hardened are constrained between elements on opposite sides, each of said elements being movable, but at any one moment of time, one element will be stationary whilst the other will be moving. By this means a uniform fibre disturbance is obtained throughout the thickness of the lap or batt.

The invention is further described with reference to the accompanying diagrammatic drawings, in which:

Fig. 1 is a diagram of one known form of hardening machine,

Fig. 2 is a diagram of another known form of hardening machine,

Fig. 3 is a diagram showing the method of hardening of felt according to this invention,

Fig. 4 is a side elevation of a machine operating according to this invention,

Fig. 5 is a corresponding plan view,

2

Fig. 6 is a diagrammatic view showing another form of device.

In the known method illustrated diagrammatically in Figure 1 a lap or batt of fibre is constrained between two plates 1, 2 or groups of rollers as the case may be or a plate and a group of rollers, the plates 1, 2 or the two groups of rollers being oscillated in their own planes simultaneously in opposite directions, from which it will be seen that fibre displacement will be zero along the median plane between the two plates or groups of rollers. The resultant felt sheet or web will of necessity be soft and loose along its centre.

In the arrangement of Figure 2 where the top plate 3 alone is oscillated or otherwise displaced in its own plane whilst the other plate 4 (or group of rollers) is stationary, one side of the felt will be hardened, but the felt will be progressively softer towards the other side which obviously remains in its original condition.

In the arrangement of the present invention, however, shown diagrammatically in Figure 3 where one plate 5 (or group of rollers) is moving whilst the other plate 6 (or group of rollers) is stationary, and then the plate 5 is stationary whilst the plate 6 is moving, then it will be readily appreciated that the fibre movement will be uniform throughout the lap or batt in that whilst the outer surface of the lap is moving twice the distance of the fibre in the median plane, the fibre lying in the median plane is operated upon for twice the time.

In the machine shown in Figures 4 and 5 soft laps or batts of fibre or felt to be hardened on storage rolls 7, 8 may be held in supports 9, 10 respectively, and fed between top and bottom carrying cloths 11, 12 to be passed thereby either step by step or continuously and slowly between the pair of plates 13, 14. Instead of a pair of plates 13 and 14, either the top plate 13 or the bottom plate 14 or both may be in the form of a set of rolls held in a frame. The plate 13 or the top group of rollers as the case may be, is adapted to be oscillated in its own plane, whilst the bottom plate 14 or group of rollers, as the case may be, is stationary and vice versa. This may be effected by means of cams, 15, 16, disposed at the four corners of the plate (as shown in Fig. 5), mounted on intermittently driven shafts 17, 18, respectively, which shafts may be independently driven or geared together in groups, so that the top plate or group of rollers 15 is moving when the bottom plate or group of rollers 16 is stationary and vice versa. In the embodiment shown in Figure 5, driving arrange-

3

ments 19 are shown each of which intermittently drives the shafts 17 and 18 at one corner of the plate as explained above. Of course, the four driving arrangements 19 at the four corners of the plate are properly synchronized so as to displace the bottom plate in its own plane while the top plane 13 is stationary, and vice versa. In a simple form, of course, the cams 15, 16 may be mounted on the same driving shaft, but one set of cams 15, may be disposed out of phase with the other set of cams 16.

Another arrangement purely by way of example is shown diagrammatically in Fig. 6 where a rotating shaft 19 has a pair of crank pins 20, 21 connected respectively to connecting rods 22, 23 connected to slide links 24, 25, respectively, which have lost motion connection, being conveniently in the form of stops such as 28, 29 and stops 30, 31, on the slide links 24, 25 respectively, engaging stops 32, 33, respectively, connected to the plates 26, 27.

It will be noticed that in each case the top plate or set of rollers as the case may be is moving whilst the bottom plate or set of rollers is at rest and vice versa.

It has been found that by this means an improved felting is obtainable, both as regards effect on the finished felt and as regards time and energy spent in this process, and in the subsequent milling or felting processes.

I declare that what I claim is:

1. A method of hardening fibrous material consisting in constraining a number of laps of fibre between a pair of elements in parallel planes and alternately displacing each element in its own plane in opposite directions at times only when the other element is stationary.

2. A method of hardening fibrous material consisting in constraining a number of laps of fibre between a pair of plates in parallel planes and

4

alternately displacing each plate in its own plane in opposite directions at times only when the other plate is stationary.

3. A machine for hardening laps of fibrous material consisting in combination of a pair of constraining elements spaced in parallel planes, and means to displace one constraining element in its own plane whilst the other constraining element is stationary, and vice versa.

4. A machine for hardening laps of fibrous material consisting in combination of a pair of plates spaced in parallel planes, and means to displace one plate in its own plane whilst the other plate is stationary, and vice versa.

5. A machine for hardening laps of fibrous material consisting in combination of a pair of constraining elements spaced in parallel planes to constrain fibrous material between them, conveyor means to displace said fibrous material progressively between the said constraining elements, and means to displace one constraining element in its own plane whilst the other constraining element is stationary, and vice versa.

CYRIL PHILIP DE MUSCHAMP PORRITT.

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