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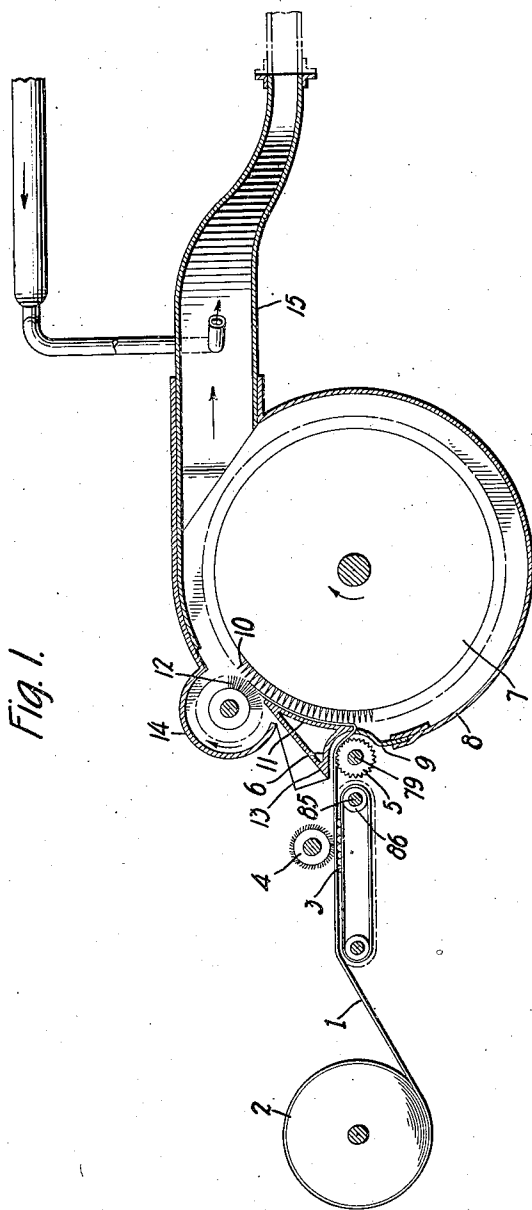
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CARDING AND FORMING APPARATUS

Filed July 24, 1928

2 Sheets-Sheet 1



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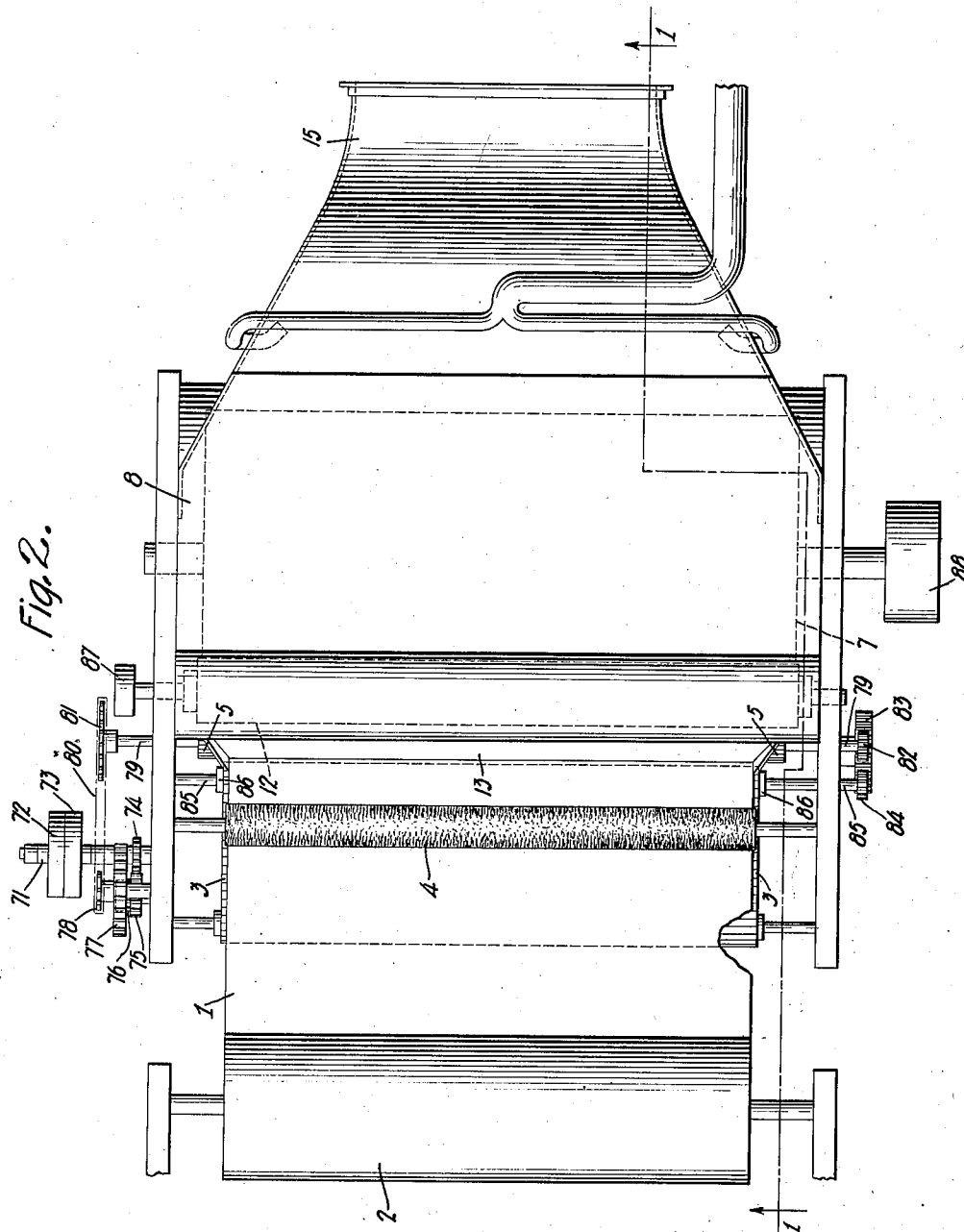
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Fig. 2.



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CARDING AND FORMING APPARATUS

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5 Claims. (Cl. 19—33)

This invention relates to the formation of loosely felted fibrous material, the conversion of sheets or webs of wood-pulp into webs of such material, and the application of backing webs thereto.

In a preferred form of the invention and as illustrated herein a continuous sheet of wood pulp is fed by a conveyor to a carding roll, and broken up by the carding roll to separate it substantially into individual, unconnected fibers. The broken material is transferred by a suction conveyor and delivered at high speed by the conveyor to a forming belt.

One feature of the invention relates to means for causing the relatively coarse particles of material which survive the carding action to be separated out and resubjected to the carding action automatically as many times as may be necessary to reduce them to the desired degree of fineness.

Other objects and advantages will hereinafter appear.

In the drawings forming part of this specification:

Figure 1 is a sectional side elevation of a portion of the apparatus particularly including the carding means, the section being taken on the line 1—1 of Figure 2; and

Figure 2 is a plan view of the portion of the apparatus disclosed in Figure 1.

As will be best understood from an inspection of Figure 1, a continuous web or sheet 1 of wood pulp is led from a reel 2 onto a belt conveyor 3, which conveyor in cooperation with a feed roll 4 feeds the material between a serrated feed roll 5 and a curved guide 6 for presenting the material to a carding roll 7 which rotates in a clockwise direction within a casing 8. In entering the casing 8 the material passes between the lower edge of guide 6 and the upper edge of a leather sealing strip 9. The carding roll 7 is provided with teeth or bristles 10 which engage the material as it is introduced into the casing 8, tear it in pieces and carry the pieces around with it. An arcuate presser plate 11 which forms a section of casing 8 lies closely adjacent the carding roll and causes the material to be torn into fine bits so that the fibers are separated individually from one another. Some of the pieces of material, however, pass the presser plate without being torn up so finely, and as it is not desired to transmit these relatively coarse pieces to the forming conveyor, provision is made of means for separating such pieces cut and turning them back for re-subjection to the

carding action. Such separating means comprises a brush 12 just above the presser plate 11 and in proximity to the carding roll, which brush is rotated in a clockwise direction. This brush may be operated at the same angular speed as the carding roll or the drive gearing may be arranged to procure any speed relation found to be desirable. As the adjacent surfaces of the carding roll and the brush move in opposite directions, the brush will be effective to throw outward toward the left the relatively coarse pieces of material engaged by it. Provision is made of a chute 13 for catching the thrown out material and conducting it by gravity onto the sheet of wood pulp which is being fed to the carding roll. The material may thus be repeatedly subjected to the carding action until it has been reduced to the desired degree of fineness.

The separating brush necessarily engages and throws outward some of the more finely divided material, and as it is desirable to retain this material within the casing, the apparatus is arranged to accomplish this result.

The casing 8 is provided with an enlargement 14 which surrounds the separating brush 12 and is spaced a short distance therefrom. The lower edge of this casing enlargement 14 terminates a short distance above the chute 13 so that a restricted outlet opening is provided. The entire casing has suction applied thereto, as will be more fully explained herein, so that there is a stream of air constantly entering the casing through the restricted opening between the lower edge of enlargement 14 and the chute. This incoming air opposes the discharge of the thrown out material, and while it is incapable of preventing the discharge of the relatively coarse pieces, it is effective to hold the light, finely divided pieces in the casing.

Because of the rotation of the separating brush in a clockwise direction, a current of air is set up in a clockwise direction around the brush 12. This current is strong enough to catch up the lighter pieces of material and carry them between the brush and the casing enlargement 14 back to the carding roll at the upper side of the brush. The carded material is withdrawn from the casing through a suction conveyor 15.

The driving means for the parts described are briefly as follows: A shaft 71 carries pulleys 72 and 73, the former being loose on the shaft and the latter being fixed thereto, so that by shifting a drive belt (not shown) between the pulleys the shaft may be rendered idle or active at will. The

shaft is connected through a train of gears 74, 75, 76, and 77 to drive a sprocket 78 and the latter drives the shaft 79, on which serrated roller 5 is mounted, the driving connection consisting of a chain 80 and a sprocket 81 fast on shaft 79. At the opposite end of shaft 79 provision is made of a pinion 82 which through gears 83 and 84 drives shaft 85 synchronously with shaft 79. Shaft 85 has roller 86 fast thereon and through said roller drives endless conveyor 3. The conveyor 3 and the roller 5 are thus controlled in common but the control is independent of the other operating parts.

Rotary brush 12 is independently driven by a pulley 87, the rotation of the brush being in a clockwise direction, as viewed in Figure 1. The carding roll 7 is independently driven by a pulley 88.

While I have illustrated and described in detail certain preferred forms of my invention, it is to be understood that changes may be made therein and the invention embodied in other structures. I do not, therefore, desire to limit myself to the specific constructions illustrated, but intend to cover my invention broadly in whatever form its principle may be utilized.

I claim:

1. In a carding machine, in combination, a carding roll, a casing surrounding said roll whereby rotation of the roll sets up a fanning action, means for feeding material to be carded to the roll, a suction conveyor communicating with the casing for conducting the carded material away from the roll, means located in advance of the suction conveyor for striking and throwing out of the casing any material above a predetermined size, a chute for catching the material thus thrown out and conducting it back onto the feeding means for re-presentation to the carding roll, and means for pneumatically preventing the throwing out of finely divided material.

2. In a carding machine, in combination, a carding roll, means for feeding material to the roll in a location such that the material will be carried upward by the roll at carding, a brush

located above the feeding means and in proximity to the carding roll for throwing out and returning to the feeding means by gravity material above a predetermined size, and means for pneumatically preventing the throwing out of material below such size.

3. In a carding machine, in combination, a carding roll, a casing surrounding the roll, suction means for conducting the carded material away from the roll, a presser cooperating with the roll in carding the material, a separating brush for throwing out the relatively coarse pieces of material that have passed the presser, there being a narrow opening in the casing through which the thrown out material is discharged and through which air enters the casing at high velocity for preventing the discharge of the more finely divided material.

4. In a carding machine, in combination, a carding roll, a casing surrounding the roll, suction means for conducting the carded material away from the roll, a presser cooperating with the roll in carding the material, a separating brush for throwing out the relatively coarse pieces of material that have passed the presser, there being a narrow opening in the casing through which the thrown out material is discharged and through which air enters the casing at high velocity for preventing the discharge of the more finely divided material, the separating brush being rotated in the same direction as the carding roll, and the casing being enlarged to surround the brush so that the finely divided material acted on by the brush but retained in the casing by the incoming air may be blown around by the brush and returned to the carding roll.

5. The method of making felt, which comprises subjecting material to a carding action, mechanically separating out the relatively coarse pieces of material surviving after the carding action, and resubjecting them to the carding action until they have been reduced to the desired degree of fineness, and pneumatically preventing separation of the fine pieces.

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