Jan. 19, 1937. J. KRONHEIM 2,068,139

MACHINE FOR MAKING STUFFING FOR FURNITURE

Original Filed Aug. 1, 1933 3 Sheets-Sheet 1

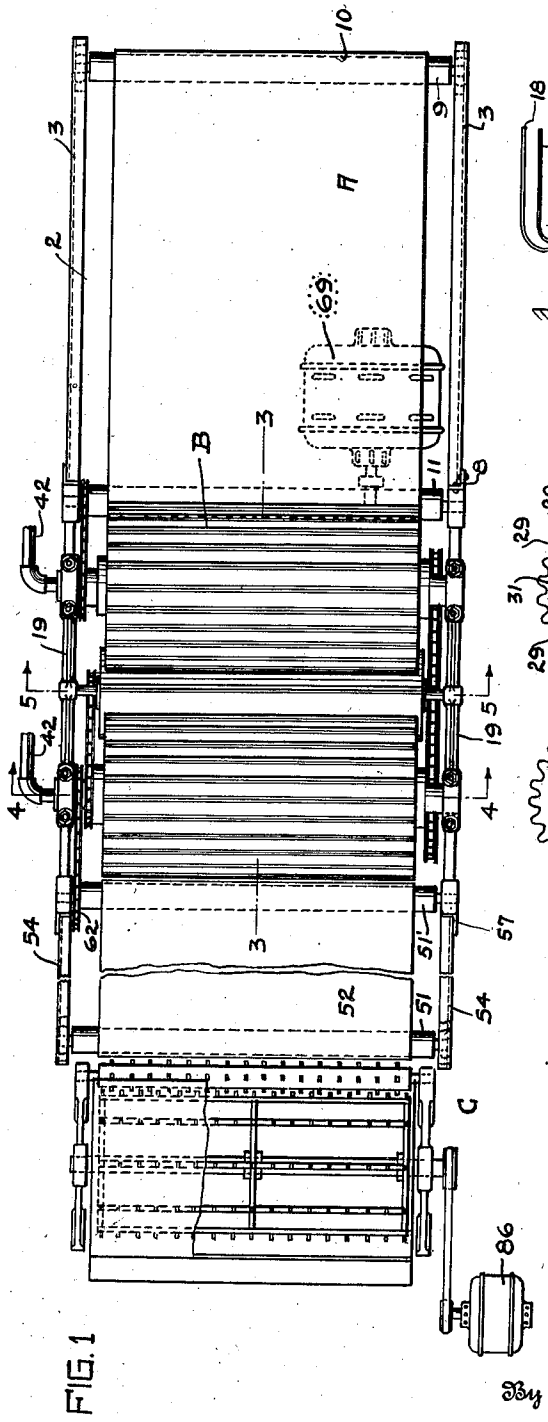

FIG. 1

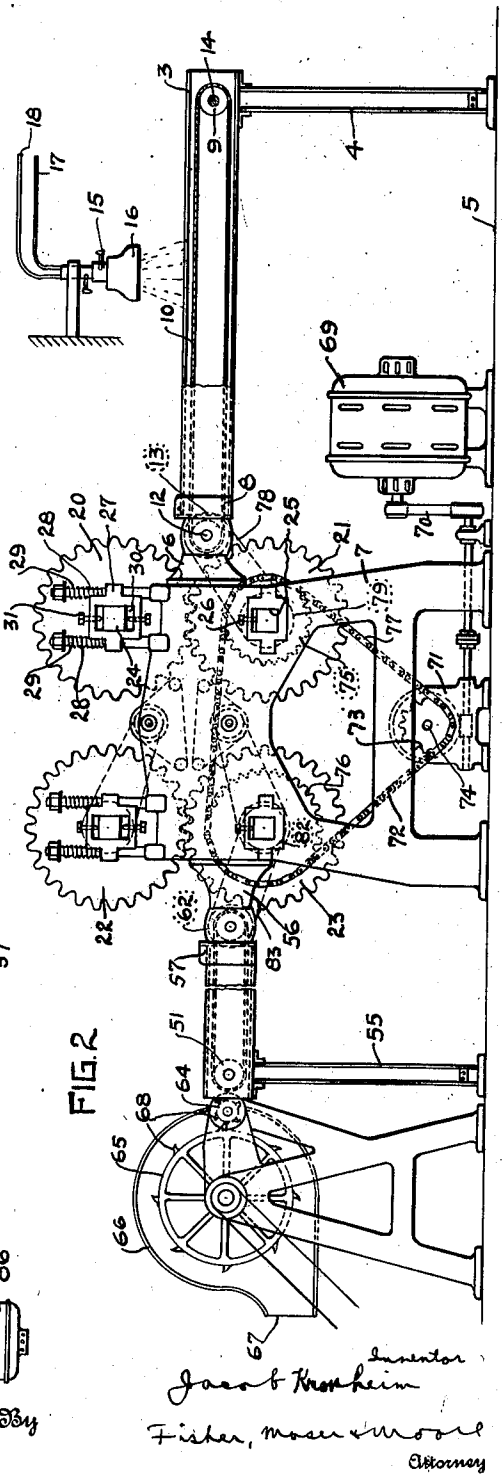

FIG. 2

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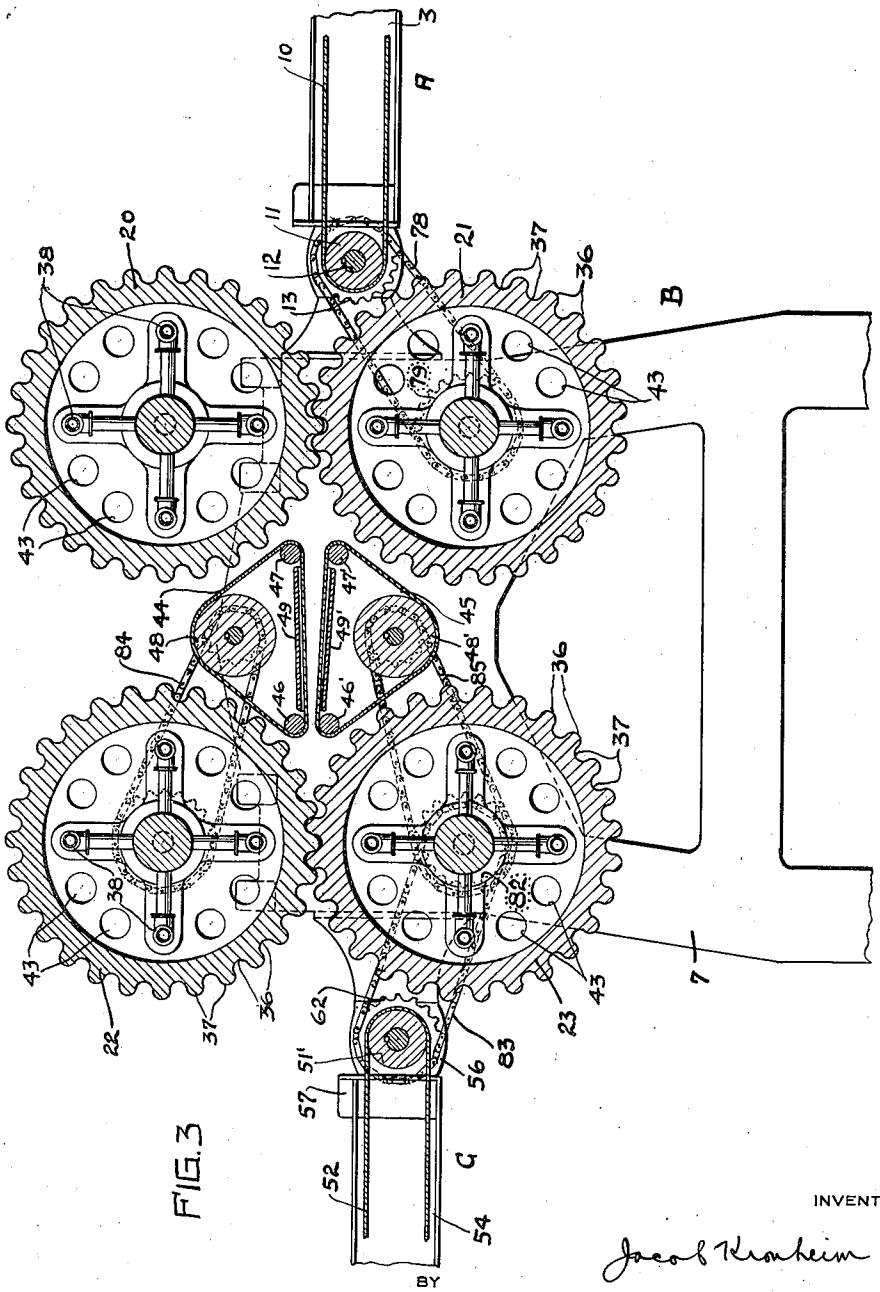

FIG. 3

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FIG. 4

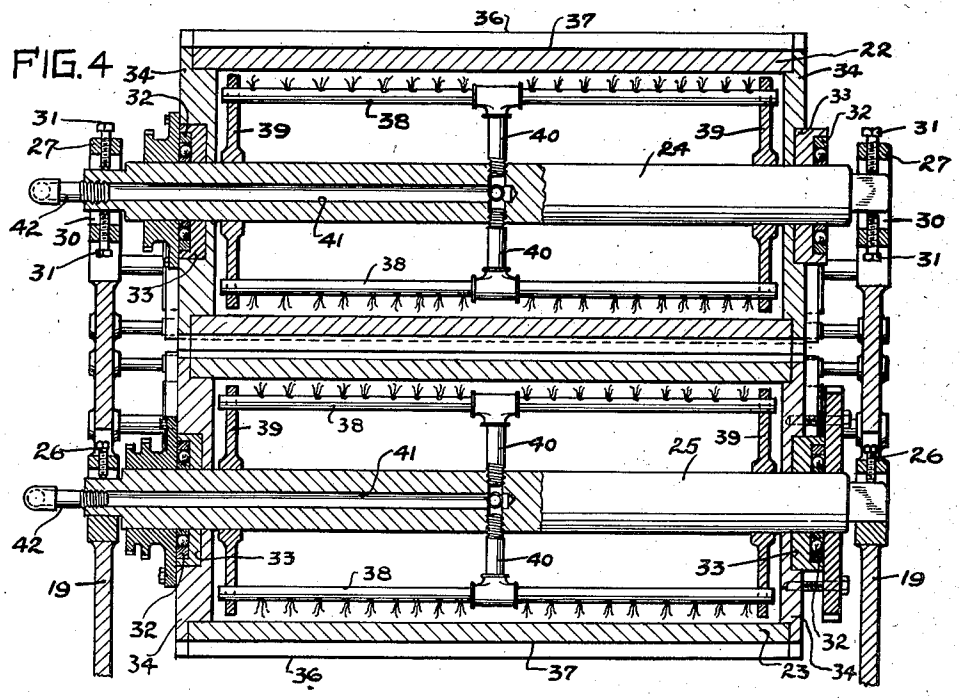
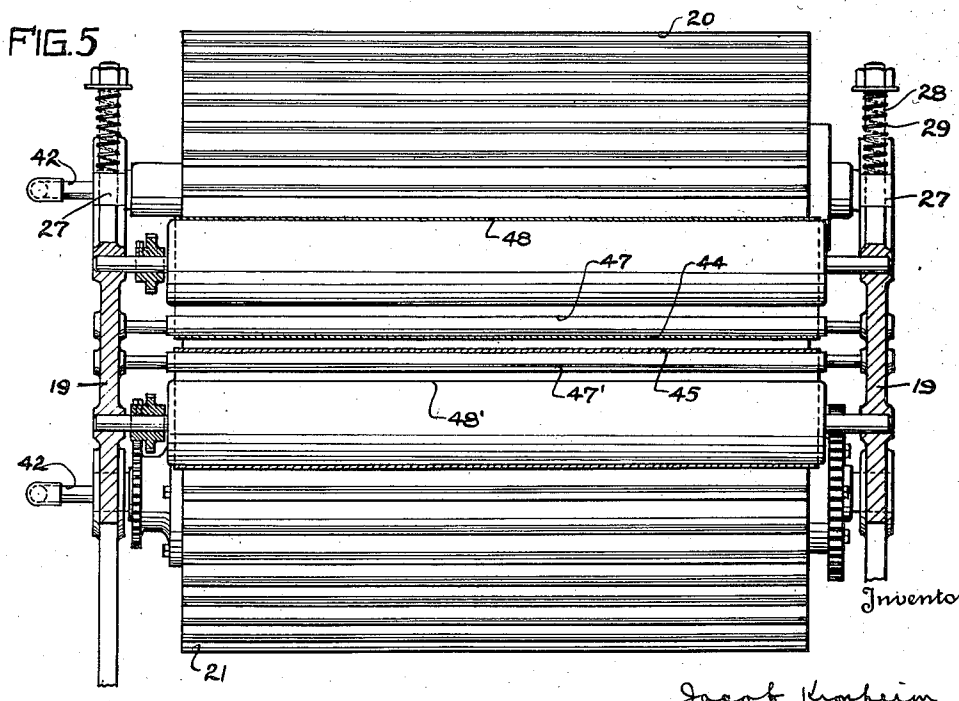


FIG. 5



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UNITED STATES PATENT OFFICE

2,068,139

MACHINE FOR MAKING STUFFING FOR FURNITURE

Jacob Kronheim, Cleveland, Ohio

Application August 1, 1933, Serial No. 683,223
Renewed July 24, 1935

7 Claims. (Cl. 19—66)

My invention relates in general to stuffing for chairs, cushions, mattresses and the like and more particularly to sanitary, strong, durable, and resilient, fibrous stuffing, which will not pack, grind and/or gather up in use, and which can readily be made from strips or strands of raw fibrous material sprayed with water or other fluid, curled, dried and finally pulled or picked apart to impart the desired fluffiness to the finished product.

At present stuffing having the above characteristics is made in a continuous process by machines such as described in my copending application Serial No. 682,703, filed on July 28, 1933, wherein the raw fibrous material is subjected to curling operations by forcibly pressing the material into contact with the corrugated surface of a heated rotating curling drum, for an appreciable length of time. This extended contact with the heated drum frequently results in the raw material becoming burnt during the curling operations or so dry that it becomes brittle. Furthermore, the number of curls which machines of the type referred to are capable of imparting is very limited and it is impractical to provide them with means for increasing the curls.

The general object of the present invention is to provide an improved machine for economically and continuously producing stuffing from raw fibrous material in which the material is subjected to several curling and drying operations, for short time intervals, by means of a plurality of successively arranged sets of curling and drying means.

Another object of the present invention is to provide a machine adapted to produce overlapping curls in the fibrous raw material by means of sets of successively arranged curling and drying means.

With the above objects in view and in order that those skilled in this art may have a full and complete understanding of the structural and functional advantages of a machine embodying this invention and in order that the attainment of other desirable objects may be indicated, I have illustrated in the accompanying drawings a preferred embodiment of the invention and throughout the various views of these drawings like reference characters refer to the same parts.

In the accompanying drawings:

Figure 1 is a plan view of a machine embodying the invention, which machine produces in a continuous manner the finished stuffing from raw material fed thereinto;

Figure 2 is a side view of Figure 1;

Figure 3 is an enlarged transverse view on line 3—3 of Figure 1;

Figure 4 is an enlarged cross sectional view through a set of curling drums of the machine, the section being taken on line 4—4 of Figure 1; and

Figure 5 is an enlarged cross sectional view through the conveying means of the machine between the two curling sets, the section being taken on line 5—5 of Figure 1.

The machine herein described, which is designed to produce a resilient, fibrous stuffing material in a continuous manner, comprises three sections, the section A for spraying the raw material with water or other fluid, the curling and drying section B, and the picking and delivery section C. Of course all three sections of the machine cooperate continuously in producing the finished product, but it is thought that the operation of the machine will be best understood by describing each section, in turn.

Section A comprises a frame 2 of laterally spaced channel irons 3, having at their outer ends legs 4, which are preferably mounted in a foundation 5, extending lengthwise of the machine. The inner ends of channels 3 are connected to and supported by laterally extending arms 6 of the main frame 7 of the curling and drying section B, angle irons 8 riveted to frame 2 being employed to connect the parts 3 and 6 together, as by riveting or the like. The outer ends of channel irons 3 rotatably support an idler roller 9, and arms 6 of frame 7 rotatably support a driven roller 11, and mounted upon these rollers is an endless conveyor belt 10. The shaft 14 of idler roller 9 is stationary, whereas the shaft 12 of driven roller 11 is rotatably supported, and carries at one end a driving gear 13. A spraying device 15 embodying a nozzle 16, connected by means of supply lines 17 and 18 with a supply tank, not shown, is arranged above belt conveyor 10. Water, or where desirable, a chemical solution is sprayed upon the material while the latter is being conveyed toward the curling and drying section.

After the raw material has been dampened, this material is simultaneously curled and dried while advancing through curling and drying section B. This section includes the main frame 7 previously referred to, which frame consists of two oppositely arranged frame members 19, mounted on foundation 5 and rigidly secured together and properly spaced with respect to each other. Frame members 19 support two sets or pairs of cylindrical curling and drying drums, one set being arranged in advance of the other, the for-

ward pair consisting of upper and lower cooperating drums 20, 21 and the rear pair of upper and lower drums 22 and 23, all of which drums are rotatably mounted upon their respective upper and lower hollow shafts 24 and 25, non-rotatably supported at their opposite ends in frame members 19. As the various drums and mountings therefor are substantially identical a description of one set or pair will suffice for both. The lower shaft 25 of the lower drum 23 of the forward pair of drums is secured in a suitable opening in members 19 against vertical and longitudinal movement by means of set screws 26. The upper shaft 24 is mounted for vertical adjustment in elongated openings 30 of brackets 27, inturn slidably mounted on parallel posts 28 and yieldingly forced against their seats by compression springs 29, set screws 31 being employed for securing the shaft in desired adjusted position.

Anti-friction roller bearings 32 mounted in perforated disks 33, inturn attached to the side walls 34 of the drums reduce friction between the drum shafts and their respective drums to a minimum. The cylindrical surface or periphery of the drums is longitudinally corrugated to provide a curling surface embodying elongated ribs 36 and grooves 37 of substantial depth. The ribs and grooves of each set of curling drums mesh and cooperate with each other during curling operations to resiliently press the material fed thereto into the grooves of the drums.

It is essential that the raw material fed to the drums by conveyor belt 10 be subjected to both heat and pressure, in order to produce the desired curling effect, thus the pressure is exerted by the cooperation of the two drums of each set and the heat is individually supplied by each of said drums. Each drum encloses in its hollow body a plurality of gas burners 38 mounted on brackets 39 inturn rigidly secured to the stationary supporting shaft of said drum. Burners 38 communicate through pipes 40 with the bore 41 of their respective shafts, fuel being supplied through pipe 42, connected with any suitable source of supply, not shown. A plurality of openings 43, arranged in the side walls 34 of the drums provide the necessary air for the burners 38, four of which provide the desired heat to each drum. As one set of drums is materially spaced from the other set, the heated raw material energizing from the forward set will not be immediately subjected to the heat and pressing action of the second set, in other words the continuity of the curling and drying action of the drums is broken. Furthermore as the material is fed in a straight line through the respective sets of drums, as will be presently understood, the period of contact between the drums and the raw material is of short duration, the drums may be heated to relatively high temperatures without danger to the raw material.

The use of two or more sets or pairs of curling drums through which the material is successively fed, insures a more thorough drying and curling action and also permits of a much finer and greater number of short curls being made than heretofore. The length and therefore the number of curls formed in the raw material can be readily regulated or predetermined by timing the rotation of the sets of drums with respect to each other, or by specifically timed conveying means which carry the material from one curling set to the other. The latter arrangement, which is specifically disclosed in the exemplified form of the invention, embodies two cooperating belt conveyors 44 and 45, symmetrically arranged one above each other, and adapted to transport the partly curled material issuing from the first set of curling drums to the second set of drums.

The top and bottom conveyor belts 44 and 45 respectively, travel in opposing directions over idle rollers 46—46′ and 47—47′ and driven rollers 48—48′ in a substantially triangular course, and the conveying portions or flights of these belts are spaced with respect to and converge slightly towards each other in the direction of their rotation. These respective opposing conveying flights preferably pass over and are backed by plates 49—49′, which also converge toward each other in a forwardly direction or in the direction of flow of raw material passing through the machine. The fibrous partly curled material is thus tightly gripped between the two opposing belt surfaces, as it is fed to the second set of curling drums. A positive and uniform feed is thus obtained. The speed of conveyors 44—45 is so timed with respect to that of the two sets of curling rolls that the corrugations of the second set of curling rolls will engage the material at points somewhat offset from or overlapping the curls formed by the first set, thus increasing the elasticity and fluffiness of the finished product. The material passes through the first set of curling rolls and through the conveyor belts 44 and 45 at the same speed, whereas the speed of the second set of corrugated curling rolls must be much less than that of the first set and also less than that of the travel of material through belts 44 and 45, because the second set of rolls have the effect of shortening the fibers to approximately the same extent as the first set. This relative difference in speed of rotation between two sets of curling rollers and the conveyor belts 44 and 45, supplemented by the compressing action of the said belts, causes the second set of rolls to form curls supplemental to and overlapping those formed by the first set.

After the material has been curled and dried in the continuous operation previously described said material is conveyed to the picking and delivery section C, by means of endless conveyor belt 52, which operates over an idler roller 51 and driven roller 51′. Roller 51 is mounted in the outer ends of a pair of laterally spaced parallel channel irons 54 supported at their outer ends on legs 55. The inner ends of channels 54 are connected to and supported by laterally extending arms 56 on main frame 7, by means of angle irons 57. The shaft for idler roller 51 is stationary, whereas the shaft for driven roller 51′ is rotatably supported, and has a driving gear 62 mounted on one end. Conveyor 52 delivers the curled and dried material to a pulling and picking device C, arranged in alignment with and adjoining the discharge end of said conveyor. This device, which is of common design, embodies two oppositely rotating picking rolls 64 and 65, arranged in a housing 66 having at one side thereof an elongated discharge opening 67 through which the finished product is discharged. The rotating picking rolls 64, 65 carry a plurality of picking teeth 68 adapted to separate or split the material longitudinally into a multiplicity of fine fibers or threads and to change the previously curled, dried and hardened material into a curly, fluffy product of inherent resiliency. According to common practice in picking devices of the kind referred to, rolls 64 and 65 rotate with different speeds and are of differ-

ent size to more readily accomplish the desired results.

The machine thus described is driven by an electric motor 69. This motor is coupled by means of a pulley drive 70 with a reduction unit 71, which in turn is coupled with the lower curling and drying drums of both sets of drums, by means of a chain drive. This chain drive embodies a small gear 73, rigidly connected to shaft 74 of reduction unit 71, a larger gear 75, rigidly connected to drum 21 of the first set of curling and drying drums, a still larger gear 76 rigidly connected to curling and drying drum 23, and a chain 77. The pulley drive, the reduction unit 71 and the chain drive 72, just described, reduces the speed of the first set of curling and drying drums 20—21 relative to that of motor 69 to a ratio of 1 to 10 revolutions per minute, and also drive the second set of drums at approximately half the speed of the first set. The number of revolutions of drum 21 governs the speed of travel of conveyor belt 10 and the number of revolutions of drum 23 governs the speed of travel of conveyor belt 52, thus insuring proper feeding of material to the first set of curling and drying drums and also properly timed discharge from the second set. Conveyor belt 10 of course must travel much faster than the curling drums 20, 21 because of the curling and shortening action of the drums. On the other hand the speed of travel of conveyor belt 52 must be approximately equal to the travel of the drums 22—23 to prevent stretching and accumulation of the partly curled and dried material in front of the pulling and picking device C. Thus, there is provided a chain drive between drum 21 and gear 13 of conveyor 10, which includes a larger gear 79 rigidly mounted on drum 21, gear 13 and chain 78. Conveyor belt 52 is driven from drum 23 by means of a chain drive, which embodies a gear 82, gear 62 and a chain 83. Conveyors 44 and 45 are driven from drums 22 and 23 respectively, by means of chain drives 84 and 85, as best shown in Figure 3. The pulling and picking device C is individually driven by a separate motor 86 thus providing for independent adjustment of the speed of picking rolls 64 and 65.

The operation of the machine is as follows: When burners 38 have sufficiently heated the drums 20—21, 22—23 the raw material is manually or automatically fed to conveyor 10 and during its travel on said conveyor the material is dampened by spraying device 15. The moist material is then fed uninterruptedly to the curling and drying section, where it is successively curled and dried by the successive curling and drying drums, and after leaving said section curled and dried is conveyed to the pulling and picking device C where it is pulled and picked apart and finally discharged through discharge opening 67.

It is believed that the foregoing conveys a clear understanding of my improvements and the objects prefaced above, but it should be understood that while I have illustrated only one working embodiment of my invention various changes and modifications might be made without departing from the spirit and scope of the invention as expressed in the appended claims.

Having thus described my invention,

What I claim is:

1. In a machine for making stuffing for chairs, couches, etc. from fibrous material having a curling section, means for advancing said material through said curling section including spaced sets of differently timed rotatory curling and crimping means, and conveying means between said sets of curling and crimping means timed to the speed of the faster rotating, curling and crimping means, and means within said curling and crimping means for heating same during curling operations.

2. In a machine for making stuffing for chairs, couches, etc. from fibrous material having a curling section, means for advancing said material through said curling section including spaced sets of differently timed curling and crimping means, and conveying means between said sets of curling and crimping means timed to insure offsetting and overlapping of the crimps and curls in said material by said first and second curling and crimping means, and means within said curling and crimping means for heating same during curling operations.

3. In a machine for making stuffing for chairs, couches, etc. from fibrous material having a curling section means for advancing said material through said curling section including spaced sets of differently timed curling and crimping means each embodying two superposed rotatable heated curling and crimping drums, and conveying means intermediate said sets of curling and crimping means timed to approximate the rotary speed of the faster rotating, curling and crimping means to feed the curling material coming from one set of curling and crimping means to the adjoining set of curling and crimping means.

4. In a machine for making stuffing for chairs, couches etc. from fibrous material having a curling section, means for advancing said material through said curling section embodying sets of aligned rotary curling means, a single drive means for driving said sets of curling means at different speeds of rotation, conveying means intermediate said sets of curling means and drive connections between said conveying means and said sets of curling means to advance material fed through said curling section in timed relation with respect to said curling means.

5. In a machine for making stuffing for chairs, couches etc. from fibrous material as described in claim 4, conveying means at opposite ends of said curling section and driving connection between the sets of curling means and said conveyors.

6. In a machine for making stuffing for chairs, couches etc. from fibrous material having a curling section, a frame, pairs of hollow shafts, non-rotatably mounted on said frame in spaced relation with respect to each other, hollow curling drums rotatably mounted within said frame upon said shafts, a plurality of heating elements within each curling drum mounted upon its corresponding hollow shaft, means extending through each shaft to said heating elements to supply said elements with heat, and a plurality of conveying means within said curling section and at opposite ends thereof, the speeds of said conveying means being differently timed with respect to each other.

7. In a machine for making stuffing for upholstery, comprising two separated sets of curling rollers driven at proportionately different speeds, conveying means between the curling rollers and driven at a speed to cause the second curling means to form curls in the fibrous material overlapping the curls formed by the other curling means.

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