

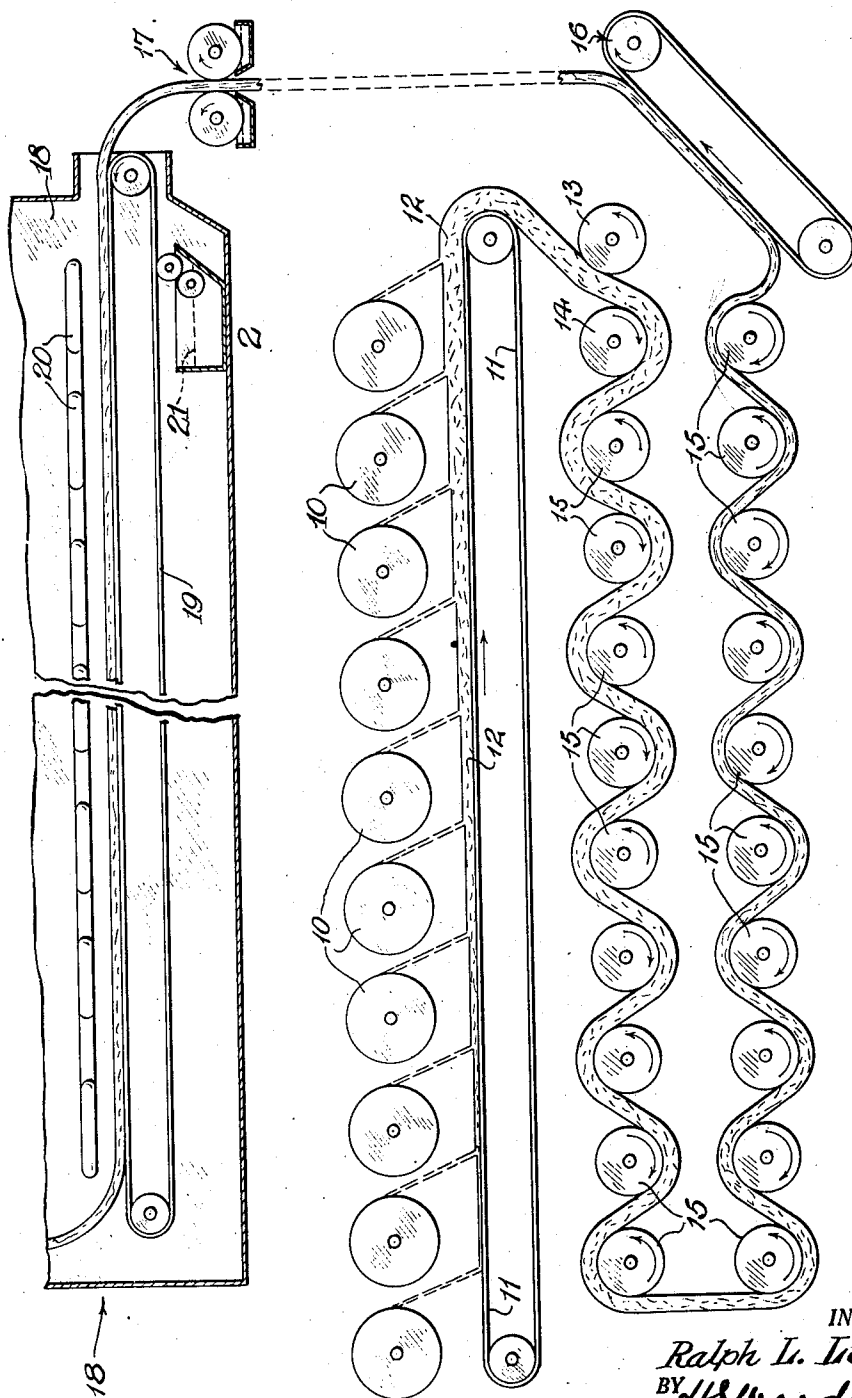
Sept. 29, 1936.

R. L. LOOMIS

2,055,936

HIGH SPEED WADDING PRODUCTION

Filed Sept. 27, 1933



INVENTOR:
Ralph L. Loomis,
BY *H. B. Woodward*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,055,936

HIGH SPEED WADDING PRODUCTION

Ralph Lane Loomis, Bedford, Mass.

Application September 27, 1933, Serial No. 691,203

6 Claims. (Cl. 19-161)

The invention relates to the production of waddings of matted fibers. It has been applied to the production of cotton wadding in which a lap sheet is formed by means of garnets or cards to be conveyed to sizing and drying apparatus.

It is an object of the invention to enable the more rapid production of the wadding by more rapid movement of the sheet—particularly in the sizing and drying, while enabling operation of the cards at moderate speeds. It is well understood in the art that the speed of the cards is limited and that excessive speed of the cards and the receiving conveyor on which the lap is initially built up by cards tends to result in a lumpy product, or at least one with inequalities of thickness and surface which are objectionable. It has therefore been my purpose to retain the advantage of the moderate speed of carding machines and moderate speed in the movement of the lap during its building up by the cards, at the same time enable a subsequent comparatively high speed movement of the lap, and at the same time produce a good undistorted wadding of uniform texture, thickness and weight, with sized faces having a proper continuity and strength, yet with the size skin as thin as required in the various grades of product and without cockles.

It is a further purpose to enable the production of wadding by my process while using very simple apparatus.

Additional objects, advantages and features of invention reside in the steps and manner of treatment of the product by my method, and in the construction, arrangement and combination of parts involved in the embodiment of mechanism for producing the goods. One embodiment of the apparatus and method is represented in the accompanying drawing, the view showing a lap-throwing system and sizing means with intermediate treating system of rolls, and a drier system receiving from the sizing means.

In carrying out my method I first utilize a series of cards 10 to throw a lap sheet 12 onto a receiving conveyor 11 as in prior practice, except that I use a longer conveyor and a much greater number of cards (say, ten of the latter) in order to build up the lap sheet to a much greater thickness than is desired in the finished product. The conveyor 11 and cards have been operated at a speed corresponding to that customarily employed heretofore, say, seventy feet per minute, for the conveyor. Heretofore in the manufacture of simple cotton wadding the lap sheet from the corresponding conveyor has been conducted directly to a sizing apparatus, usually consisting

of rolls wet in the size, over which rolls the sheet is passed, and from the sizing rolls the sheet has been passed directly into a drier. By my method, however, I conduct the lap from the conveyor 11 a short distance without support to and partly around a first roll 13 rotating at a slightly greater peripheral speed than that of the conveyor and being the first of a series of stretching rolls 15. From this first roll I similarly conduct the lap to and partly around a second roll 14 rotating at a slightly greater peripheral speed than the first roll, and then the lap is carried similarly upon a succession of the stretching rolls, each rotated at a greater speed than the one next preceding, so that the last of these rolls is rotating at twice the speed of the first, or faster. Excessive stretching at any one time should be avoided. The rate of increase of speed of each roll over that preceding has been about five per cent as far as my practice has been carried. That is, if the conveyor is moving at the rate of sixty feet per minute, the first roll mentioned should have a peripheral speed of sixty-three feet per minute, and each succeeding roll should be increased in speed a corresponding extent over that of the last one preceding it in the series 15, the fifth roll operating at seventy-six (76) feet per minute. The speed of the lap is thus built up to whatever is practicable in the sizing and drying apparatus.

For convenience, the rolls 15 described are arranged parallel to each other in one or more series, alternate rolls turning in opposite directions and the lap passed alternately over and under the rolls, thus following a serpentine path. If two series of such rolls are employed the first series may be arranged beneath the card conveyor 11 so as to carry the lap 12 backwardly thereunder, and at the end of the first series where the lap leaves the last roll thereof, the first roll of a second series may be located below the last roll of the first series, the lap passing tortuously over and under the succeeding rolls as shown in Figure 1 until it arrives close to the point of delivery from the conveyor 11, or beyond, and the last one being as close as practicable to the sizing device 17 to which the sheet may be delivered with or without an intervening conveyor 16. The lap passes from the size device 17 to the drier 18 which may be constructed and operated in accordance with the disclosure in my patent, U. S. No. 1,928,568 of September 26, 1933. This will bend the lap sheet without stretch of either face, in accordance with the practice disclosed in the patent mentioned.

The operation of the various conveyors and cards will be understood from the foregoing, and the operation of the stretching rolls may be accomplished by any well known driving connections, which do not require to be illustrated.

It is apparent that at the same time that the speed of the lap is increased it is also drawn to a thinner body, and it may be one-half the original thickness or less at the end of the stretching rolls series. The fibers are also arranged more in a longitudinal direction in the sheet than initially, and this adds to the strength of the sheet without involving any objectionable compacting of the lap. This improves its absorbent quality where absorbent cotton is involved, as the capillary action is improved by having the fibers extended greater distances in nearly parallel relation. At the same time there is ample crossing of the fibers to insure homogeneity of the lap body and to avoid liability of excessive fragility for some of the special uses where transverse strength is material.

By reason of the increased speed of the lap in the drier it will of course be necessary to arrange for a greater length of travel of the lap therein than under prior practice, and longer conveyors or increased passes or flights, or both may be employed. Under this practice the fibers in the lap sheet are laid more nearly in parallel relation longitudinally of the sheet, and the sheet has a correspondingly greater strength inherently. It is in consequence possible to make a satisfactory wadding with much thinner size skins than heretofore, for certain special uses.

The sizing device 17 as illustrated is preferably arranged to size both sides of the lap. From this the wet-lap passes into the drier 18, in which the conveyor 19 is one with a water-repellant surface such as may be produced by the application of beeswax. Heating coils 20 are illustrated though other heating systems may be employed. A wax-applying means 21 is indicated, though other means may be employed.

I claim:—

1. A machine for producing cotton wadding comprising a series of card elements of normal operation greatly exceeding in number those heretofore used for throwing down a lap sheet, a first conveyor positioned to receive from all of said card elements, means to operate the card elements and conveyor at maximum speeds corresponding with prior practice, whereby an initial lap sheet may be built up on the first conveyor greatly exceeding the prior maximum ratio of thickness and content of the initial lap to that of the desired finished sheet, a multiplicity of conveyor units in a series closely spaced, each unit being of small extent linearly in the series, and the total greatly exceeding in number the lap-sheet drawing units of prior practice in producing stock for slubbing, said series arranged to receive and convey the lap from said first conveyor, each of the conveyor units being arranged to receive from the one next preceding in said series and to deliver to the next unit in suc-

cession in the series and means to operate the said conveyor units at successively faster speeds whereby the last of said series will pass the lap at a speed exceeding the lap speed of standard prior practice in wadding machines by fifty per cent or more, and means to size and dry the lap delivered from the last of said series of conveyor units.

2. In a wadding machine, a first conveyor, means to move the conveyor at a speed corresponding to the final conveyor speed in prior practice, means to build up a lap sheet thereon greatly exceeding in thickness and content that of the desired finished wadding, a multiplicity of conveying roll units arranged in a series to receive and convey from the conveyor, each of said units having a conveying speed substantially in excess of the one next preceding and greatly exceeding the draft between units in prior practice in wadding manufacture, but much less than the draft between units as heretofore practiced in producing lap for slubbing or roving, whereby the lap sheet is drawn to a moderate fractional increase of its previous length and thickness at each unit stage and moved at a final aggregate speed greatly exceeding speeds of conveyors and lap in prior practice in wadding manufacture.

3. In wadding manufacture, a first conveyor, means to build up a lap sheet thereon exceeding by at least fifty per cent the density and content per unit of area the finished wadding, a multiplicity of conveyor units in close succession, each consisting of a single lap-engaging and drawing roll, the said rolls being arranged in a series positioned to receive from the first conveyor the said rolls rotating in opposite directions alternately, and the lap sheet being engaged through the series in serpentine form with extremely short portions of lap between the rolls.

4. The structure of claim 3 in which the said rolls of the multiplicity of conveyor units are each rotated at a speed approximating five per cent in excess of that of the next preceding unit.

5. The structure of claim 1 in which the increase of speed of each unit beyond that of the next preceding one approximates five per cent.

6. The method of producing cotton wadding consisting in throwing a single unitary initial lap sheet having a thickness greater than that of the desired finished wadding in a ratio greatly exceeding that of prior wadding practice, and using card elements operating at prior normal speeds but in number greatly exceeding that of prior practice for a given finished product, then subjecting the initial lap sheet to a multiplicity of draft operations in immediate succession greatly exceeding in number the drafts heretofore given in immediate succession to a single lap sheet, each draft being effected by engaging the sheet at one side only, and while the fibers are loosely laid and uncompressed, each draft being of very small extent as compared to prior practice for slub or roving.

RALPH LANE LOOMIS.