Oct. 5, 1926. 1,601,712

J. BAER

APPARATUS FOR MIXING BRISTLE, HAIR, VEGETABLE FIBERS AND THE LIKE

Filed May 13, 1925 2 Sheets-Sheet 1

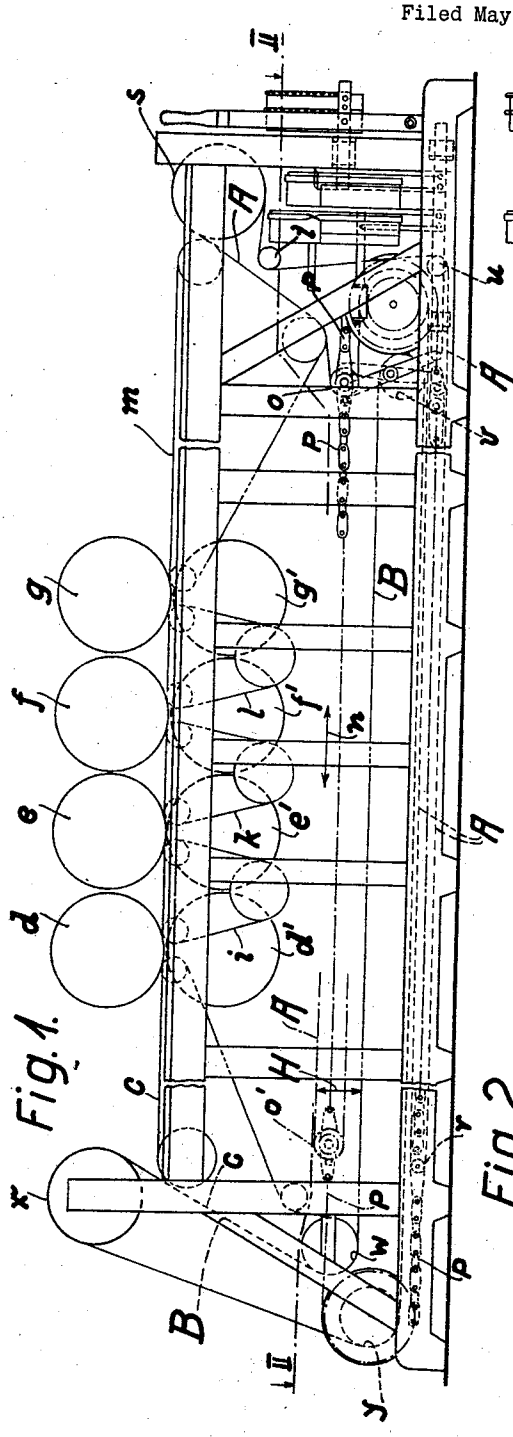


Fig. 1.

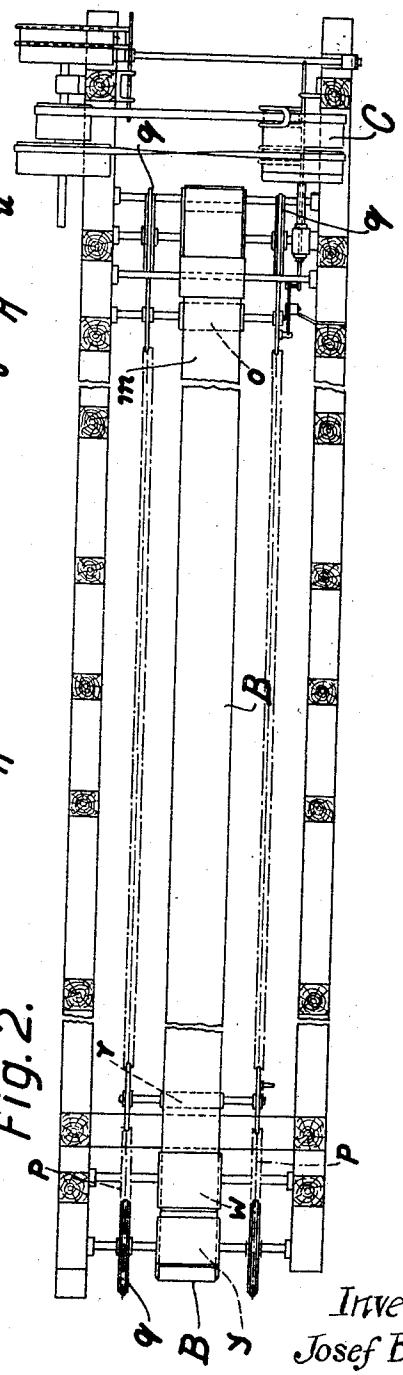


Fig. 2.

Inventor
Josef Baer
per William H. Young
Attorney.

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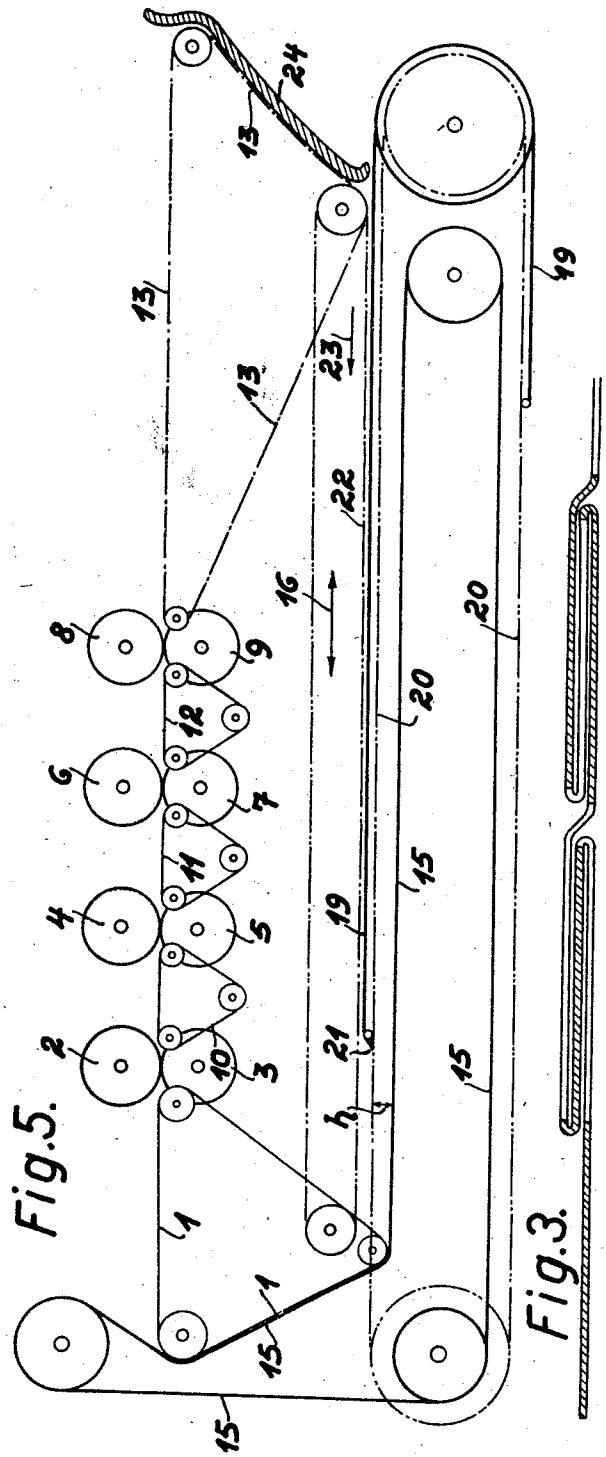


Fig.5.

Fig.3.

Fig.4.

Inventor
Josef Baer
per William H. Young
Attorney.

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UNITED STATES PATENT OFFICE.

JOSEF BAER, OF WEINGARTEN, GERMANY.

APPARATUS FOR MIXING BRISTLE, HAIR, VEGETABLE FIBERS, AND THE LIKE.

Application filed May 13, 1925, Serial No. 30,107, and in Germany September 27, 1924.

This invention relates to an apparatus for mixing bristles, hair, vegetable fibers and the like, the said mixing being effected by folding the various layers of bristles over each other, after they have been manually introduced by the attendant into the apparatus at a supplying or feeding place in the form of single layers, for instance one behind another.

The object of the apparatus is to mix together in the most uniform manner possible an in the shortest time, materials of different kind and nature, such as for instance bristles of different colour, bristles and hair together, bristles and vegetable fibers together.

The invention is illustrated by way of example in the accompanying drawing in which:—

Figure 1 shows diagrammatically in side elevation a mixing apparatus according to the invention;

Figure 2 is a section on line II—II of Figure 1;

Figure 3 is a diagram of a folding arrangement in a given construction of the apparatus;

Figure 4 shows diagrammatically a folding arrangement in another construction of the apparatus; and

Figure 5 shows diagrammatically in side elevation a modified construction of the apparatus.

According to the invention, on the machine frame there is provided as a support a travelling conveyor band c, and the bristles placed on the same by the attendant are delivered, with a given relatively low speed (in order to give the attendants time to put on), to pressure rollers d, d'. By these pressure rollers the bristles are held fast, and during the time of their passage through the said rollers, they are treated by a well known combing device. Behind the pressure rollers d, d', are arranged further pressure rollers e, e', f, f', g, g' and so on. Between the said pressure rollers are arranged further conveyor bands i, k, l, which supply or feed the bristles, with preferably increasing speed, to the next pressure rollers where they are again treated by combing devices. The bristles are finally delivered to a conveyor band and are taken therefrom by the attendant.

The devices c to m represent the drawing device, by means of which the bristle layers delivered in a given depth at c, are pulled out and stretched. The conveyor band m carries the single bristle layers situated behind each other and stretched owing to the increase of their speed of advance, to a delivery band A which reciprocates in the direction of the arrows n above a conveyor and mixing band B and delivers the endless bristle strip over a roller o to the mixing band B, and at the same time arranges it in superposed folds. For the reciprocation of the delivery band A there are provided tension members, such as for instance chains p, which pass over drums or chain wheels q and are reciprocated from any desired driving device C by changing the direction of rotation of the chain wheels q in the direction of the arrows n. The roller o is mounted between the said chains p, and between the latter is mounted another roller r over which the delivery band A is guided for the purpose of equalizing its length during the travel of the roller o. Guide rollers s, t and u are provided for the same purpose.

The mixing band B passes over guide rollers v, w, x, y, so that on a portion of its travel, it runs together with the conveyor band c, and at this point carries the bristles from the bottom part of the machine upwards again.

The speed of the drawing device c to m, as well as the speed of reciprocation of the chain p, and therefore the speed of travel of the roller o from its initial position to the point o' and back again, can be calculated, with reference to the speed of travel of the mixing band B for instance in such a manner that the delivery band A will place the layers of bristle on the mixing band B in a triple superposed layer, as shown in Figure 3.

In a particularly preferred construction, the speed of the said parts is however calculated in such a manner that the bristle strips are placed on the mixing band B in a superposed five-fold layer, as shown in Figure 4.

The bristle strips arranged in superposed triple or five-fold layer, are then carried upwards in that stratification by the mixing band B running together with the conveyor band c, and delivered to the conveyor band c. These layers start then again to travel through the machine, and in the case of the five-fold stratification, the advantage is

ensured that the time required for complete mixing is relatively short.

An essential feature of the apparatus is that the point of delivery of the delivery band A which is formed in the roller *o*, moves to and fro during the working of the apparatus, practically through the whole length of the apparatus, so that a long path is produced relatively to the length of the apparatus, and this long path contributes substantially to the good mixing of the single bristle layers, more particularly if the bristle materials have not been previously mixed by hand in a separate preparation stage, but single bristle layers of different nature are fed at the point of delivery of the apparatus in an irregular manner.

In the apparatus just referred to, the bristles are delivered as described through the delivery point constituted by the roller *o*, to the mixing band B. the single bristle layers being folded in alternate directions. Consequently, the distance of the delivery band A from the mixing band B (height H) governs this delivery.

In the construction shown in Figure 5, this height H has been greatly reduced to a smaller height *h*, the delivery taking place over a fixed edge, instead of over a roller.

This apparatus comprises substantially the same parts as the apparatus described previously. There is provided a conveyor band 1, pressure rollers 2 to 9, intermediate conveyor bands 10 to 12 and a conveyor band 13, these parts corresponding to the drawing device *c* to *m* of Figure 1.

As in the apparatus previously described, there is here provided a mixing band 15, and the delivery device is also reciprocated in the direction of the arrows 16. The difference consists in the fact that the delivery device is constituted by a band 19 with a smooth surface, for instance a steel band, which is reciprocated by a gear chain 20 in the same way as the chains *p* of the apparatus in Figure 1. This band 19 has a dropping edge 21, and above it is arranged a travelling conveyor device 22 which travels in the direction of the arrow 23. This conveyor device could be constituted by a chain engaging over the bristles, and separate driver devices could be inserted between the single chain links. For delivering the bristles from the drawing device, to the delivery band 19, a guide device 24 is provided within the range of the conveyor band 13.

What I claim and desire to secure by Letters Patent of the United States is:—

1. Apparatus for mixing bristles, hair, vegetable fibers and the like, comprising in combination a supporting surface for the bristle material, constituted by a travelling band, a drawing device for pulling out the bristle material placed on the supporting surface, a conveyor band extending through the whole length of the apparatus and forming a delivery and mixing surface for the bristles, and means for continuously placing the bristles on the said conveyor and mixing band, and for simultaneously folding the bristle layers.

2. Apparatus for mixing bristles, hair, vegetable fibers and the like, comprising in combination a supporting surface formed by a travelling band, a plurality of sets of upper and lower pressure rollers, intermediate conveyor bands between single sets of pressure rollers, a conveyor and mixing band extending through the whole length of the apparatus, forming the delivery and mixing surface for the bristles and carrying the mixed bristles up again to the supporting surface, and a delivery band reciprocating above the conveyor band to continuously place the bristles on the transport and mixing band and to simultaneously fold the bristle layers.

3. Apparatus for mixing bristles, hair, vegetable fibers and the like, comprising in combination a supporting surface formed by a travelling band, a plurality of sets of upper and lower pressure rollers, intermediate conveyor bands between the single sets of pressure rollers, a conveyor and mixing band extending through the whole length of the apparatus, forming a delivery and mixing surface for the bristles and carrying the mixed bristles up again to the supporting surface, a delivery band reciprocating over the conveyor band to continuously deliver the bristles on the conveyor and mixing band, and to fold the bristle layers, two rotating drums and two tension members passing over said drums and reciprocated owing to changes of the direction of rotation of the said drums, for the purpose of reciprocating the delivery band.

4. Apparatus for mixing bristles, hair, vegetable fibers and the like, comprising in combination a supporting surface formed by a travelling band, a plurality of sets of upper and lower rollers, intermediate conveyor bands between single sets of pressure rollers, with speed increasing in the direction of advance of the bristles, a conveyor and mixing band extending through the whole length of the apparatus, forming a delivery and mixing surface for the bristles and carrying the mixed bristles up again to the supporting surface, a delivery band reciprocating over the conveyor band, to continuously place the bristles on the conveyor and mixing band, and to fold the bristle layers, two revolving chain wheels, two chains passing over said chain wheels and reciprocated owing to changes of the direction of rotation of these chain wheels, and a guide roller be-

tween the chains for the delivery band, carrying with it the delivery band during the reciprocation of the chains.

5. Apparatus for mixing bristles, hairs, vegetable fibers and the like, comprising in combination a supporting surface formed by a travelling band, a plurality of sets of upper and lower pressure rollers, intermediate conveyor bands between the single sets of pressure rollers, with the speed increasing in the direction of advance of the bristles, a conveyor and mixing band extending through the whole length of the apparatus, forming a delivery and mixing surface for the bristles and carrying the bristles up again to the supporting surface, a delivery band reciprocating over the conveyor band, to continuously place the bristles on the conveyor and mixing band, and to fold the bristle layers, rotating chain wheels, two chains passing over said wheels and reciprocated by changes of the direction of rotation of the said chain wheels, and a further guide roller for the delivery band in addition to guide rollers for the equalization of the length of the delivery band during the reciprocation of the first-named guide rollers.

6. Apparatus for mixing bristles, hair, vegetable fibers and the like, comprising in combination a supporting surface formed by a travelling band, a plurality of sets of upper and lower pressure rollers, intermediate conveyor bands between the single sets of pressure rollers, with the speed increasing in the direction of travel of the bristles, a conveyor and mixing band extending through the whole length of the apparatus, forming the delivery and mixing surface for the bristles, carrying the mixed bristles up again to the supporting surface, a delivery band reciprocating over the conveyor band to continuously place the bristles on the conveyor and mixing band, and to fold the bristle layers, the delivery band being constituted by a band with smooth surface, rotating chain wheels, two chains passing over said wheels and reciprocated by changes of the direction of rotation of the said chain wheels, a fast connection between the delivery band and the said chains, a dropping edge at one end of the delivery band, and a conveying device constantly moved in the same direction above the delivery band.

7. Apparatus for mixing bristles, hair, vegetable fibers and the like, comprising in combination a supporting surface formed by a travelling band, several sets of upper and lower pressure rollers, intermediate conveyor bands between the single sets of pressure rollers, with speed increasing in the direction of advance of the bristles, a conveyor and mixing band extending through the whole length of the apparatus, forming the delivery and mixing surface for the bristles, carrying the mixed bristles up again to the supporting surface, a delivery band reciprocating over the conveyor band, to continuously place the bristles on the conveyor and mixing band, and to fold the bristle layers, the delivery band being constituted by a band with smooth surface, rotating chain wheels, two chains passing over said wheels and reciprocated by changes of the direction of rotation of the said chain wheels, a fast connection between the delivery band and the said chains, a dropping edge at one end of the delivery band, and a gear chain constantly moving in the same direction above the delivery band.

8. Apparatus for mixing bristles, vegetable fibers, hair and the like, comprising in combination a supporting surface formed by a travelling band, several sets of upper and lower pressure rollers, intermediate conveyor bands between the single sets of pressure rollers, a conveyor and mixing band extending through the whole length of the apparatus, forming the delivery and mixing surface for the bristles, carrying the mixed bristles up again to the supporting surface, and a delivery band reciprocating above the conveyor band, to continuously place the bristles on the conveyor and mixing band, and to fold the bristle layers, the speed of advance and the speed of the delivery band relatively to that of the mixing band being calculated in such a manner that the delivery of the bristles on the mixing band produces stratification in five layers.

JOSEF BAER.