July 26, 1960 M. HÖPPNER ET AL 2,946,097

GILL BOX

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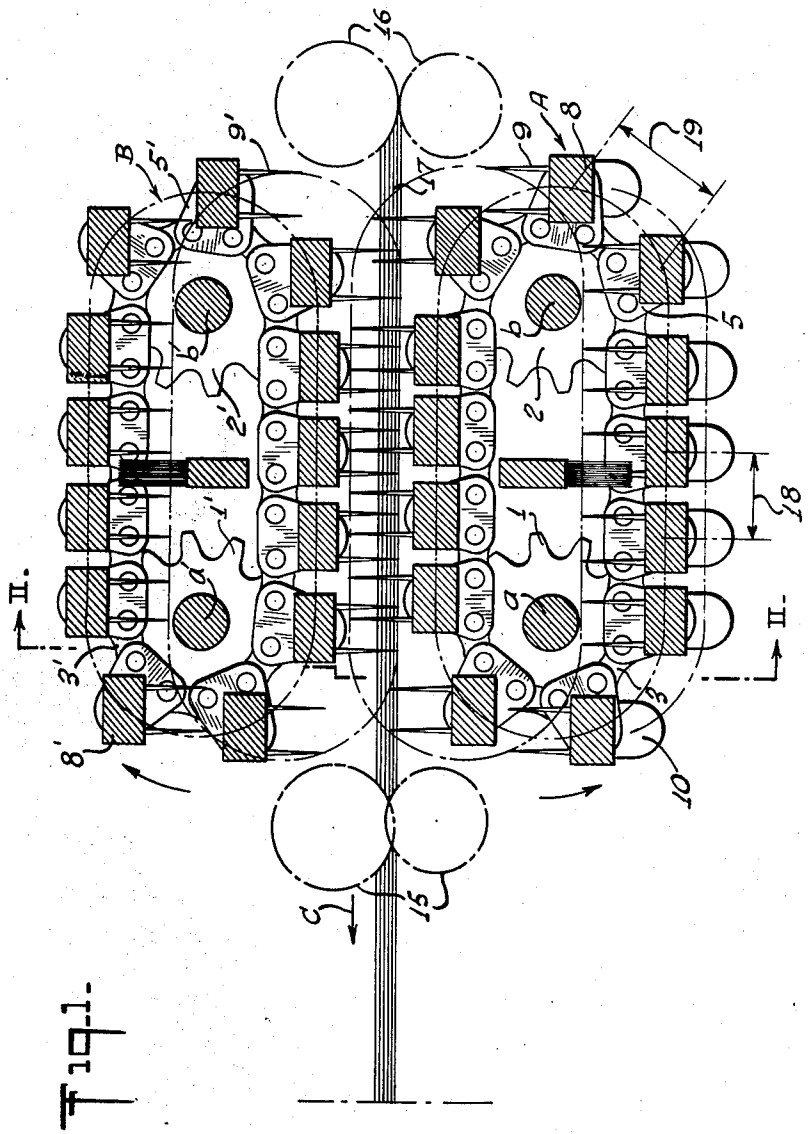


Fig. 1.

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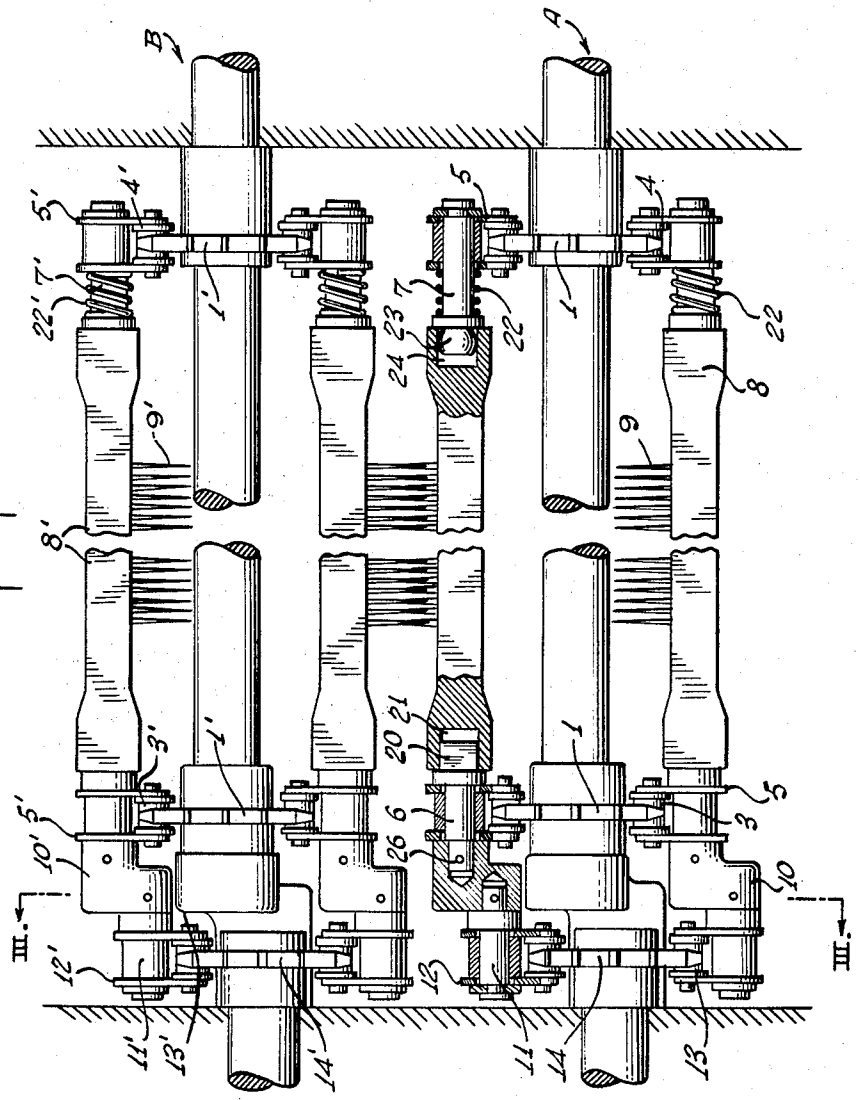
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FIG. 2.



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Fig. 3.

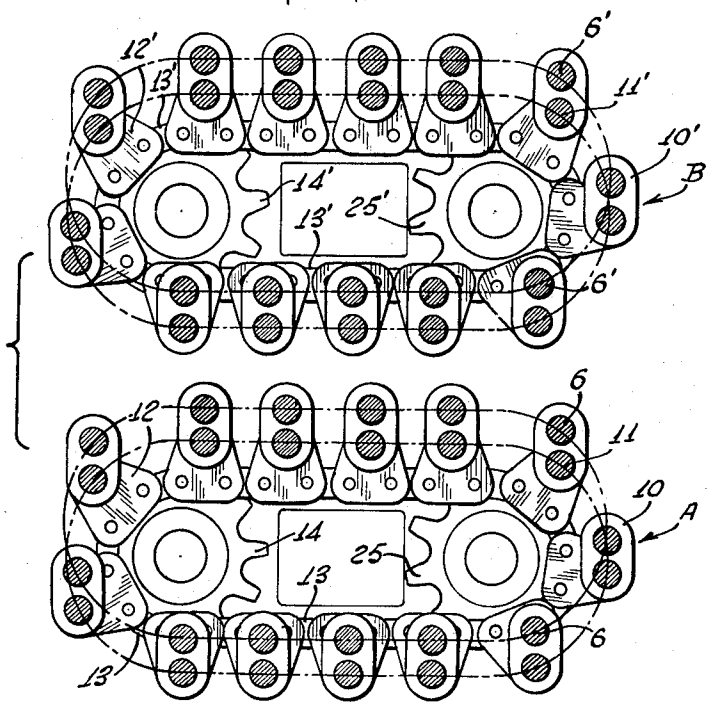
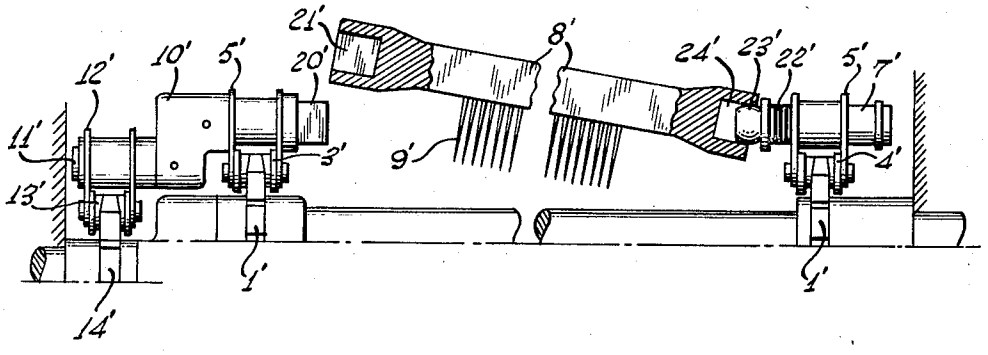


Fig. 4.



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GILL BOX

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12 Claims. (Cl. 19—127)

The invention relates to a gill box with gill bars linked to endless chains and which can be turned with respect to the chains by means of controlled cranks.

In conventional devices of the kind here under consideration, the gill bars are arranged in a swivel-like manner in order to utilize the space provided for the set of gill bars between the usually existing drawing cylinders as completely as possible. In such devices, the gill bars are controlled so that their needles or teeth are substantially at right angles to the plane of the set of bars where they enter and leave the fiber band, and so that they are substantially at right angles to the chains at the reversing points of the latter. In any position of the chains, the points of the needles are outwardly directed so that they must be turned through a rather large angle prior to their entrance into and after their withdrawal from the fiber band. Consequently, the speed of the chains is limited and the chains must be specially guided in order to pass the closely located drawing cylinders due to the great length of the swivel path.

The invention aims to avoid the mentioned drawback and to provide means whereby the needles of the gill bars are held throughout their entire path in a position parallel to their position of use.

Another object of the invention is the provision of means whereby a gill bar can be readily exchanged for another one.

Further objects and details of the invention will be apparent from the description given hereinafter and the accompanying drawings illustrating an embodiment thereof by way of example. In the drawings,

Fig. 1 is a longitudinal cross-sectional view of a twin gill box according to the invention;

Fig. 2 is a partial cross-sectional view along line 2—2 of Fig. 1;

Fig. 3 is a cross-sectional view along line 3—3 of Fig. 2, and

Fig. 4 is an illustration of the exchangeability of the gill bars.

Referring now to the drawings, the illustrated device comprises two substantially similar gill bar sets or assemblies, generally designated by A and B, which are arranged one below the other. In both sets like reference characters are used for similar parts, but those of the upper set B have a (') added to the numeral. In view of the similarity of the parts except for features which will be specially explained, the following description can and will be restricted mainly to the set A, it being understood that the same description can be applied to the set B.

Each set comprises two pairs of sprocket wheels of which the wheels of a pair rotatable in spaced relation about the same axis *a* are designated 1 whereas the wheels of a pair in the same plane as the wheels 1, respectively, and rotatable about an axis *b* parallel to axis *a* are designated 2. An endless chain 3 is placed about one pair of sprocket wheels 1 and 2 and another endless chain 4 is placed about the other pair of wheels 1 and 2. The chains are provided with outwardly projecting brackets

5. The brackets 5 of the chain 3 have pins 6 mounted for free rotation thereon. Similarly, there are pins 7 freely rotatable in the brackets 5 of the chain 4. Each pin 6 and a co-ordinate pin 7 have heads 20 and 23, respectively, to engage in recesses 21 and 24, respectively of a gill bar 8 so as to carry the latter. The head 20 and recess 21 are of interlocking cross-section, for instance, squared, so that upon rotation of the pin 6, the gill bar 8 will rotate with it. The body of bar 8 is set with two parallel rows of spikes or needles 9. The head 23 may be shaped differently for reasons to be explained later. Means are provided to keep the needles oriented in one basic direction throughout their entire path. This direction corresponds to and is parallel with the position of use. In other words, all the needles on all the bars are kept parallel to each other. For this purpose, cranks 10 are secured to the pins 6 by means indicated at 26. Each crank 10 has another outwardly directed pin 11 for controlling the associated bar 8. Each pin 11 engages in brackets 12, which are similar to the brackets 5 and connected to another endless chain 13 placed about a pair of sprocket wheels 14 and 25, as clearly shown in Figs. 2 and 3. The chain 13 is so staggered with respect to the chains 3 and 4 that the bars 8 with the needles 9 at the reversing points of their chains 3 and 4 are turned from a position in which they run above into one below the chains or vice versa. As a result, the bars 8 with needles 9 will rotate in relation to each other at the reversing points of their chains. Because of the outwardly projecting brackets 5 the spacing 18 between adjacent bars in the straight portion of their path will be increased to the spacing 19 at the reversing points as shown in Fig. 1. This provides clearance between adjacent bars which would otherwise not exist.

In the illustrated embodiment needles 9 are upwardly directed and needles 9' of the upper set B are downwardly directed so as to enter, into the fiber band 17 moving in the direction of the arrow *c* in Fig. 1, in which the drawing cylinders 15 and 16 are indicated by dash and dot lines. It will also be noted that chains 3, 4 are staggered with respect to the chains 3', 4' so that at their adjacent sides each needle 9 engages in the fiber band in the space between two adjacent needles 9'.

The manner in which the needles are controlled so as to always point in one direction may be best appreciated from Figs. 1 and 2 where the bars 8 on chains 3, 4 of the lower sprockets 1 and 2 are considered. The cranks 10 are keyed to the gill bars 8 and are journalled within the brackets 5. Another pin 11 of crank 10 is journalled within the brackets 12. Thus whenever the axes of the pins 11 are below the axes of the gill bars 8, the needles 9 will point up. The sprockets 14 and 25 are the same diameter as the sprockets 1 and 2 and hence as both the sprockets 14, 25 and 1, 2 turn and the brackets 5 and 12 pass through their straight and circular paths, the axes of the pins 11 will always be below the corresponding axes of the gill bars 8. As a result the needles on the lower chains will always point up. Similarly the needles 9' on the upper chains will always point down.

Means are preferably provided to facilitate the assembling and removing of each individual gill bar. For this purpose, in the illustrated embodiment as clearly shown in Fig. 4, the head 20' of pin 6' and the co-ordinate recess 21' of the end of a gill bar 8' are of a square cross-section. Contrary thereto, the head 23' of the pin 7' is of spherical configuration and the recess or blind bore 24' of the other bar end is cylindrical. Furthermore, a compression spring 22' is applied between the head 23' and the adjacent bracket 5', so as to urge the bar with its recess 21' into engagement with head 20', i.e., into the position of use in which the bar is coupled with pin

6' for common rotation. In order to remove a gill bar 8' it is only necessary to push pin 7' back against the restraint of spring 22' so that the opposite bar end clears the pin head 20' whereupon the bar can be tilted about the spherical head 23', as shown in Fig. 4, and in this position, stripped from that head.

It will be apparent to those skilled in the art that alterations and modifications of the structure shown and hereinbefore described can be made without departure from the essence and spirit of the invention which for this reason shall not be limited but by the scope of the appended claims.

What we claim is:

1. In a gilling machine having a plurality of pairs of opposing endless carrier chains each including a plurality of links, a pair of sprockets for mounting each chain so that each chain is formed into a pair of straight extended portions and a pair of circular portions, a plurality of needle bars adapted to be pivotally supported between a pair of said chains, a plurality of needles projecting from said needle bars, crank members connected to each of said bars, and sprocket-mounted guide chain means connected to said crank members whereby said guide chain means rotates said crank members so that said needle bars are continuously oriented in a direction perpendicular to the straight portions of said carrier chains during movement of said carrier chains, the improvement which comprises a plurality of outwardly extensive brackets mounted on said chain links, whereby the distance between the ends of adjacent ones of said brackets are spaced more closely on the straight extended portions of said chains than at the circular portions of said chains, and means at the outer ends of said brackets for pivotally supporting said bars.

2. In a gilling machine having pairs of opposing sprocket-mounted endless carrier chains each of which includes a plurality of links, said chains being in the form of loops having straight portions and circular portions, a plurality of outwardly extensive brackets secured to said links, said brackets being spaced at their outer ends more closely at the straight portions of said chains than on the circular portions, a plurality of needle bars pivotally and removably supported from corresponding brackets of each of said pairs of chains, a plurality of needles mounted on said needle bars, crank members secured to said brackets for pivotal movement of said bars, a guide chain for each pair of opposing endless carrier chains sprocket-mounted for connection to the cranks thereof, and a plurality of outwardly projecting guide brackets secured to each guide chain connecting said crank members to said guide chains, whereby said guide chains turn said crank members so that said needles projecting from said needle bars are continuously oriented in one direction during movement of said carrier chains by the sprockets.

3. In a gilling machine as set forth in claim 2, said bars including recesses at their ends, said outwardly extending brackets including bolts adapted to fit into said recesses, the bolts on one of said chains of each pair of opposing endless carrier chains being axially movable whereby convenient removal of said bars is made possible.

4. In a gilling machine as set forth in claim 3, one of said recesses at the end of each of said bars being of multi-faced cross-section, and said bolts associated with said multi-faced recesses being shaped to mate therewith.

5. In a gilling machine as set forth in claim 4, including a spherical surface on said movable bolts adapted to assist in removal of said bars.

6. In a gilling machine as set forth in claim 5, the other of said recesses at the end of each of said bars being cylindrical.

7. In a gilling machine as set forth in claim 6, annular rings secured to said movable bolts adapted to abut against the ends of said bars, and resilient means adapted to cause abutment of said annular rings against said bars whereby said bars are maintained between said bolts.

8. In a gilling machine having two pairs of spaced rotatable wheels, an endless carrier mounted around each pair of wheels for movement by said wheels so that each carrier is formed into linear parts by the extension between the wheels and curved parts where the carrier is adjacent said wheels, a plurality of brackets mounted on said carriers and extending outwardly transverse to the direction of said carriers, whereby the brackets which are mounted on the linear parts of the carriers are parallel to each other and whereby the brackets which are mounted on the curved parts of the carriers extend radially from said wheels, a plurality of needle bars pivotally mounted between corresponding brackets of said carriers, said needle bars having pivotal axes parallel to the axis of one of said wheels and being located at position spaced from said carriers, and means connected to said needle bars for orienting all of said needle bars in a like direction during their entire path of travel.

9. A gill box having two endless driving chains, two pairs of spaced driving sprockets for mounting said chains, a plurality of mounting means on said chains, a plurality of needle frames pivotally mounted between said chains on said mounting means for movement by said chains, a plurality of parallel needles on said needle frames, a guide chain positioned adjacent one of said driving chains, a pair of guide sprockets for mounting said guide chain, a plurality of cranks on said guide chain for orienting the needles in said needle frames in one common direction whereby the needle frames are held during an entire revolution of said driving chains oriented in one operating direction, and means for mounting said cranks, said plurality of mounting means comprising a plurality of brackets mounted on said driving chains and extending outwardly perpendicular to said driving chains for supporting said needle frames at positions spaced from said chains whereby said brackets are parallel upon straight suspended portions of said driving chains and said brackets extend radially from the portions of said driving chains mounted about said driving sprockets and whereby the outer ends of said needle frames are closely spaced on the straight portions and are spaced at greater distances on the portions of the driving chains mounted about the driving sprockets.

10. In a gilling machine having a pair of spaced endless driving chains, a plurality of spaced sprockets supporting each of said driving chains for movement whereby each of said driving chains has straight portions between said sprockets and circular portions surrounding parts of said sprockets, a plurality of mounting brackets secured at spaced positions to said driving chains and extending outwardly from and transverse to said driving chains whereby said brackets when passing over said sprockets extend radially from said sprockets, and whereby the distance between the outer ends of said brackets which pass over said sprockets is greater than the distance between the outer ends of said brackets which are passing over the straight portions of said driving chains, a plurality of needle frames each including a plurality of parallel needles, each of said frames being rotatably mounted between one of said brackets on one of said chains and a corresponding one of said brackets on the other of said chains and at the outer ends of said brackets, a plurality of bearing journals on said brackets positioned on the outer ends thereof for rotatably supporting said needle frames, projections on each of said journals for receiving the ends of said needle frames, an endless guide chain adjacent one of said driving chains, a pair of guide sprockets for mounting said endless guide chain, a plurality of outward extensions mounted on said guide chain, a plurality of cranks on said extensions connected to said bearing journals for continuously orienting said needles and said needle frames in a common direction, whereby said needle frames are spaced more closely to each other on the straight portion than on the circular portion of said driving chains.

11. In a gill box as set forth in claim 10, said journal projections on a first of said chains being square in cross

section for receiving recesses on the ends of said needle frames of like cross section.

12. In a gilling machine as set forth in claim 11, said journal projections on a second of said chains being spherical for easy removal from cylindrical recesses in the other ends of said frames.

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