May 28, 1946. C. KOPPEL 2,401,083

CYLINDER AND DIAL KNITTING MACHINE

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Fig. 1.

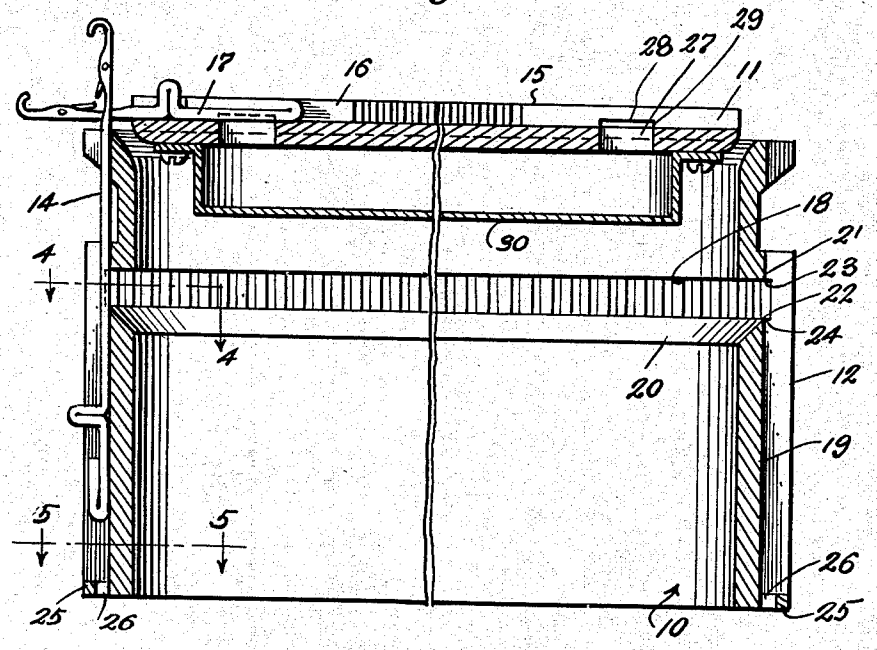


Fig. 6.

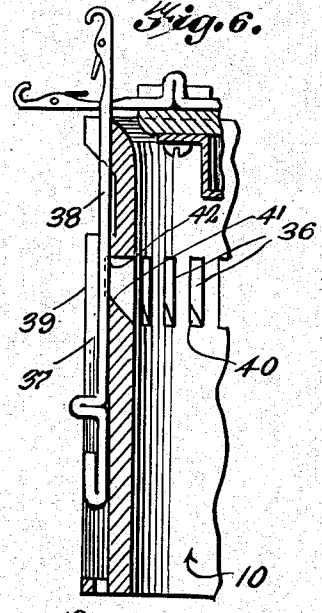


Fig. 4.

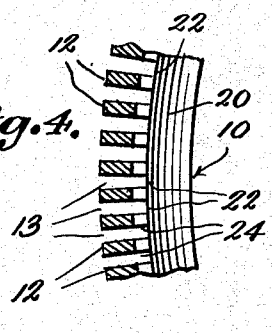


Fig. 5.

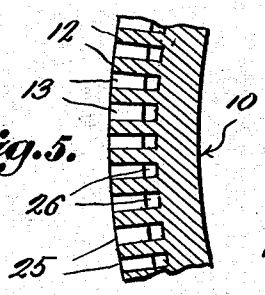


Fig. 8.

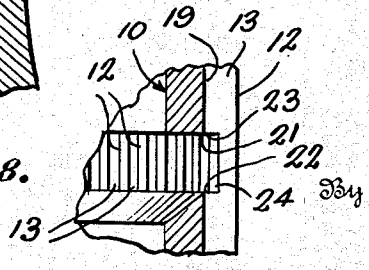
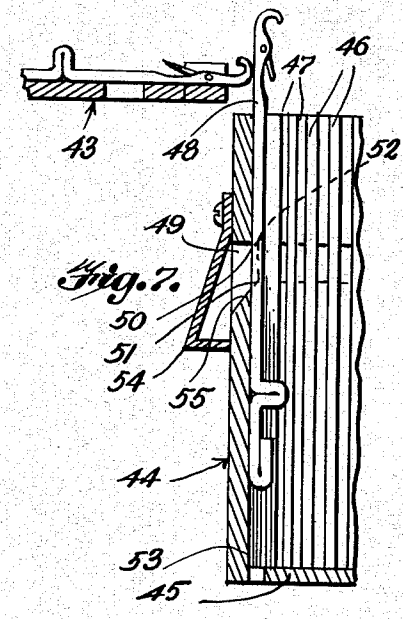


Fig. 7.



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Fig. 2.

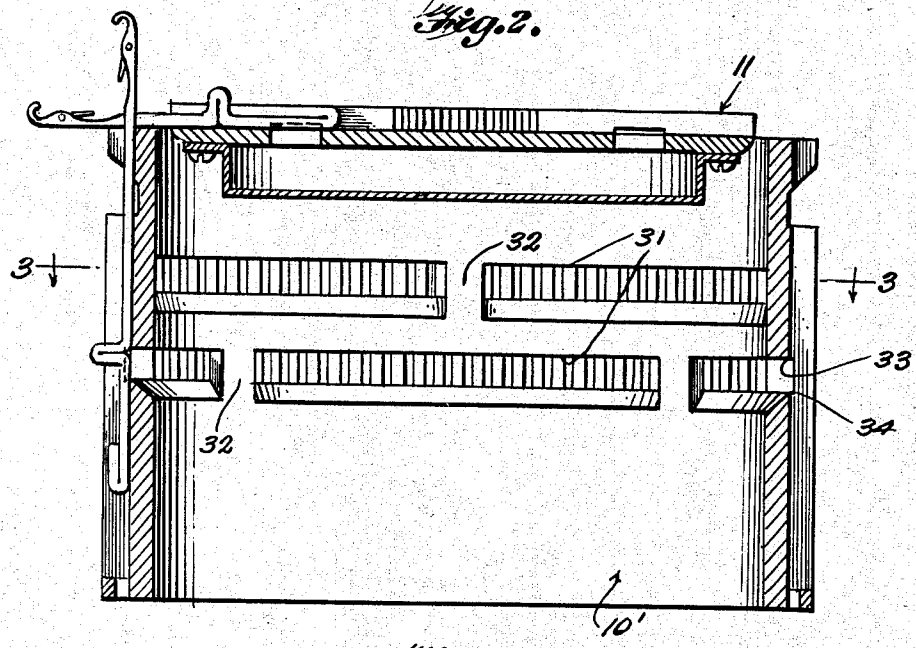
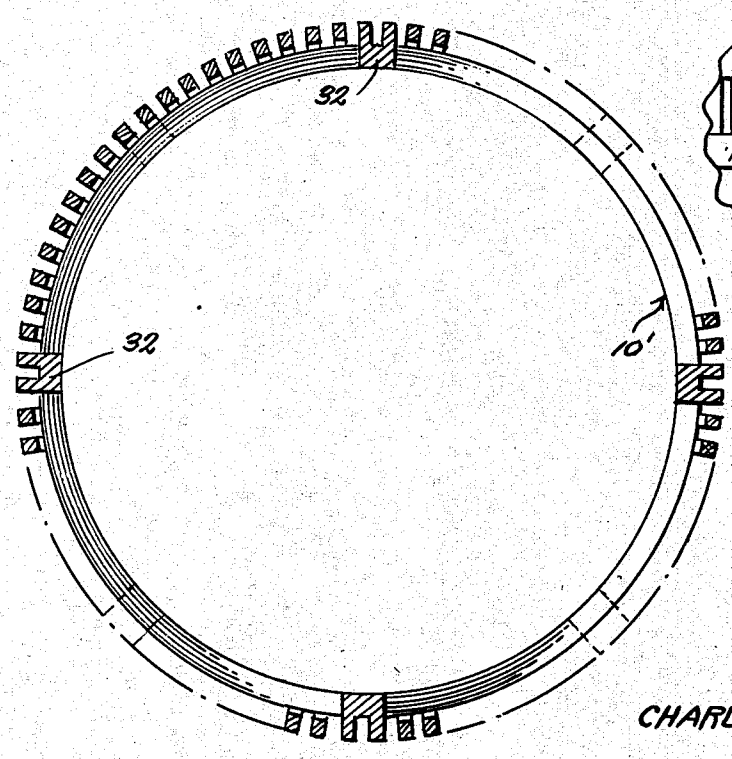


Fig. 3.



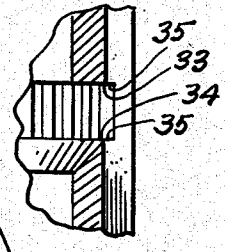


Fig. 9.

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CYLINDER AND DIAL KNITTING MACHINE

Charles Koppel, Robbinsville, N. J.

Application February 23, 1944, Serial No. 523,565

6 Claims. (Cl. 66—115)

This invention relates to improvements in knitting machines and pertains particularly to machines of the cylinder and dial type.

This application is based upon and constitutes a continuation in part of my prior application Serial No. 486,867, filed May 13, 1943, for Knitting machine of a cylinder type.

A primary object of the present invention is to provide in a knitting machine of the cylinder and dial type, means for preventing the accumulation of dust and dirt in the grooves provided in the cylinder wall for the needles, jacks and the like.

More specifically the invention consists in the formation in the wall of the cylinder, of a broken or continuance channel extending through the wall and through the bottoms of the needle grooves to provide openings through which dust and lint which accumulates upon the needles, may pass, the bottom portions of such channels being sloped or inclined to facilitate the discharge of accumulated dust or lint downwardly either through the cylinder or toward the outside thereof depending upon whether the channel is formed in the inner wall or the outer wall of the cylinder in the cases respectively of a machine having the needle grooves upon the outer side or upon the inner side.

Another object of the invention is to provide in a cylinder type knitting machine, needle grooves which are closed or partially closed at their lower ends but which have openings adjacent the bottom of the groove through which accumulated lint or dust may escape downwardly and be prevented from packing under the needle so as to force the latter outwardly and therefore interfere with its proper sliding movement in its groove.

Still another object of the invention is to provide in a cylinder knitting machine of either of the two types above referred to, dust and dirt escape openings in the bottoms of the needle grooves which are so formed as to extend into the guide ribs forming the grooves whereby both the rear or back face and the side faces of the needle will move across the scraping edges which will function to remove from such faces adhering dirt or lint, so that the needle shall be maintained clean and can be shifted as required in the operation of the machine and the necessity of stopping the machine periodically for cleaning the needles and grooves is avoided.

The invention will be best understood from a consideration of the following detailed description taken in association with the accompanying drawings, with the understanding, however, that the invention is not confined to a strict conformity with the showing of the drawings but may be modified so long as such modifications are within the scope of the appended claims.

In the drawings:

Figure 1 is a view in vertical section through a cylinder and dial type knitting machine, the cylinder and dial being conventionally illustrated, showing the application of one embodiment of the invention thereto.

Figure 2 is a vertical section through a cylinder and dial, corresponding to Figure 1, and showing the application of another embodiment of the invention thereto.

Figure 3 is a transverse section taken on the line 3—3 of Figure 2.

Figure 4 is a partial section taken on the line 4—4 of Figure 1.

Figure 5 is a partial section taken on the line 5—5 of Figure 1.

Figure 6 is a vertical section of a portion of a cylinder and dial showing the embodiment of the invention as illustrated in my prior application previously referred to.

Figure 7 is a partial vertical section through a cylinder and outside dial showing the application of the invention to the cylinder and showing a dirt collection receptacle applied to the cylinder wall.

Figure 8 is a detailed section on an enlarged scale through the channel of the cylinder shown in Figure 1.

Figure 9 is a detailed section on an enlarged scale through a channel in the cylinder of Figure 2.

Referring now more particularly to the drawings, the numeral 10 generally designates a conventionally illustrated needle cylinder in association with which is employed, at the top of the cylinder, the disk-like dial which is generally designated 11.

Since the construction and method of operating dial and cylinder machines of the character herein referred to are well understood by those versed in the art no showing has been made of the needle operating mechanism and no description of the same or of the manner of actuating the needles is believed necessary.

The numeral 12 designates the longitudinal ribs formed integrally with the cylinder upon the outer side thereof and providing the spaces or grooves 13 in which are located for reciprocatory motion the vertical knitting needles 14.

The dial 11 is likewise provided upon its top

surface with the plurality of radial ribs 15 which provide grooves 16 in which the horizontal radially moveable needles 17 operate.

In accordance with the present invention in one of its embodiments, the inner wall of the cylinder 10 is provided with the continuous encircling channel 18 which is of a depth not only to extend entirely through the thickness of the wall but into the ribs 12 and consequently beyond the bottoms 19, of the needle grooves 13, as is clearly illustrated in the several figures.

The body portion of this channel 18 is cut away to form the inclined face 20 which functions to carrying dirt inwardly and downwardly from the needle grooves and from the needles for discharge through the bottom of the cylinder or for discharge into a collection receptacle such as is shown in my prior application Serial No. 486,867, filed May 13, 1943.

By forming the channel 18 of a depth to extend entirely through the thickness of the cylinder wall and into the ribs 12, there are provided a number of scraping edges across which the back and portions of the side faces of the needles 14 pass in their reciprocatory motion during the operation of the machine. Horizontal edges at 21 and 22 are formed at the top and bottom of the channel 18 across which the back face of the needle in each groove passes and there are also provided the horizontal outwardly extending edges at the top and bottom of the channel as indicated respectively at 23 and 24 across which the side faces of the needles pass. Thus any lint or other material gathering in the channels, which would ordinarily collect and pack between the needle faces and adjacent walls of the channel and thus interfere with the free operation of the needle, will be scraped off and will fall inwardly upon the sloping surface 20 of the channel to be discharged downwardly through the bottom of the cylinder.

In some types of cylinders the lower ends of the needle grooves are closed by the outwardly extending walls 25 and difficulty has been experienced from having dirt accumulate in the bottom of each needle groove at the lower end, in the angle between the bottom wall of the groove and the wall 25. To avoid such accumulation each of the walls 25 at the lower end of the needle groove is provided with the discharge opening 26 through which accumulated dirt may escape.

Provision is also made for the cleaning of the back faces and side faces of the needles 17 carried by the dial 11 by forming in the under side of the dial the annular channel 27 which extends through the dial and into the ribs 15 as illustrated, whereby to provide transverse edges 28 upon which the back face of the needle moves and vertical scraping edges 29 extending across the side faces of the needle for effecting the removal of adhering matter therefrom.

The under side of the dial 11 may have secured thereto a pan or receptacle 30 as shown to catch dust and dirt escaping downwardly through the annular channel 27.

Figure 2 illustrates a modification of the structure shown in Figure 1. In this modification or second embodiment of the invention the cylinder wall, here designated 10', instead of having a single continuous channel cut in the inner side thereof, is provided with a vertically spaced series of short circumferentially extending channels 31. The short channels making up each series are in one plane and there is thus formed between the spaced ends of the channels of these series, the unbroken wall portions 32 which function as reinforcing posts to strengthen the cylinder wall.

As is clearly shown in Figures 2 and 3 the channel portions 31 of one series are shifted approximately 45° with respect to those of the adjacent series so that the unslotted portions 32 of one series are out of vertical alignment with the corresponding portions of the adjacent series.

This arrangement also provides several horizontal scraping edges 33 and 34 across the back of each needle and several horizontal scraping edges 35 at the sides of each needle, to more effectively remove lint and adhering matter from the needle faces.

Figure 6 illustrates the cylinder structure disclosed in my prior application, previously referred to, wherein the wall of the cylinder, designated 10'', instead of having a circumferentially extending continuous channel or a broken channel therein is provided with a plurality of radially directed slots 36 each of which extends to and opens through the bottom of the groove 37 in which the needle 38 moves between the spaced guide flanges 39. The bottom of each slot 36 is inclined downwardly and inwardly as indicated at 40 so that matter scraped from the back of the needle by the scraping edge 41 and the overlying edge 42 will be guided downwardly and inwardly to pass out from the bottom of the cylinder.

Figure 7 illustrates a portion of a cylinder and dial construction in which the dial is in the form of a flat annular plate 43 which is concentric with the cylinder generally designated 44 but lies outside the overall diameter of the cylinder. In this form the bottom of the cylinder is customarily closed as indicated at 45 and the inner face of the cylinder wall has the longitudinal ribs 46 which provide between them the channels 47 in which the vertical needles 48 reciprocate.

In the cylinder form of Figure 7 the continuous channel is formed in the outer wall, such channel being designated 49. This channel, as shown, is of a depth to extend through the entire thickness of the cylinder wall into and across the ribs 46 so that in this construction, as in the construction shown in Figures 1 and 2, there are formed upper and lower horizontal scraping edges 50 and 51 respectively which extend across the back face of the needles to keep the same clean of adhering matter and upper and lower scraping edges 52 which extend partly across the side faces of the needles to keep such faces clean.

It will be readily apparent that the arrangement shown in Figure 1 and that in each of these two figures as well as in Figure 2 there are provided the top and bottom scraping edges extending across the rear face of the needle and the horizontal inwardly extending top and bottom scraping edges against which the side faces of the needles bear. Consequently all three faces of the needles which are in the grooves will be kept clean so that there will be no interference with the smooth functioning of the needles in their respective grooves.

In order that the lower ends of the needle grooves may also be kept clean the bottom plate 45 is provided with a plurality of apertures, one only of which is shown in Figure 7 and designated 53, each of which apertures opens into the lower end of a groove adjacent the bottom thereof.

In order to prevent oily or gummy lint or other matter being picked up by the knitted material

as it moves downwardly around the outer side of the cylinder 44 there is provided the receptacle 54 which is of annular form and is open upon its inner side. The top edge of this receptacle is secured to the wall of the cylinder so that the open side is covered by the cylinder wall and the receptacle is positioned, as shown, so that material discharged outwardly and downwardly across the sloping bottom wall of the channel 49 will enter the receptacle.

It will be seen upon reference to the several embodiments of the invention that in each case the back face of the needle is in contact with the bottom wall face of the groove excepting, of course, for the distance from one transverse scraping edge to the opposite edge. Consequently there is no possibility of dirt working in behind the needle as it moves up and down in the groove and in any case where a particle of matter may adhere to the back face of the needle it will immediately be scraped off either by the transverse bottom or top edge of the channel across which the needle extends.

In addition, as has previously been pointed out, in those embodiments of the invention illustrated in Figures 1, 2 and 7 the side faces of the needles are in close contact with the scraping edges, such as the edges 23 and 24 of the embodiment shown in Figure 1, so that these side faces will also be kept clean and free at all times, of adhering matter.

As will be readily apparent, by providing the dials with the channel 27 and extending the channel into the ribs between which the needles move, the same cleaning and scraping action upon the back and side faces of the needles will be obtained as is obtained through the action of the edges 21 to 24 inclusive and the corresponding edges of the other structures shown in Figures 2, 6 and 7. The construction of the dials forms the subject matter of a separate application for patent.

I claim:

1. In a cylinder type knitting machine having a cylinder provided with needle grooves longitudinally in one wall, means for preventing accumulation of dust and dirt in said grooves, comprising an opening leading from the bottom of each groove through the wall of the cylinder to the opposite side thereof, the material of the cylinder between the grooves being cut out in a direction extending transversely of the groove to form side openings merging with the groove bottom opening, said bottom and side openings providing scraping edges across which the back and side faces of a needle pass in its reciprocatory movement in the groove.

2. A cylinder type knitting machine cylinder structure as set forth in claim 1, in which the bottom part of each of the first openings is inclined downwardly toward the opposite side of the cylinder from the groove to facilitate movement of dirt from the opening away from the groove.

3. In a cylinder type knitting machine having a cylinder provided with needle grooves longitudinally of one face, means for preventing accumulation of dust and dirt in said grooves, comprising a channel cut through the cylinder wall in a circumferential direction from the side face opposite that in which the grooves are formed, said channel being of an overall depth greater than the thickness of that part of the cylinder wall which lies between the sides of each groove whereby the channel extends into that part of the material of the cylinder lying between and forming the walls of the grooves, to provide each groove with two spaced scraping edges across the bottom thereof at the top and bottom of the channel and spaced scraping edges at its sides, said scraping edges engaging the back and side faces of a needle moving in the groove to remove adhering matter from said needle faces.

4. A cylinder type knitting machine cylinder of character set forth in claim 3, in which said channel is continuous circumferentially of the cylinder.

5. A cylinder type knitting machine cylinder as set forth in claim 3, wherein the circumferential channel is divided into a series of sections lying in a common plane and separated by unchanneled portions of the cylinder.

6. The combination with a cylinder type knitting machine cylinder of the character set forth in claim 3, of a receptacle secured to the cylinder wall upon the side opposite from the needle grooves to receive material passing by gravity downwardly from the grooves to the opposite side of the cylinder.

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