

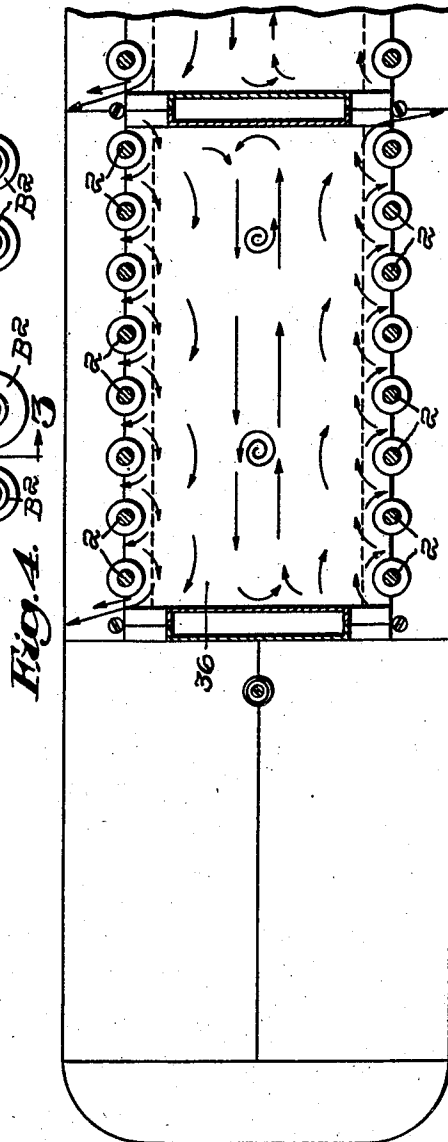
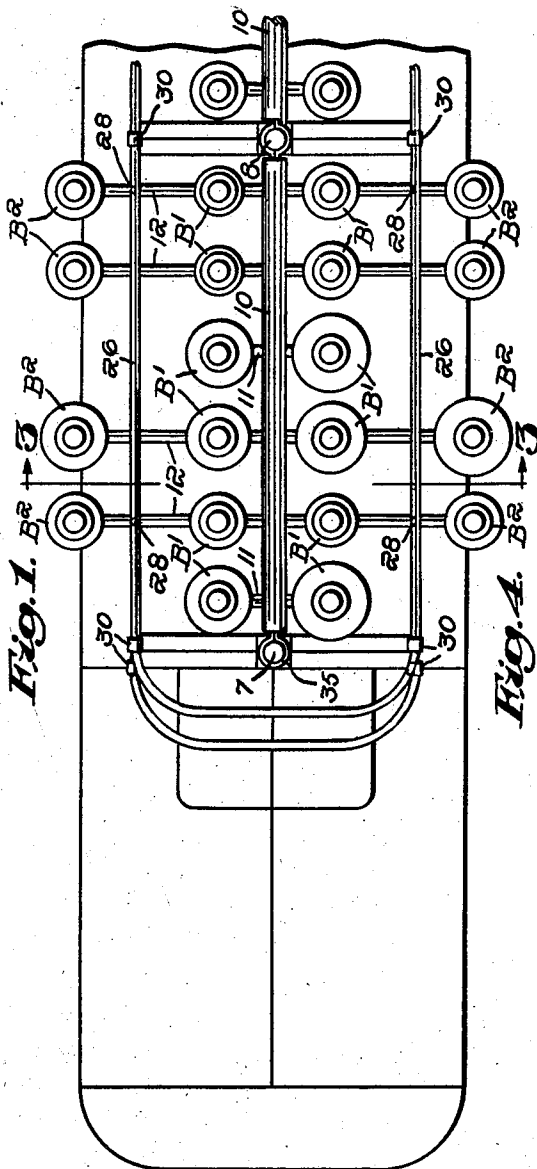
Dec. 18, 1945.

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2,391,135

SPINNING FRAME

Original Filed July 16, 1941 4 Sheets-Sheet 1



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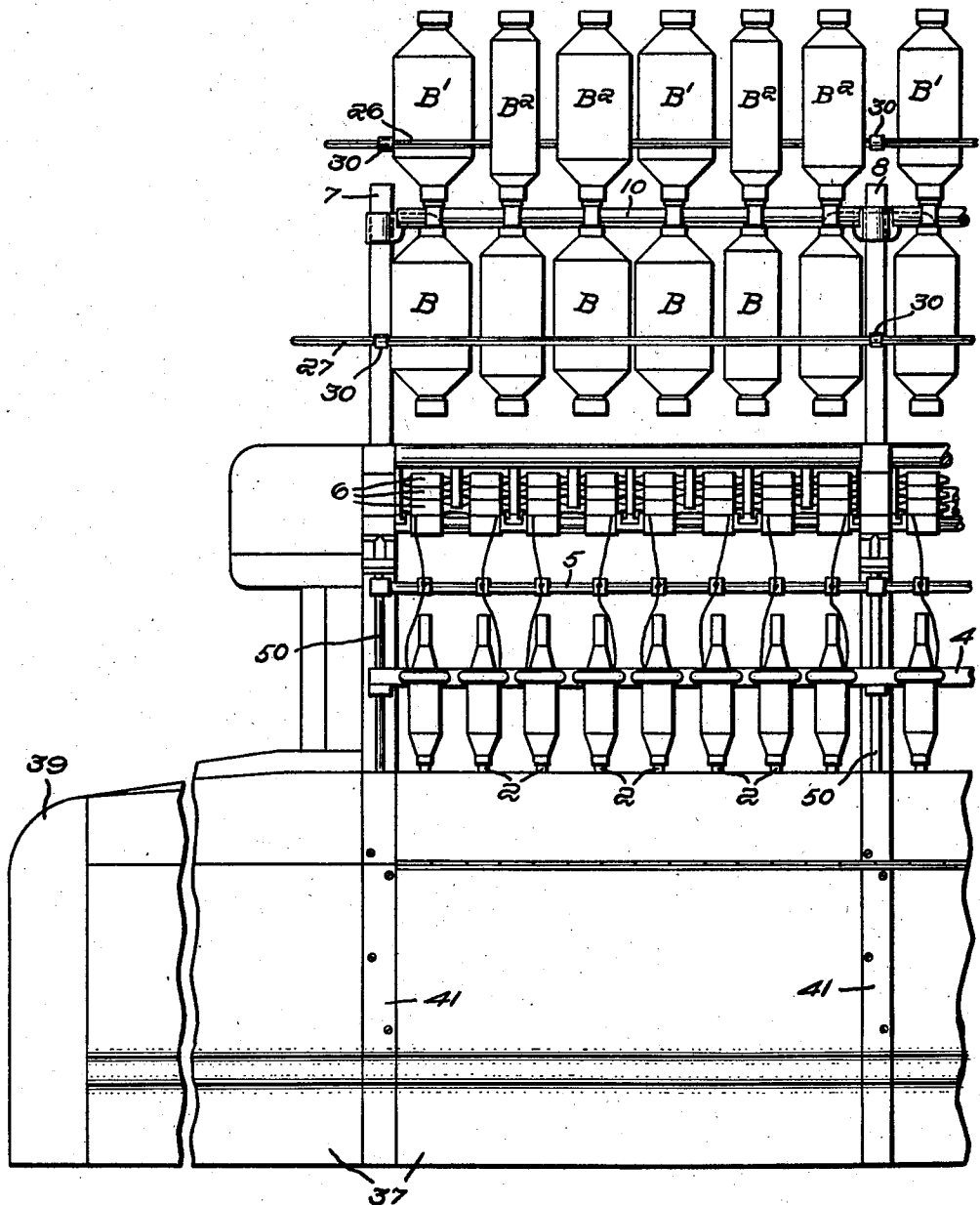
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Fig. 2.



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Original Filed July 16, 1941 4 Sheets-Sheet 3

Fig. 3

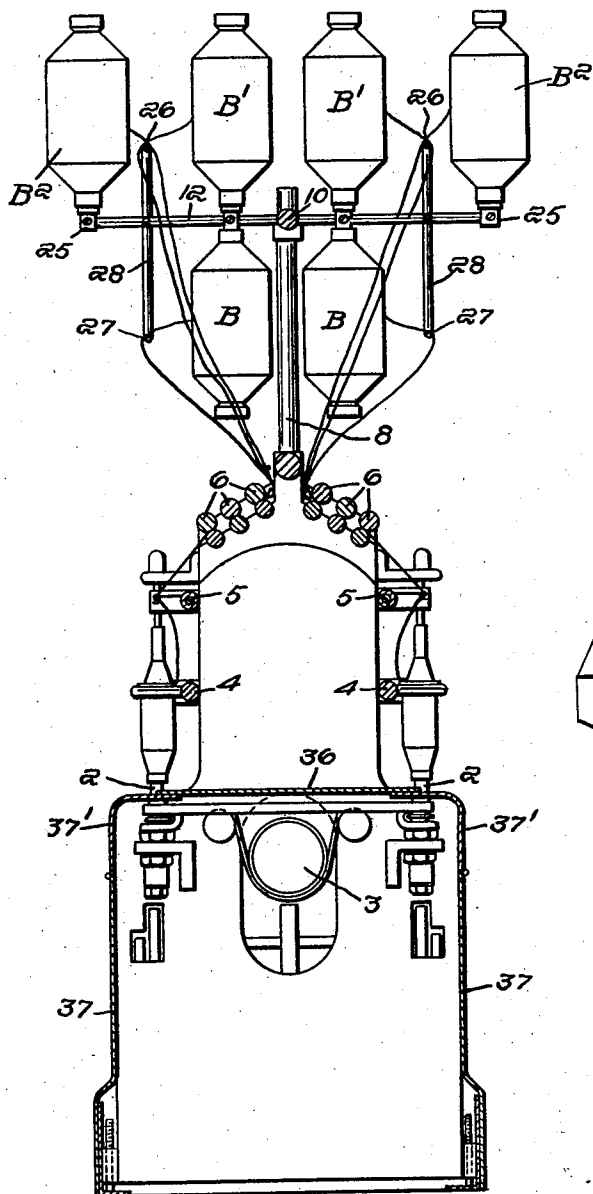
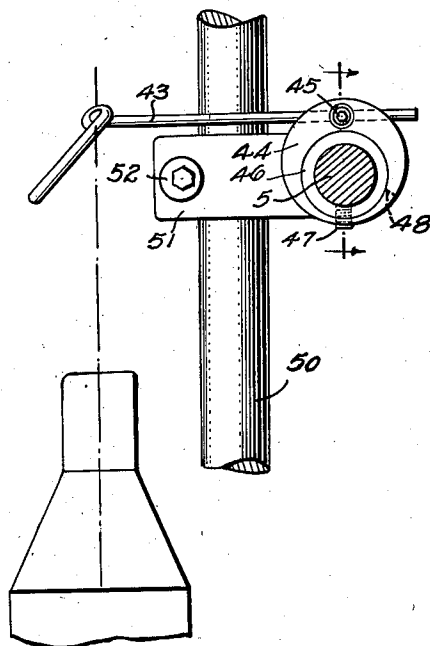


Fig. 6.



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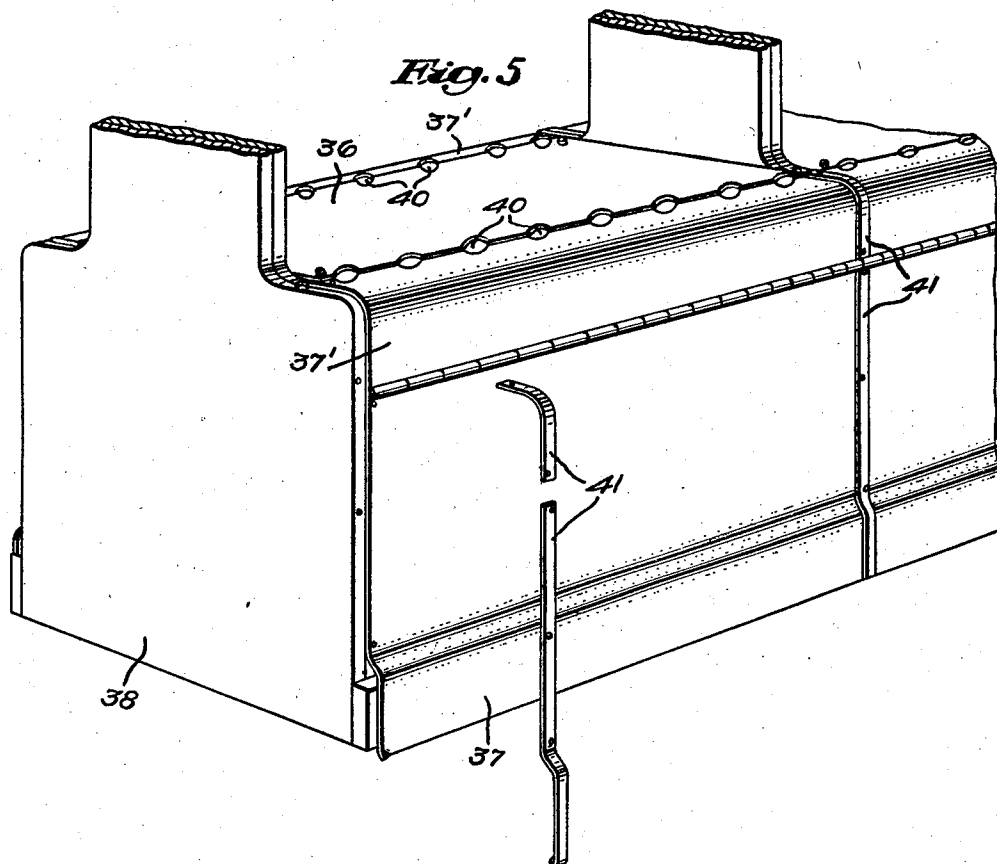
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SPINNING FRAME

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UNITED STATES PATENT OFFICE

2,391,135

SPINNING FRAME

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Original application July 16, 1941, Serial No.
402,581. Divided and this application Novem-
ber 2, 1943, Serial No. 508,673

10 Claims. (Cl. 57—56)

This invention relates to spinning frames, more especially of the type used in cotton spinning, and it has for its general object to effect economies in the manufacture and use of machines of this type.

More specific objects of the invention are to reduce the floor space required by a spinning frame to the end of reducing the overhead expense involved in the spinning operation, and to facilitate the servicing which any spinning frame requires, especially that involved in replacing empty roving bobbins, piecing up, and similar operations.

An analysis of the labor costs in a cotton spinning room shows that a surprisingly high proportion of such costs is for cleaning. In some mills this proportion will run as high as forty percent. of the entire operating cost. Cleaning is important primarily from the standpoint of quality of the product manufactured. Or, to state the matter differently, if the spinning frames are not kept clean of lint and fly a noticeable drop in quality occurs. This fact is well known in the industry and it is the controlling reason for the expenditure of so much time and pains in keeping the machines clean.

Accordingly, a further important object of this invention is to devise a spinning frame which, in a very substantial measure, will keep itself clean.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings,

Fig. 1 is a plan view of a portion of a spinning frame constructed in accordance with this invention;

Fig. 2 is a side elevation of that part of the machine shown in Fig. 1;

Fig. 3 is a vertical, sectional view approximately on the line 3—3, Fig. 1;

Fig. 4 is a horizontal section, the plane of section being taken just above the bobbin whorls;

Fig. 5 is a perspective view of a portion of a spinning frame at the tail end of the machine showing a preferred method of enclosing the mechanism in the machine base; and

Fig. 6 is a view, partly in side elevation and partly in vertical section, showing a detail of construction of the thread board.

Referring first to Figs. 2 and 3, a spinning frame is there shown of a type disclosed in an earlier application of mine, now issued as Patent

No. 2,295,935. This machine comprises sectional units secured end to end, each unit being substantially a complete spinning machine except for a driving mechanism. As illustrated, each

section includes two lines of spindles 2 mounted at opposite sides of the frame, each spindle being adapted to support a bobbin, and all the spindles being driven by bands or tapes which, in turn, are driven from a central cylinder 3, Fig. 3. Cooperating with the respective lines of spindles are the usual rings mounted on ring rails 4—4, thread boards 5—5, and two rows of sets of drawing rolls 6—6 which draw strands of roving from the supply bobbins and feed them laterally to the two lines of spindles.

So far as this general arrangement of the parts or mechanisms mentioned is concerned, the machine is essentially like those already known.

In prior art constructions it has been the universal practice to mount a creel for supporting the supply bobbins between the lines of drawing rolls at opposite sides of the frame. Usually the creel board is positioned on and between the roller beams on which the roll stands are mounted, and the lowest lines, rows, or tiers of roving bobbins are about on a level with the drawing rolls. Above these lower tiers there usually are one or more additional tiers of bobbins. Such an arrangement necessarily increases the width of the frame by a distance equal to the width of the creel. Usually the first story of the creel stand is designed to accommodate four longitudinal rows of bobbins, and if double roving is to be run, then the creel must include a second story accommodating four more rows of bobbins. With this arrangement it is not easy for an operator of average height and reach to replace an empty bobbin with a full one and to piece up. One of the objects of this invention, therefore, is to devise novel spinning frame and creel structures which will facilitate these operations.

It will be seen from an inspection of Fig. 3 that in the spinning frame provided by this invention the creel is positioned above the machine, the lower story of roving bobbins B consisting simply of two rows or tiers mounted directly over their respective rows of drawing rolls 6 and spaced from them only by a distance sufficient for convenience in piecing up and performing the servicing operations.

Attention is particularly directed to the fact that this re-arrangement permits a reduction in the width of the frame to about half that of the present commercial constructions, due chiefly to the removal of the creel from between the two

rows of drawing roll sets, the positioning of these rolls back to back, and the reduction of the space between them to a distance less than the normal diameter of a full roving bobbin, or, in other words, to a distance less than the overall lateral width of either of said rows of drawing roll sets, as will be evident from an inspection of Fig. 3. Also, by mounting the creel substantially as shown, the lower ends of the lowermost bobbins may be positioned below the shoulder level of a person of average height so that all of the bobbins in the creel then are within convenient reach. Moreover, since the bobbins are above or directly over the drawing rolls instead of behind them, an operator standing at either side of the machine is within easy reaching distance of all of the bobbins for that side.

The creel structure itself is of skeleton form and will be best understood from the detailed description and illustration thereof contained in my application Ser. No. 402,581, of which the present case is a division. For present purposes it is sufficient to point out that the creel structure preferably is made in sections corresponding to the sectional units of which the machine is composed. That portion of the creel for the extreme left-hand section shown in Figs. 1 and 2 comprises two upright posts 7 and 8 mounted at opposite ends of the section, and a horizontal bar 10 supported on them. Extending through this bar are several cross bars, two of which are relatively short and are shown at 11, the others, indicated at 12, being considerably longer. Some of the bobbins are suspended from these bars, while others are supported in standing positions on them.

It should also be observed that the bars and rods which form the structural elements of the creel are all made of circular cross-section so that they present no flat horizontal surfaces on which lint and fly can lodge. On the contrary, these surfaces are so curved or sloped that they naturally shed material of this nature and the creel therefore keeps itself clean at practically all times. Thus the labor of cleaning the creel is substantially eliminated. I have found that the labor of cleaning may further be reduced very materially by covering the space between the lines of spindles with some kind of a smooth surfaced plate such as that shown at 36 in Figs. 3, 4 and 5. Preferably, also, the entire base of the machine is enclosed by side plates 37 and additional plates, such as shown at 38 or 39, where required at an end of the frame. Each of the side plates 37 includes a supplemental plate 37' of approximately L-section secured to its respective plates 37 by a piano type hinge so that it may be swung outwardly to expose the whorls when desired. The margins of the top plate 36 rest on the inner margins of the curved plates 37', the three sets of plates being notched, as shown at 40 in Fig. 5, to fit around the spindles. Normally the plate 36 is held in its operative position by pins or screws so that they may be quickly taken out to permit its removal whenever desired. The abutting edges of adjoining side plates may be covered by strips such as those shown at 41.

With a construction of this nature I have found that the lint and fly which naturally tends to settle down between the lines of spindles is prevented from actually coming to rest in this space by the air currents created by the rotary motion of the bobbins and spindles. In Fig. 4 the arrows indicate, in a general way, what I believe to be the paths taken by these currents of air. There

is a down draft from overhead through and around the drawing rolls and the thread boards which naturally tends to carry lint into the space between the rows of spindles, but the whole body of air in said space is in motion and the air currents have ample velocity to prevent the lint from depositing on the smooth upper surface of the plate 36 which, while adapted to catch it, is not allowed to do so. Contributing to this result is the fact that the frame is exceptionally narrow due to the removal of the creel from between the two rows or lines of drawing rolls into a position above them, and the whole space from the creel to the plate 36 is open sufficiently for the down flow of air which will carry with it particles of lint and fly substantially as fast as they are shed by the bobbins and by the strands passing through the drawing rolls. The air currents relied upon to keep the plate 36 clean are the result of centrifugal action due to the rotative motion of the bobbins. They apparently throw air away from the frame at opposite sides and thus draw air from overhead down through the space between the rows of spindles. Naturally these air currents are more effective in a narrow space than they would be in a wide one. In this machine the frame has a maximum width of two feet and the two lines of spindles are sixteen inches apart. While this dimension can be varied, it is preferable to keep it within eighteen inches.

Since the creel and the cover plate 36 remain clean indefinitely, due to the causes above described, the greater part of the necessity for cleaning this frame is eliminated and the labor involved is correspondingly reduced.

In addition to contributing to the object of maintaining the frame clean, as above described, the narrow frame also has the very important advantage of occupying only about half the floor space that is required by the spinning frames now in common use. Every square foot of space in a mill translates itself into a certain fraction of the overhead cost of the product manufactured by that mill. Consequently, such a saving in floor space as that just mentioned is a substantial practical advantage. A further advantage of the creel structure is the fact that it can be manufactured very economically.

The thread board above referred to is made in sections individual to the respective sections of the spinning frame. Each section comprises a bar 5 of circular cross-sectional form supporting a series of lappets. Each of the lappets also is of novel form and includes a thread guide 43, Fig. 6, which may conveniently be made of wire twisted at one end to form the usual pig-tail eye. The shank of this guide extends through a hole formed to receive it in a bushing 44 and it is locked adjustably therein by a set screw 45. A sleeve 46 encircling the rod 4 and locked thereon by a set screw 47, supports the bushing 44 for rotative movement around the bar, and the bushing is slotted throughout a portion of its circumference to receive the set screw 47. For a more detailed illustration and description of this thread board structure reference should be made to the parent application above referred to.

In such a thread board construction the surfaces capable of supporting lint and fly are so extremely small that cleaning of this part of the frame is rarely required.

While I have herein shown and described a preferred embodiment of my invention, it will be evident that the invention is susceptible of em-

bodiment in other forms without departing from the spirit or scope thereof.

This is a division of my copending application Ser. No. 402,581, filed July 16, 1941. The claims of this case are limited to those features relied upon to prevent the accumulations of lint and fly in the machine or, in other words, to keep the machine clean. These features are not claimed in the parent application. The thread board features above described are not claimed in this application but are claimed in applicant's copending application Ser. No. 549,740, filed August 16, 1944.

Having thus described my invention, what I desire to claim as new is:

1. In a spinning frame, the combination with spinning instrumentalities including two lines of spindles positioned at opposite sides of the frame and adapted to support bobbins, and mechanism for driving said spindles, of a cover located between said lines of spindles and extending across the space separating them where its upper surface cooperates with the spindles and bobbins to cause the air currents created by the rotation of the bobbins to keep said surface substantially free from accumulations of lint or fly.
2. In a spinning frame, the combination with spinning instrumentalities including two lines of spindles positioned at opposite sides of the frame and adapted to support bobbins, and mechanism for driving said spindles, of a cover positioned between said lines of spindles and extending substantially across the space separating them, said cover having a smooth upper surface adapted to catch lint and fly settling in the region between said rows of spindles, said lines of spindles being spaced apart by a distance such that said cover is kept substantially free from lint and fly by the air currents created by said bobbins.
3. In a spinning frame, the combination with two parallel horizontal lines of spindles positioned at opposite sides of the frame and means for supporting and driving said spindles, of two rows of sets of drawing rolls for feeding strands of fibrous material laterally toward opposite sides of the frame to the respective lines of spindles, said rows being positioned back to back and separated by a space too narrow to accommodate a creel, whereby the width of the frame is greatly reduced, and a cover extending across the space between said lines of spindles and having an upper surface cooperating with said spindles and the bobbins mounted on them to cause the air currents created by the rotation of said bobbins to keep said surface substantially free from accumulations of lint or fly.
4. A spinning frame according to preceding claim 3, in combination with a creel mounted above said drawing rolls and supporting horizontal rows of bobbins from which the strands of roving are drawn by said rolls and fed to the

spindles, the supporting means for said drawing rolls and bobbins providing free space for the flow of air from said bobbins down and around said rows of drawing rolls to said cover.

5. In a spinning frame, the combination with spinning instrumentalities including two lines of spindles positioned at opposite sides of the frame and adapted to support bobbins, and mechanism for driving said spindles, of means substantially enclosing the mechanism in said frame below the spindles including a cover extending across the space between said lines of spindles and having a smooth upper surface.

6. In a spinning frame, the combination with spinning instrumentalities including two lines of spindles positioned at opposite sides of the frame and adapted to support bobbins, mechanism for driving said spindles, of a cover extending across the space between said lines of spindles, side plates cooperating with said cover to substantially enclose the space below said cover and the mechanism contained therein, said plates including sections readily removable for exposing the working parts thereunder.

7. A spinning frame according to preceding claim 3, in combination with a creel mounted above said drawing rolls and supporting horizontal rows of bobbins from which the strands of roving are drawn by said rolls and fed to the spindles, a skeleton thread board having parts for guiding said strands of roving in their travel to the respective spindles, said creel structure and said thread board being constructed to provide a minimum of area for the collection of lint and fly and the space between said bobbins and the area between said lines of spindles being relatively open and unobstructed for the free down flow of air from the bobbins, around said drawing rolls, and into the space between said lines of spindles.

8. A spinning frame according to preceding claim 3, a construction in which the overall width of said frame is not over approximately two feet.

9. In a spinning frame according to preceding claim 3, a construction in which the distance between said lines of spindles is not over approximately eighteen inches.

10. A spinning frame according to preceding claim 3, in combination with a creel structure mounted above said drawing rolls and constructed to support the bobbins from which strands of roving will be drawn by said rolls and fed to the spindles, the supporting structures above said cover being substantially devoid of horizontal surfaces on which lint and fly can collect and the region between said bobbins and said cover being relatively open and unobstructed for the free down flow of air from the bobbins around said drawing rolls and into the space immediately above said cover.

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