Jan. 12, 1932. E. STUTZ-BENZ 1,840,923

BOBBIN BANK MOVEMENT FOR SPINNING MACHINES

Filed Sept. 30, 1930 3 Sheets-Sheet 1

Fig. 1.

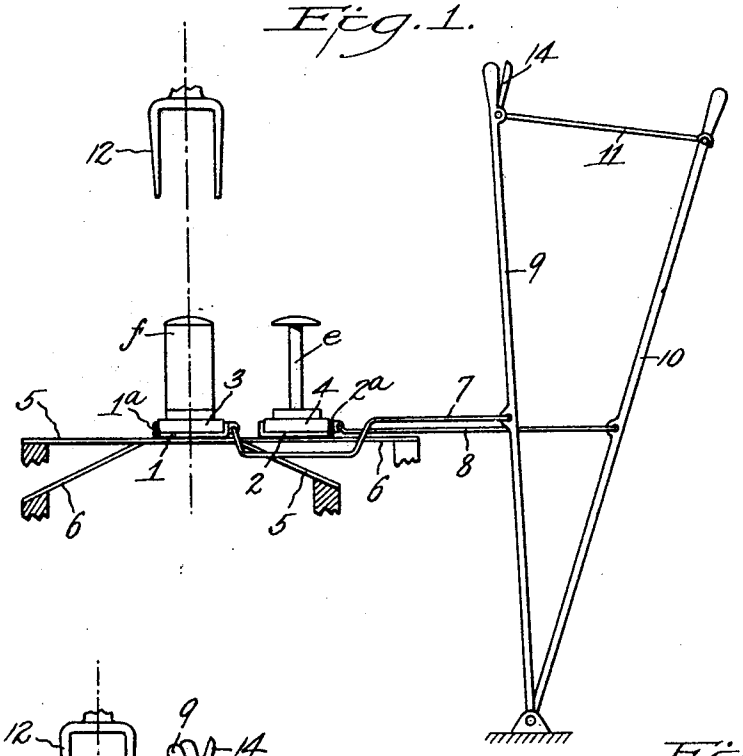
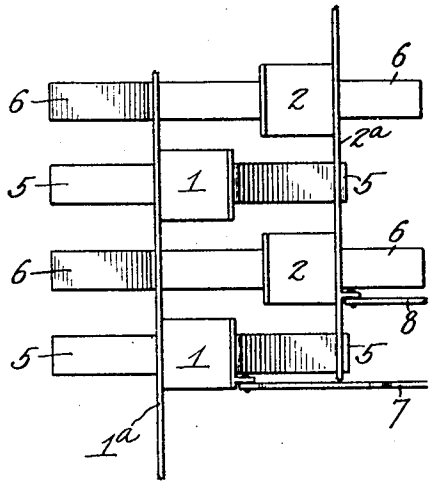


Fig. 1a.



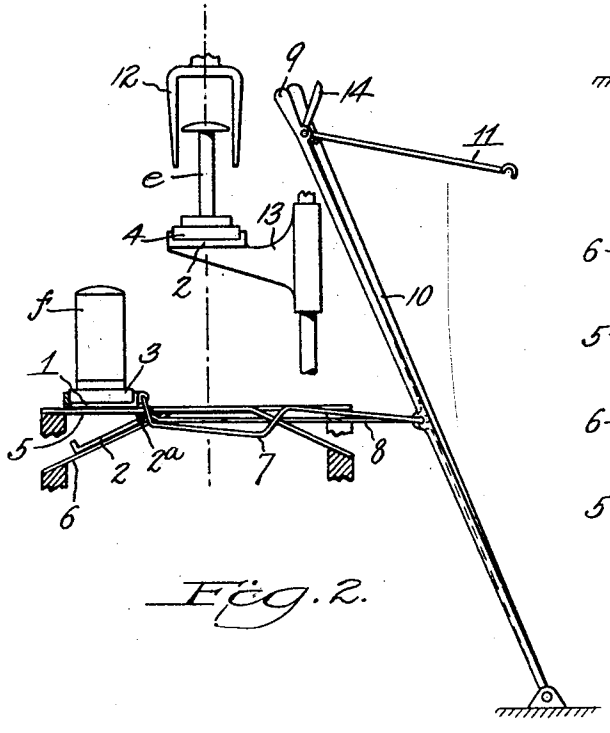


Fig. 2.

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BOBBIN BANK MOVEMENT FOR SPINNING MACHINES

Filed Sept. 30, 1930 3 Sheets-Sheet 2

Fig. 3.

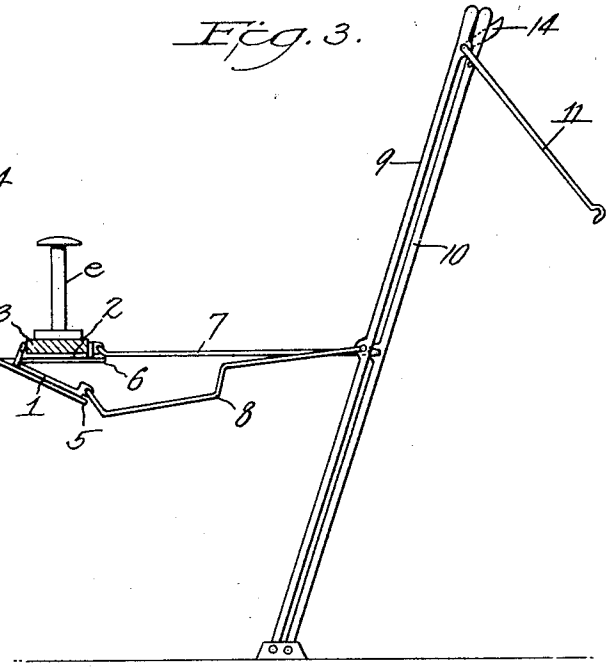


Fig. 11.

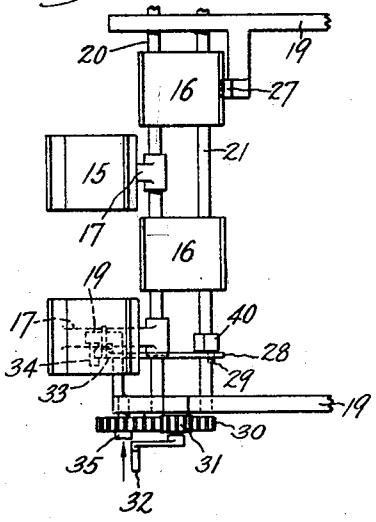


Fig. 4.

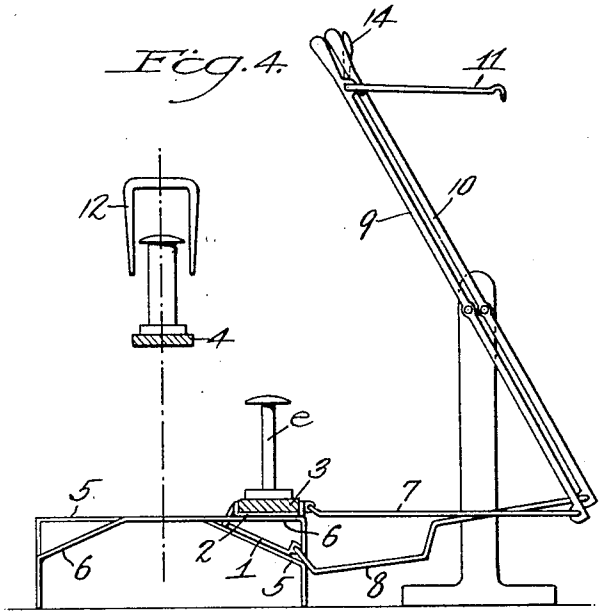
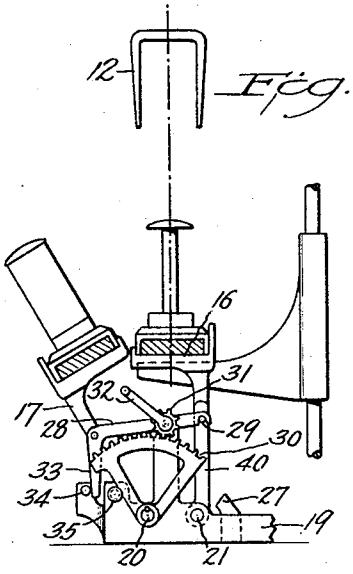


Fig. 10.



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BOBBIN BANK MOVEMENT FOR SPINNING MACHINES

Filed Sept. 30, 1930 3 Sheets-Sheet 3

Fig. 5.

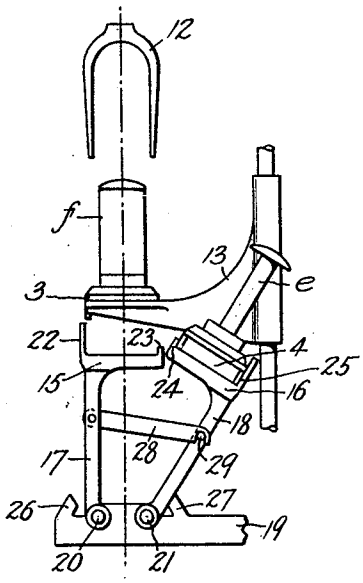


Fig. 6.

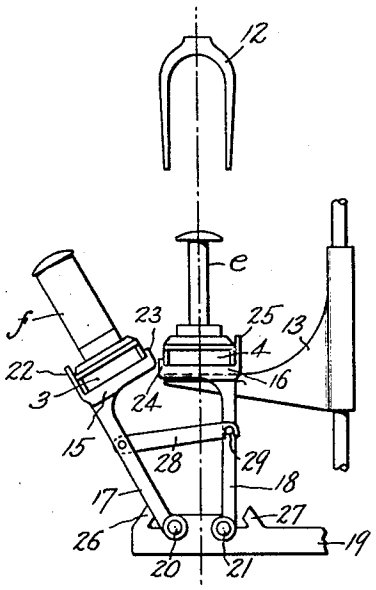


Fig. 7.

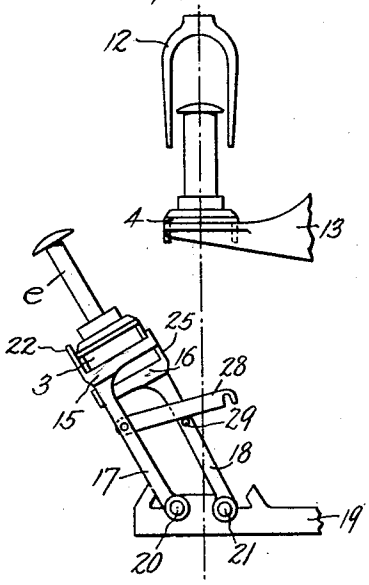


Fig. 8.

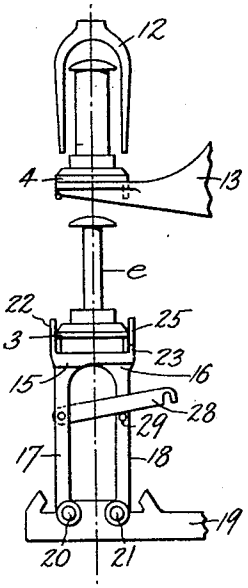
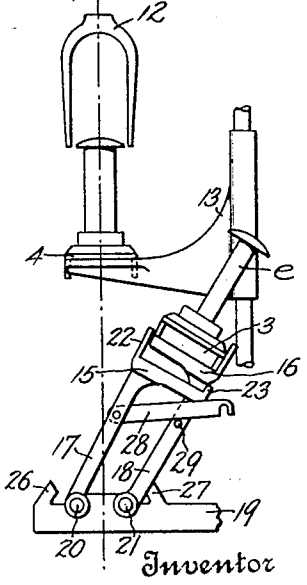


Fig. 9.



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Patented Jan. 12, 1932 1,840,923

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BOBBIN-BANK MOVEMENT FOR SPINNING MACHINES

Application filed September 30, 1930, Serial No. 485,416, and in Germany October 28, 1929.

During the exchange operation of bobbin-banks in spinning machines, it is necessary to remove the bank containing the full bobbins in a direction at right angles to the spinning axes from the alignment with these axes, and the bank containing the empty bobbins must be moved into the spinning axes also in a direction substantially at right angles to these axes. In order to enable the operative to remove the full bobbins from the bank, and to exchange them for empty bobbins, it is necessary that the full bank be located at the front of the machine, i. e. in front of the spinning axes. Accordingly, it is necessary to move the full bank to the front of the machine. In order to render the same operation possible for the next bobbin exchange, it is further necessary that the bank which contains the empty bobbins, and which is held in readiness for the exchange, be moved from the front of the machine, underneath the bank whose bobbins are at that time engaged in the spinning operation, to the rear of the machine, i. e. to the rear of the spinning axes.

This kinematic problem has been solved already in the prior art in several ways. It has been suggested, for instance, to provide horizontal slides with individual seats for the exchange position and for the ready position of the banks, and to provide in conjunction therewith movable auxiliary devices operating at right angles to the direction in which the banks are shifted. Later the mechanism was considerably simplified by providing a seat capable of holding two banks, one for the exchange position and the other for the ready position. This mechanism renders it possible to slide the bank deposited at one side of the seat later over to the other side.

My present invention proposes to solve this kinematic problem in an entirely different way. I propose to use two separate systems or rows of bank carrier elements, one for the empty and the other for the full banks, which rows, however, do not move altogether vertically with respect to each other, but both perform also horizontal movements in both directions. They do not move, of course, in a straight line, but in a curved path during which the two carrier rows assume the same level when they are located in alignment with the spinning axes.

In order to clearly define the term "spinning axes" as used in the present specification and claims, I would state that I mean the imaginary axes on which the fliers of the spinning machine rotate. These axes are all located in the same vertical plane, and thus form a straight row of lines along the length of the machine.

According to my invention, these rows of carriers, while having the same level when they are in line with the spinning axes, are located at different levels relatively to each other when they are located in front or to the rear of the spinning axes, such that one carrier row when in front of the axes is lower than the other row, and this other row is lower than the first-mentioned row when the two rows are located behind the spinning axes. This arrangement enables me to either move one row of carriers underneath the bank when it is held by the other row of carriers, or to withdraw a row of carriers from underneath a bank which is held by the other row, as will be explained more fully with reference to the drawings.

In the accompanying drawings,

Figures 1, 2 and 3 represent a more or less diagrammatical illustration in three operating positions of the principle of operation involved in my present invention;

Figure 1ª represents a plan view of a portion of Figure 1;

Figure 4 represents diagrammatically a modified form of the lever movement;

Figures 5 through 9 show a constructional form of my invention in side elevation in five different operating positions;

Figure 10 represents the same constructional form in the position shown in Figure 6, illustrating a particular mode of detaching the coupling between the two rows of carriers, and

Figure 11 represents a plan view of Figure 10.

Referring now to Figures 1, 1ª, 2 and 3, 1 and 2 represent the two rows of bank carriers,

each row consisting of a plurality of carriers coupled together respectively by a bar 1^a and 2^a, the carriers of each row being distributed over the length of the bank and spaced apart a sufficient distance to permit the carriers of the other row to enter between the carriers of the first-mentioned row when the two rows of carriers are in certain positions, as will be described presently. In most figures of the drawings, only two carriers are visible, as the other ones are directly behind in line, and for the purpose of this description reference numerals 1 and 2 indicate the rows of carriers.

Figure 1^a which shows only a portion of the total length of each carrier row, also shows the interstitial spaces between the carriers of each row, into which the carriers of the other row can slide in certain operating positions as aforementioned.

3 and 4 represent the bobbinbanks, of which, for instance in Figure 1, 3 carries full bobbins *f* and bank 4 carries empty bobbins *e*. 5 and 6 represent a number of guide rails arranged in line along the machine, so that in Figures 1 to 3 only one of each kind is visible. In Figure 1^a several of the rails 5 and 6 are shown. Guide rails 5 extend horizontally in front of the machine and into the spinning axis, which is indicated in all figures in dot and dash lines. To the rear of the spinning axes guide rails 5 are downwardly inclined. Guide rails 6 are downwardly inclined in front of the spinning axes and extend horizontally in the spinning axes and behind these axes. As shown in Figure 1^a there is one rail 5 provided for each carrier of the row 1, and one rail 6 for each carrier of the row 2, so that when these carriers are shifted to the front or to the rear of the spinning axes, row 1, supported throughout its whole length, will move horizontally in front of the spinning axes, but be downwardly inclined when it is moved behind the spinning axes, whereas the carriers of row 2 will move in horizontal direction when they are behind the spinning axes, and will be downwardly inclined when they are moved to the front of the spinning axes. The carriers of both rows are in horizontal position and at the same level when they are located in the spinning axes, as is shown for instance in Figure 1 with reference to row 1. As is diagrammatically illustrated in Figures 1 to 3, carrier row 1 is moved by means of link 7 through a hand lever 9, while row 2 is moved by means of a link 8 through hand lever 10. 11 represents a coupling rod controlled by the operative through handle 14 provided on lever 9, by which rod levers 9 and 10 can be coupled together in spaced relation to each other, so that they can be moved together in this spaced relation, whereby the two carrier rows 1 and 2 can be shifted in horizontal direction in this spaced relation. The principle according to which the mechanism, diagrammatically illustrated in Figures 1 to 3 operates, is as follows: In Figure 1 the carrier row 1 is located on the horizontal portion of its guide rail 5 and in line with the spinning axes, and it is assumed that the bank 3 with the full bobbins *f* has just been lowered from the flier 12 by means of the bobbin lift bracket 13 in the well-known manner (not shown in detail here) on to carrier row 1. Carrier row 2, which rests to the rear of the spinning axes on the horizontal portion of its guide rails 6, carries at present bank 4 with the empty bobbins *e*, which are held in ready position to be shifted into the spinning axes. Hand levers 9 and 10 are coupled by link 11 in spaced relation, as described. If now hand lever 9 is pulled by the operative towards the front of the machine, until carrier row 2 has arrived in the spinning axes, carriers 1 have arrived in horizontal position with their full bobbinbank in front of the spinning axes where the operative can conveniently exchange the full bobbins for empty ones. At the same time, the bobbin lift bracket 13, in a manner not shown here, can lift bobbinbank 4 from carrier row 2 and raise it into spinning position, as shown in Figure 2. If now the operative pulls handle 14 of coupling link 11 towards the handle of lever 9, the link is disengaged from lever 10, which enables the operator to pull lever 10 towards lever 9, as shown in Figure 2, which shifts carrier row 2 forward of the spinning axes, when the row tilts downwardly on the inclined portion of its rail 6, assuming the position shown in Figure 2 below the level of row 2. If now, after the full bobbins on bank 3 have been exchanged for empty ones, the operative moves both hand levers 9 and 10 together from the position shown in Figure 2 into the position shown in Figure 3, the carriers of row 2 will first rise to the level of the carriers of row 1 when both rows have arrived in the spinning axes, and thus commence to partake in the support of bank 3, now containing empty bobbins. On further movement of levers 9 and 10 to the rear, the carriers of row 2 will remain on the same level and slide back of the spinning axes on the horizontal portion of their rails 6, and will continue carrying bank 3 alone, whereas the carriers of row 1 on this rearward movement will slide down on the inclined portion of their rails 5 and assume the position shown in Figure 3. In this position, they have freed themselves entirely of the engagement with bank 3, and if now hand lever 9 is shifted forward alone and into the position shown in Figure 1, the empty carrier row 1 is thereby shifted into the spinning axes where it is ready to receive bank 4, now engaged in the spinning opera-

tion, as soon as the bobbins of this bank are filled. Bank 3 in the meantime remains in the rearward position with its empty bobbins *e*, ready to be shifted forward, and thus commencing the cycle anew. The forward shifting of hand lever 9 alone also brings the coupling link 11 into engagement with hand lever 10, and thus recouples the two levers in the position shown in Figure 1.

In order to shorten the height of the mechanism, by which the bank carrier rows 1 and 2 are shifted in the manner aforedescribed, I may pivot hand levers 9 and 10 midway between their ends, as shown in Figure 4, and connect the lower free ends respectively to the links 7 and 8 and have the handles provided at the upper free ends. In all other respects, the principle of operation is the same as described with respect to Figures 1 to 3. In Figure 4, the two carrier rows 1 and 2 are shown in the same position in which they appear in Figure 3.

It will be apparent to the observer that the principle thus explained and illustrated can be reduced to practice in various other ways, for instance, by forming the two carrier rows 1 and 2 as slides or carriages, and by shaping the guide rails 5 and 6 as cams or in any other suitable manner, so as to accomplish the purpose explained with reference to Figures 1 to 3.

A particular simple form, however, is obtained by mounting the two carrier rows on groups of arms by which they can swing on two axles spaced apart, as shown more fully in Figures 5 to 11, which I shall now describe in detail.

Referring to these figures, 15 and 16 represent respectively the two rows of carriers, each carrier in its row being spaced apart from the adjacent carrier as shown in Figure 11 to allow the oppositely disposed carriers of row 16 to pass between them when the two rows are located in the spinning axes. The two rows of carriers are fixed to, or made integral each with a group of arms 17 and 18 respectively, which arms are fixed respectively to axles 20 and 21 journalled in the frame structure 19 of the machine. Only one arm 17, 18 respectively of each group is visibile, the others being in line behind. Therefore, when I refer in the following conveniently to the two arms 17 and 18, I mean of course the entire set 17 or 18. These pivotal axles 20 and 21 are spaced apart a distance, and lie symmetrically the same distance away on each side of the plane of the spinning axes, which is again indicated in a dot and dash line. The carriers of each row are suitably shaped at their top surface to receive a bobbinbank. The carriers of row 15 are provided each on their left side with a high rim 22 and at their right side with a low rim 23, whereas the carriers of row 16 are provided on their left side with a low rim 24 and on their right side with a high rim 25. The bobinbanks seat between these rims in each row, as for instance shown with respect to bobbinbank 4 in Figure 5. 13 again represents the bobbin lift bracket and 12 the flier. *f* represents the full bobbins and *e* the empty bobbins in Figures 5 and 6. Owing to the two sets of arms 17 and 18, which respectively carry the two rows, being pivoted a distance apart, it is obvious that when both arms are tilted to the left, as is for instance shown in Figure 7, the carriers of row 16 are below the level of the carriers of row 15, whereas if the two arms are rocked to the right, as shown in Figure 9, the carriers of row 15 are below the level of the carriers of row 16. When the two arms are in middle position, and in parallel with the spinning axes, as shown in Figure 8, the carriers of both rows are on the same level, and are capable of jointly carrying a bobinbank. It will also be noted that if, for instance, the arms are tilted to the left, as shown in Figure 7, and empty bobbinbank 3 is located on row 15, and if the two arms are swung gradually to the right through the spinning axes, row 16 will gradually rise until both rows are at the same level in the spinning axes, when on further movement to the right, row 16 takes the burden of carrying the bobbinbank, whereas row 15 recedes until it arrives in its lowermost position with respect to the other row when the two arms are swung to the extreme right hand position, shown in Figure 9. In this position the high rims 22 of the carrier row 15 abut against the bobbinbank on row 16, and thus arm 17 is prevented from moving further to the right, while when both arms are swung over to the extreme left hand position, as shown in Figure 7, the high rim 25 of row 16 abuts against the bobbinbank on row 15, and thus arm 18 is prevented from moving further to the left. Stops 26 and 27 are provided on the frame portion 19 near the respective pivot points 20 and 21 of the two arms, and respectively in the paths of the arms against which the latter abut, so as to limit the left and right hand swing of the whole system. To one of the arms 17 of row 15 a coupling link 28 is pivotally attached, which corresponds with the coupling link 11 of Figure 1. The free end of this link engages a pin 29, provided on a separate arm 40 fixed on axle 21, when the two rows are pulled apart a certain distance, as shown in Figure 5. In this position, the coupling of the system corresponds with the condition of the system shown in Figure 1, namely, carrier row 15 is in the spinning axes and ready to receive the full bobbinbank 3 which is, as shown in that figure, about to be lowered on to it by the bobbin lift bracket 13. Carrier row 16 is in its extreme right hand position and carries the empty bobbinbank 4 ready to be moved into the spinning axes

when the coupled system is swung over to the left into the position shown in Figure 6. In this position the bobbin lift bracket 13 can lift the empty bobbinbank 4 with its empty bobbins *e* from row 16, and bring it into operative position with the flier 12. The full bobbins *f* are now presented at a very convenient angle to the operative, who can easily lift them from the bank 3 and replace them with empty bobbins. In the meantime, the bobbins on bank 4 are being filled, as is shown in Figure 7, in which bank 3 is shown as having been recharged with empty bobbins *e*. In the meantime, the operative has lifted coupling link 28 from its engagement with pin 29 so that arms 18, which are unevenly balanced due to the carriers being mounted to overhang to the left, will topple over to the left into the position shown in Figure 7, in which the rims 25 of this row abuts against the bank row 15, thereby preventing further movement of arms 18 to the left. The operative can now swing both rows together, with the empty bobbinbank 3 carried then on row 15, to the right, through the spinning axes into the extreme right hand position shown in Figure 9, when the bobbinbank has been lifted off carrier row 15 and been taken over by carrier row 16, the same as described with respect to Figures 1 to 3. The operative now pulls row 15 to the left into line with the spinning axes, as shown in Figure 5, when the coupling link 28 reengages pin 29 and recouples the two arms for a new cycle of operations as soon as the bobbins, being filled at that time, are lowered onto row 15.

The most convenient way in such a construction of swinging the two rows back and forth would be to operate arms 17 of row 15 through their rocking shaft, which is shown in cross section at 20 in Figures 5 to 9. By rocking this shaft, the different functions described hereinbefore can be performed.

The rocking shaft 20 may have fixed to it, for instance, a tooth sector 30, as shown in Figure 10, which is meshed with a gear wheel 31 conveniently journalled in the machine frame (not shown), to which gear wheel a hand crank 32 is attached which can be placed into a convenient position for the operative to handle. In such an arrangement the coupling link 28 may be automatically disengaged from arms 18 as soon as the operator swings the coupled system far enough to the left, by forming this coupling link as a bell crank with a downward pointing arm 33. This arm abuts against a stationary pin 34 provided on frame 19, in the path of arm 33 when the system is swung sufficiently far to the left (see also Figure 11 in dotted lines). However, the disengagement of the coupling link 28 should not occur right away when carrier row 16 has arrived in the spinning axes, where it should stop until the empty bobbinbank carried by it is lifted off. Therefore, a removable stop 35 is provided in frame 19, which stands ahead of fixed stop 34 and which stands normally in the path of tooth sector 30 and stops the latter, and thereby carrier row 16, when the coupled system has arrived in the position shown in Figure 10. If now by some suitable means, such as for instance through a foot lever arrangement, quite obvious in its construction and therefore not shown here, movable stop 35 is withdrawn from the path of the sector 30 in the direction of the arrow Figure 11, the operative can move the system a trifle further to the left by turning crank 32 correspondingly until arm 33 of the bell crank abuts against fixed stop 34, when coupling link 28 is lifted from pin 29 so that carrier row 16 can topple over to the left into the position shown in Figure 7 as described before.

The distance which the two carrier rows move apart in vertical direction in the extreme left and right hand positions of the system depends upon the distances which the two arms 17 and 18 are pivoted apart for a given angle of swing between the left hand and right hand stops. For a given arm length, this distance can easily be determined and, if necessary, the pivotal points of the arms can be made adjustable to vary the distance at will.

I claim:—

1. A bobbinbank exchange mechanism for spinning machines or the like having two rows of bank carriers, disposed to move transversely into and out of one another and in front of and to the rear of the machine spinning axes, and means for guiding each row in vertical direction to lower one row below the level of the other row when both rows are located in front of the spinning axes and to lower the other row below the level of the first-mentioned row when both rows are moved to the rear of the spinning axes, whereby a bobbinbank resting on the higher carrier row in front of the spinning axes is transferred onto the other row when both carriers are moved together from the front to the rear of the spinning axes.

2. A bobbinbank exchange mechanism for spinning machines or the like having two rows of bank carriers, disposed to move transversely into and out of one another and in front of and to the rear of the machine spinning axes, and means for guiding each row in vertical direction to lower one row below the level of the other row when both rows are located in front of the spinning axes and to lower the other row below the level of the first-mentioned row when both rows are moved to the rear of the spinning axes and to bring both rows to the same level when both are in line with the spinning axes, whereby a bobbinbank resting on the higher carrier row in front of the spinning axes is

transferred onto the other row when both carriers are moved together from the front to the rear of the spinning axes.

3. A bobbinbank exchange mechanism for spinning machines or the like having two rows of bank carriers, disposed to move transversely into and out of one another and in front of and to the rear of the machine spinning axes, and means for guiding each row in vertical direction to lower one row below the level of the other row when both rows are located in front of the spinning axes and to lower the other row below the level of the first-mentioned row when both rows are moved to the rear of the spinning axes and to bring both rows to the same level when both are in line with the spinning axes, whereby a bobbinbank resting on the higher carrier row in front of the spinning axes is transferred onto the other row when both carriers are moved together from the front to the rear of the spinning axes, and means for detachably coupling one row in spaced relation to the other, to position the row, from which the bank is transferred, in the spinning axes when the other row carrying the bank is located to the rear of said axes, to enable the row in the spinning axes to receive a bobbinbank from the spinning machine, said coupling means permitting the shifting of both rows in said spaced relation toward the front of the machine, to shift the first-mentioned bank in line with the spinning axes and the last-mentioned bank in front of the spinning axes.

4. A bobbinbank exchange mechanism for spinning machines or the like having two rows of bank carriers, disposed to move transversely into and out of one another, each row having pivotal supporting arms, the arms of each row being jointly pivoted on a common pivotal axis to permit the shifting of each carrier row by the operator into fixed positions in front and to the rear of the machine spinning axes, the two pivotal axes of said rows being spaced apart, one a given distance in front and the other the same distance to the rear of the spinning axes, to lower one carrier row below the level of the other row, when both rows are swung in front of the spinning axes, and to lower the other row below the level of the first-mentioned row when both rows are swung to the rear of the spinning axes, and to bring both carrier rows to the same level when both are swung in line with the spinning axes, whereby an empty bobbinbank resting on the higher carrier row in front of the spinning axes is transferred onto the other carrier row when both rows are swung together from the front to the rear of the spinning axes.

5. A bobbinbank exchange mechanism for spinning machines or the like having two rows of bank carriers, disposed to move transversely into and out of one another, each row having pivotal supporting arms, the arms of each row being jointly pivoted on a common pivotal axis to permit the shifting of each carrier row by the operator into fixed positions in front and to the rear of the machine spinning axes, the two pivotal axes of said rows being spaced apart, one a given distance in front and the other the same distance to the rear of the spinning axes, to lower one carrier row below the level of the other row, when both rows are swung in front of the spinning axes and to lower the other row below the level of the first-mentioned row when both rows are swung to the rear of the spinning axes, and to bring both rows to the same level when both are swung in line with the spinning axes, whereby an empty bobbinbank resting on the higher carrier row in front of the spinning axes is transferred onto the other carrier row when both rows are swung together from the front to the rear of the spinning axes, and means for detachably coupling the pivotal arms of said two carrier rows in spaced relation to one another, to position the row carrying the transferred empty bobbinbank at the rear of the spinning axes, and the other row into alignment with the spinning axes, to enable the latter row to receive a full bobbinbank from the spinning machine, said coupling means permitting the swinging of both rows in said spaced relation toward the front of the machine, to deliver the full bobbinbank in front of, and the empty bobbinbank into alignment with the spinning axes.

6. A bobbinbank exchange mechanism for spinning machines or the like having two rows of bank carriers, disposed to move transversely into and out of one another, each row having pivotal supporting arms, the arms of each row being jointly pivoted on a common pivotal axis to permit the shifting of each carrier row by the operator into fixed positions in front and to the rear of the machine spinning axes, the two pivotal axes of said rows being spaced apart, one a given distance in front and the other the same distance to the rear of the spinning axes, to lower one carrier row below the level of the other row, when both rows are swung in front of the spinning axes and to lower the other row below the level of the first-mentioned row when both rows are swung to the rear of the spinning axes, and to bring both rows to the same level when both are swung in line with the spinning axes, whereby an empty bobbinbank resting on the higher carrier row in front of the spinning axes is transferred onto the other carrier row when both rows are swung together from the front to the rear of the spinning axes, and means for detachably coupling the pivotal arms of said two carrier rows in spaced relation to one another, to position the row carrying the transferred empty bobbinbank at the rear of the spinning axes, and

the other row into alignment with the spinning axes, to enable the latter row to receive a full bobbinbank from the spinning machine, said coupling means permitting the swinging of both rows in said spaced relation toward the front of the machine, to deliver the full bobbinbank in front of, and the empty bobbinbank into alignment with the spinning axes, and means for disengaging said coupling when said bobbinbanks are delivered into the last mentioned positions, to permit the carrier now located in the spinning axes to swing toward the front of the machine and below the level of the other carrier row.

7. A bobbinbank exchange mechanism for spinning machines or the like having two rows of bank carriers, disposed to move transversely into and out of one another, each row having pivotal supporting arms, the arms of each row being jointly pivoted on a common pivotal axis to permit the shifting of each carrier row by the operator into fixed positions in front and to the rear of the machine spinning axes, the two pivotal axes of said rows being spaced apart, one a given distance in front and the other the same distance to the rear of the spinning axes, to lower one carrier row below the level of the other row, when both rows are swung in front of the spinning axes, and to lower the other row below the level of the first-mentioned row when both rows are swung to the rear of the spinning axes, and to bring both rows to the same level when both are swung in line with the spinning axes, whereby an empty bobbinbank resting on the higher carrier row in front of the spinning axes is transferred onto the other carrier row when both rows are swung together from the front to the rear of the spinning axes, and means for detachably coupling the pivotal arms of said two rows in spaced relation to one another when the row from which the empty bank was transferred is swung by the operator into alignment with the spinning axes to enable said row to receive a full bobbinbank from the spinning machine, said coupling means permitting the operator to swing both rows in said spaced relation toward the front of the machine, to deliver the full bobbinbank in front of, and the empty bobbinbank into alignment with the spinning axes, and means controlled by the operator for disengaging said coupling after the bobbinbanks are delivered into the last mentioned positions.

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