

Aug. 10, 1965

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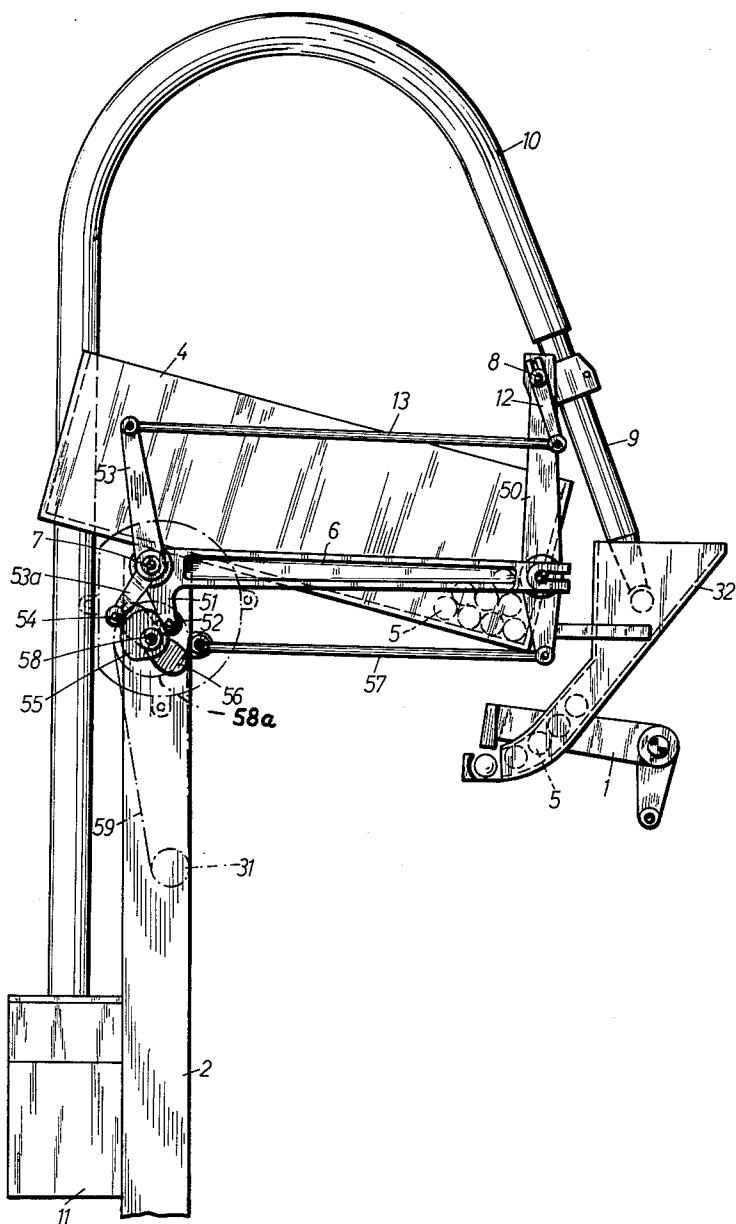
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BOBBIN SUPPLY DEVICE FOR LOOMS

Filed Oct. 15, 1962

5 Sheets-Sheet 1

Fig. 1



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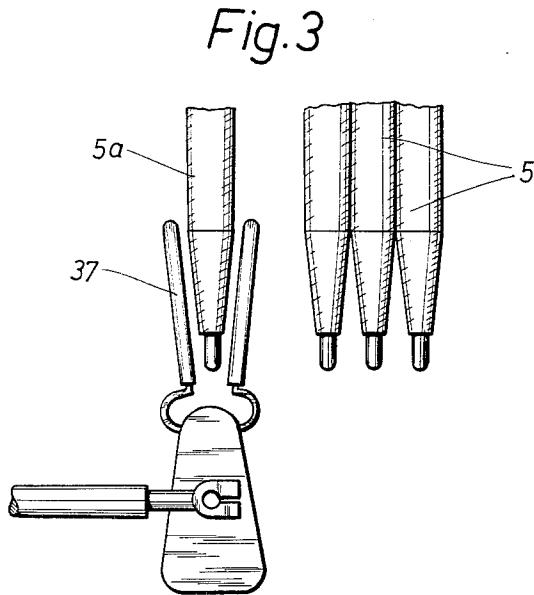
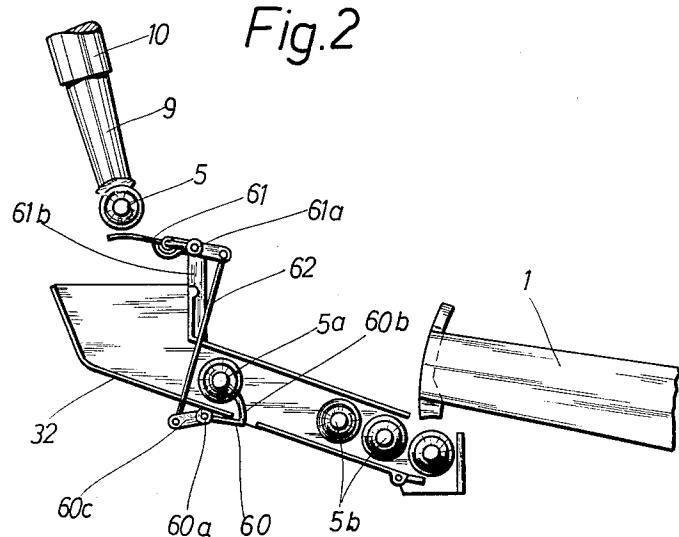
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BOBBIN SUPPLY DEVICE FOR LOOMS

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Fig. 4

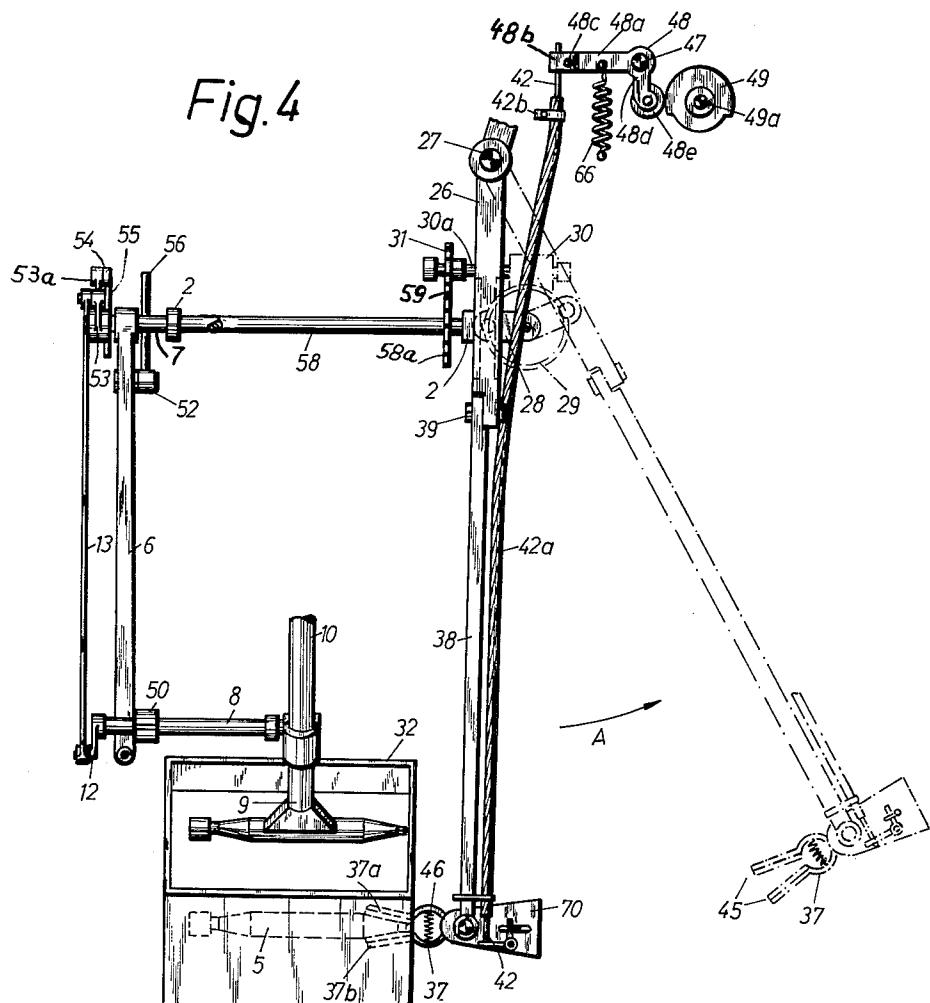
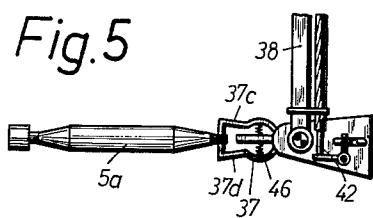


Fig. 5



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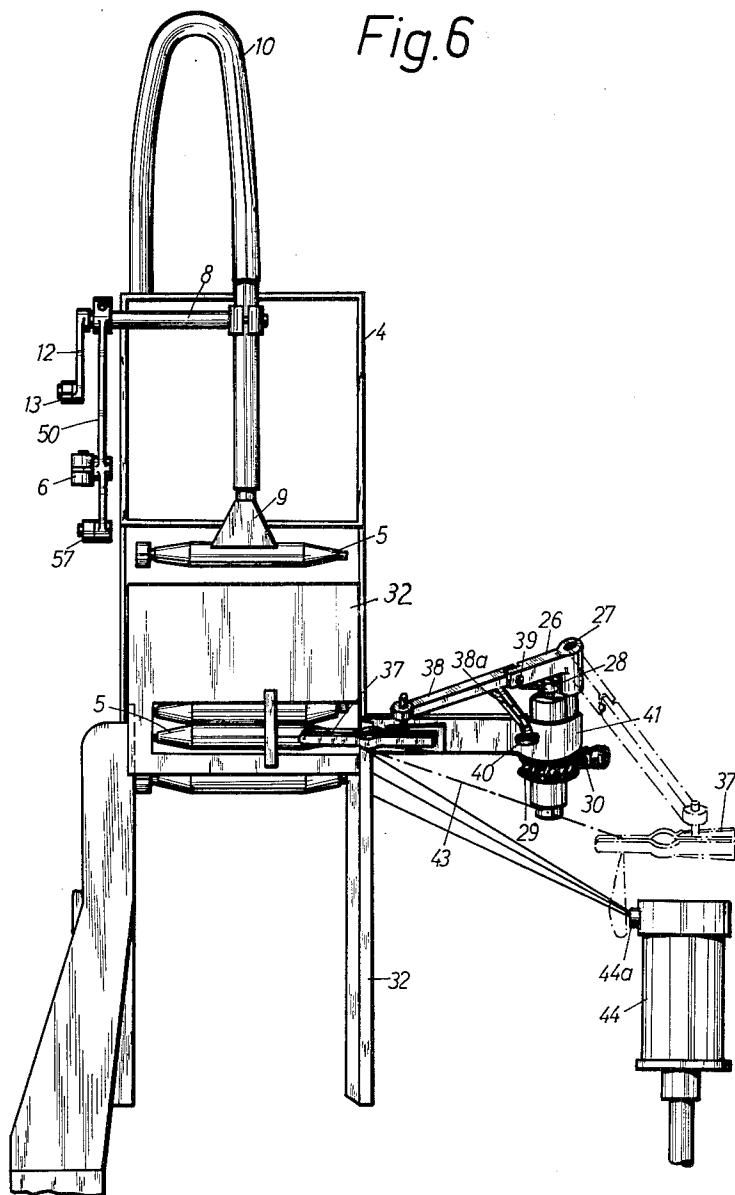
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BOBBIN SUPPLY DEVICE FOR LOOMS

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Fig. 6



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BOBBIN SUPPLY DEVICE FOR LOOMS

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Fig. 7

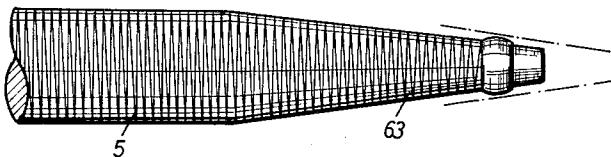


Fig. 8

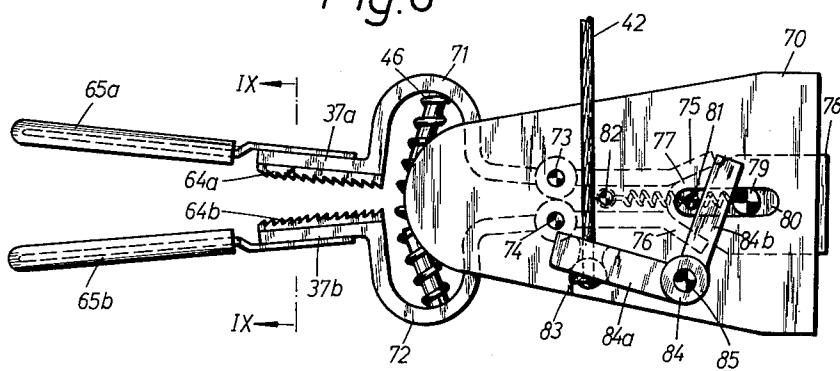
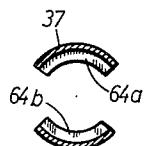


Fig. 9



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BOBBIN SUPPLY DEVICE FOR LOOMS
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M 50,573
12 Claims. (Cl. 139—245)

The present invention relates to an automatically operable bobbin supply device for use in connection with looms. The heretofore known bobbin supply devices with a drop magazine or with a drum magazine have the drawback that their capacity is rather limited. Therefore, large capacity magazines were provided which were detachable from the loom and which were loaded separately and in loaded condition connected to the loom. All of these heretofore known large capacity magazines require a bobbin point or tip winding and thus a special spooling device in order to be able to move the thread end of the bobbins to be changed to the required point. Furthermore, the above mentioned known constructions are rather complicated and therefore relatively easily liable to disturbances.

It is, therefore, an object of the present invention to provide a device of the above mentioned type which is simple in construction and can easily be observed.

It is another object of this invention to provide an automatic bobbin supply device as set forth in the preceding paragraph which will have an improved thread end grasping device.

It is still another object of this invention to provide an improved bobbin receiving device which receives the bobbin and leads the same to a transfer position or station, which device will simplify the grasping of the thread end from the bobbin.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 represents a side view of the gripper arm according to the invention and the control therefor.

FIG. 2 is a diagrammatic side view of the holding device for the bobbins.

FIG. 3 is a top view of FIG. 2 with the bobbin receiving box or funnel and the control device for the release of the bobbins omitted while showing the thread end grasping device.

FIG. 4 is a top view of a lever system for actuating the thread end grasping device.

FIG. 5 illustrates a slight modification of the thread end grasping device shown in FIG. 4.

FIG. 6 is a side view of FIG. 1 and also shows the lever system of FIG. 4 in side view.

FIG. 7 illustrates a bobbin with point or tip winding.

FIG. 8 illustrates a still further modification of a thread end grasping and stripping device.

FIG. 9 is a section taken along the line IX—IX of FIG. 8.

General arrangement

One of the foremost features of the present invention consists in that a bobbin supply box has arranged thereon a controlled pneumatically operable bobbin gripper arm and a thread end stripper and grasping device. In this connection the gripper arm is so designed that the bobbins can be withdrawn from the bobbin supply box only individually and one after the other whereupon they are fed to a bobbin receiving box, for instance in the form of a funnel, which directly leads to the transfer station. The bobbin supply box and the entire device may be arranged

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independently of the loom proper so that this device will not be affected by the vibration of the loom.

According to a further embodiment which has proved very advantageous, the gripper arm is controlled by means of a linkage-cam system which is supported by a stand independent of the loom proper. The bobbin gripper withdraws one bobbin at a time, deposits the same into the bobbin receiving and feeding box and then returns to the bobbin supply box for the withdrawal of a further bobbin. More specifically, the gripper arm is equipped with a nozzle which due to its own weight drops down on the respective bobbin in the bobbin supply box whereupon due to vacuum means said nozzle lifts the respective bobbin out of the supply box and transfers the same to the transfer chute.

Adjacent to the transfer chute or feeder box there is provided a thread end stripper and grasping device which is mounted on a control arm tiltable by a crank or the like and adapted to be controlled by means of a roller and a stationary cam disc. The thread end grasping device grasps the thread end of the bobbin and transfers the same to a suction pot in which the thread end is held fast in a manner known per se. In order to be sure that the thread end will be safely grasped, the grasping device will with each bobbin carry out two or more stripping and grasping operations so that the thread end will be grasped also if during the first grasping operation it should be dropped off and was not pulled off to the desired extent. The control arm is provided with a pull cable for opening the spring-loaded grasping device. Depending on the type of the bobbin, the jaws of the grasping device are provided with a rough lining, for instance with foam rubber; if bobbins are employed with a so-called point winding, the jaws are designed in form of hooks.

Structural arrangement

Referring now to the arrangement shown in the drawings and in FIG. 1 thereof in particular, the device illustrated therein comprises a transfer station including hammer 1 adjacent which there is provided a stand 2 supporting a bobbin supply box 4 carrying bobbins 5. The transfer station includes a discharge opening in chute 32 at the lower end through which the bobbins are driven by hammer 1. The bobbin grasping or gripping device comprises a suction nozzle 9 which is connected by a bore 10 to a source of suction in the form of vacuum pump 11. For purposes of holding, moving and guiding the suction nozzle or gripping means 9 for taking the bobbins 5 out of the supply box 4, a four-bar linkage is provided comprising a lever arm 50, a control arm 57, an angle lever 6 and stand 2. The linkage is substantially a parallelogram linkage and thus holds the lever arm 50 always in a substantially vertical position. Suction nozzle 9 is secured to shaft 8 which is tiltably supported at the free end of lever arm 50 while a further lever 53, having an arm 53a, is journaled on shaft 7 which is carried by stand 2 and also supports the angle lever 6. Lever 53 is connected to shaft 8 through the intervention of a linkage 12, 13.

Angle lever 6, which effects up and down movement of nozzle 9, has fixedly connected thereto a lever 51 which carries a roller 52. This roller is in continuous engagement with the cam surface of a symmetrically designed double cam 56, rotation of which cam will cause lifting and lowering of angle lever 6 and, therefore, of the nozzle 9.

Lever 53, which effects swinging movement of nozzle 9, has its said arm 53a provided with a roller 54 which is in engagement with and is controlled by a cam 55 to control the swinging or lateral movement of the front portion of the nozzle 9. Cams 55 and 56 are mounted

on a shaft 58 which is rotatable by sprocket 58a thereon which is engaged by a chain 59. Chain 59 is, in turn, driven by a sprocket wheel 31 mounted on a shaft 30a. Shaft 30a is drivingly connected to a rotating part (not shown) of the loom. Inasmuch as the bobbin supply device according to the invention works only intermittently, the said drive comprises a mechanical clutch (not shown), for instance a pin clutch, which is actuated by a magnetically controlled rotating wedge and, depending on the adjustment of a time relay, will control two or more complete revolutions.

Operation of the bobbin gripper

It may be assumed that the device occupies the position shown in FIG. 1 in which the nozzle 9 is in its normal position, namely within the transfer chute or feeder box 32 through which the bobbins 5 are fed to the transfer position or transfer station at the lower end of box 32. If a bobbin 5 is to be withdrawn from the supply box 4 and transferred to the feeder box 32, cam 56 is actuated by means of the chain drive 59. Cam 56 will then through roller 52 and lever arm 51 actuate the angle lever 6. As a result thereof, the lever arm 59 will be actuated and raised and nozzle 9 will be lifted out of feeder box 32 and raised to a level above the right-hand edge (with regard to FIG. 1) of the supply box 4. In view of the movement of cam 55 and the actuation of roller 54, levers 53a, 53 and of lever 12 connected to shaft 8 which mounts nozzle 9, said nozzle 9 will be moved toward the left with regard to FIG. 1 for movement into the supply box 4. The lowering of the nozzle 9 into the supply box 4 is made possible by the continued rotation of cam disc 56. The vacuum pump 11 is controlled by a timer (not shown) in such a way that when the nozzle engages a bobbin in the supply box 4, the pump is turned on and creates a vacuum in hose 10 thereby causing the nozzle to pick up the respective bobbin. This vacuum is maintained until the nozzle has been moved from the supply box 4 into the position in which the bobbin is to be released, namely, into a position over the feeder box 32 adjacent the said supply box. When a bobbin is to be released from nozzle 9, the timer operates to cut off the supply of vacuum to nozzle 9 and the bobbin held thereby will be released into chute or transfer feeder box 32. The suction nozzle 9 is thus operable for transferring bobbins one at a time from supply box 4 to a feeder box or transfer chute 32 adjacent the supply box.

Feeder box

Referring now to FIG. 2, this figure illustrates the feeder box or chute 32, which is adjacent supply box 4, in somewhat more detail. As will be seen from FIG. 2, the chute, which has a funnel-shaped contour, with a receiving opening and a discharge opening and a passage connecting said openings, has an abutment lever 60 which is pivotally connected to a stud 60a supported by the feeder box 32. As shown in FIG. 2, the inner arm 60b of abutment lever 60 extends into the interior of the feeder box 32 and, more specifically, into the path of the bobbins moving toward the transfer position or transfer station at the lower end of the box. The outer arm of abutment lever 60 has linked thereto a link 62 which in its turn is linked to a two-arm lever 61 pivotally supported by a pivot 61a carried by an arm 61b which may be connected to the feeder box 32 in any convenient manner. It will be appreciated that if lever 61 is turned in counterclockwise direction, link 62 is lifted and thereby turns two-arm lever 61 in clockwise direction so as to withdraw the inner arm 60b out of the feeder box or chute thereby releasing a bobbin previously held thereby for movement to the discharge opening of the chute.

Operation of the feeder box or chute

As previously mentioned, the nozzle 9 transfers one bobbin at a time from the supply box 4 to the feeder

box 32. When during this transfer movement the nozzle 9 has reached the position in which it is shown in FIG. 2, the vacuum in hose 10 is made ineffective whereupon the bobbin 5 carried by nozzle 9 will be released and will drop downwardly and thereby tilt levers 61 and 60 with the result that the last supplied bobbin 5a will be released by the arm 60b and will roll downwardly against the other bobbins 5b in the lower portion of the feeder box 32, whereas the bobbin 5 just released from nozzle 9 will then take the place of bobbin 5a. It will be appreciated that as soon as bobbin 5 has been released by nozzle 9 and tilted lever 61 in counterclockwise direction so as to pass by the said lever, the lever 61 will return to its previous position due to the weight of arm 62 and lever arm 60c, and in which position the arm 60b again extends into the feeder box so as to be able to stop bobbin 5 just released. If desired, the return of lever 60b into the interior of feeder box 32 may be aided by a return spring for lever 60.

It will be appreciated that with this type of bobbin changing device it is necessary to capture and to hold fast the free end of the thread on the bobbin when the bobbin is shot into the shuttle.

With this in mind, the purpose of lever 60 is to stop the respective last inserted bobbin in the feeder box and keep the same spaced from the previously inserted bobbins in the right-hand portion of the feeder box (with regard to the drawing) so the free end of the thread therein can be captured. With the bobbin thus stopped, a thread end grasping device 37, which is arranged adjacent the feeder box 32, will be better able to grasp the free end of the thread of the last inserted bobbin.

Actuating mechanism for the thread end grasping device

As will be seen from FIG. 4, an arm 38 carrying grasping device 37 is pivotally connected by pivot 39 to an arm 26 which, in its turn, is pivotally supported by a stationary horizontal pivot 27 which extends at right angles to pivot 39. It will be appreciated that in this way arm 38 is tilttable in a first vertical plane in the direction of the arrow A and additionally is tilttable in a second vertical plane perpendicular to the first vertical plane about the pivot 39.

The device of FIG. 4 comprises a worm wheel 29 which meshes with a worm 30 keyed to shaft 30a to which is also keyed sprocket 31 (see also left-hand side of FIG. 1) which is directly driven by a rotating part of the loom. Worm wheel 29 has secured thereto an arm 28 which is slidably connected to arm 26. It will thus be seen that when worm wheel 29 turns, arm 26 will be turned from its solid position into its dot-dash position of FIG. 4. The tilting movement of arm 38 in the vertical direction about pivot 39 is effected by means of a mechanism shown in FIG. 6. This mechanism comprises a stationary cam 41 on which rests a roller 40 carried by an arm 38a connected to arm 38. Thus, when arm 38 is tilted in FIG. 4 from its solid position into its dot-dash position, roller 40 will roll downwardly on cam 41 thereby causing a tilting movement of arm 38 in a vertical plane about pivot 39. The dot-dash position of arm 38 in FIG. 4 represents the normal or rest position. For purposes of grasping a thread end of the bobbin, arm 38 moves from said dot-dash position into the solid line position shown in FIG. 4 (see also FIG. 6). The thread end grasping device also comprises a cable 42 by means of which the jaws 37a, 37b of the thread end grasping device 37 will be opened. The thread end grasping operation is effected in the following manner.

Before the jaws 37a, 37b come into the range of the bobbin end with the thread thereon, pull cable 42 is actuated so as to open the jaws 37a, 37b against the thrust of spring 46 which continuously urges said jaws toward each other. The jaws then grasp the adjacent bobbin end therebetween whereupon lever 38 is again moved in the direction of the arrow A thereby pulling

thread off from the adjacent bobbin end and holding the respective thread end between the jaws. When the lever 38 has reached its dot-dash position in FIGS. 4 and 6, the thread end has been brought into the range of the mouth 44a of a suction pot 44 so that the suction effect will hold the thread end whereupon the jaws 37a, 37b are pulled apart to release the thread end previously grasped thereby.

Cable 42 is displaceably mounted in a flexible tube 42a (Bowden cable) which is connected at its upper end by means of a clamp 42b to a part of the machine frame (not shown). The free end of cable 42 is clamped to a longer arm 48a of an angle lever 48, for instance by means of a clamp 48b and a clamping screw 48c. Angle lever 48 is tilttable about shaft 47 and has connected to the free end of its shorter arm 48d a rotatably journaled roller 48e engaging a cam 49. Cam 49 is connected to a shaft 49a which is driven by shaft 36a thru the intervention of a transmission (not shown), which shaft also drives sprocket wheel 31 and worm 39. A spring 66 is connected with its upper end to the longer arm 48a of angle lever 48 and has its other end connected to a part of the machine frame (not shown). Spring 66 continuously urges roller 48e against cam 49.

The gripper itself may have various forms. According to one form shown in FIGS. 8 and 9, the gripper comprises a holder 70 which is connected to the arm 38. The holder 70 has connected thereto elastic arms 71, 72 to which are connected the jaws 37a, 37b. The gripper comprises a holder 70 in which are journaled the elastically supported arms 71, 72 which are tilttable about shafts 73, 74. Shafts 73, 74 are fixedly connected to holder 70. The ends 75, 76 of arms 71, 72 protruding beyond the shafts 73, 74 flare with regard to each other. Between the flared ends 75, 76 extends the tip 77 of a wedge member 78, which wedge member has a bolt 79 connected thereto by means of which it is displaceably journaled in a straight manner within an oblong hole 80 in holder 70. Bolt 79 has connected thereto a spring 81 which has its other end connected to holder 70, e.g. by means of a bolt 82 fixedly connected to holder 70. Spring 81 is so dimensioned that it is able to press the wedge 78 against the thrust of the spring 46, which latter presses the arms 71, 72 apart and therefore the ends 75, 76 against each other between the ends 75, 76 of the arms 71, 72 and thereby presses the ends 75, 76 apart and the arms 71, 72 together. If the gripper is to be brought from its normal or closed position into its opened position, cable 42 is pulled with a force which is greater than the difference between the forces of springs 46 and 81. In this way, the hemisphere 83 connected to cable 42 is displaced, which hemisphere acts upon the arm 84a of an angle lever 84 which is tilttable about a shaft 85 connected to holder 70. In view of the action of hemisphere 83 on arm 84a of the angle lever 84 the latter is tilted about shaft 85. Consequently, arm 84b of angle lever 84 acts upon the bolt 79 of wedge member 78 in such a way that the wedge member is displaced against the difference in the spring forces of spring 46 and 81 so that the legs 71, 72 are opened. When the force acting on cable 42 decreases, legs 71, 72 are closed again.

In order to facilitate the stripping off of the thread end from bobbin 5, if a point winding system 63 is involved as shown in FIG. 7, it is advantageous to equip the thread end grasping device 37 with tooth segments 64a and 64b as shown in FIGS. 8 and 9. These tooth segments are slightly arched and are preferably made of synthetic material, such as polyethylene, so as to make sure that the thread or yarn will not be damaged.

According to a further development of the invention, it may be advantageous for special purposes to equip the jaws 37a, 37b with additional stripper jaws 65a, 65b. The interior of the stripper jaws 65a, 65b may be covered with a rough lining, as for instance foam rubber.

It is, of course, to be understood that the present in-

vention is, by no means, limited to the particular construction shown in the drawings but also comprises any modifications within the scope of the appended claims.

What we claim is:

5. An automatically operable bobbin supply device for use in connection with looms, which includes: a bobbin supply box open at the top, pneumatically operable bobbin gripper means for grasping and releasing bobbins, chute means also open at the top and adapted for feeding bobbins to a transfer station, and intermittently operable means operatively connected to said bobbin gripper means and operable to move said gripper means into said bobbin supply box from above for picking up a bobbin therefrom and then to move said gripper means together with the bobbin gripped thereby into said chute means from above to deliver the bobbin to the chute means.

20. An automatically operable bobbin supply device for use in connection with looms, which includes: a bobbin supply box open at the top, pneumatically operable bobbin gripper means for grasping and releasing bobbins, chute means also open at the top and adapted for feeding bobbins to a transfer station, and intermittently operable means including a lever system and cam means controlling said lever system, said means being operatively connected to said bobbin gripper means and being operable to move said gripper means into said bobbin supply box from above for picking up a bobbin therefrom and then to move said gripper means together with the bobbin gripped thereby into said chute means from above to deliver the bobbin to the chute means.

25. A bobbin supply device according to claim 1, which includes an independent stand supporting said bobbin supply device.

30. An automatically operable bobbin supply device for use in connection with looms, which includes: a stand, a bobbin supply box open at the top supported by said stand, pneumatically operable bobbin gripper means for grasping and releasing bobbins, chute means also open at the top and adapted for feeding bobbins to a transfer station, and intermittently operable means including a lever system having one lever pivotally connected to said stand and also including cam means operatively connected with said lever system to impart cyclic motion thereto, said means being operable to move said gripper means into said bobbin supply box from above for picking up a bobbin therefrom and then to move said gripper means together with the bobbin gripped thereby into said chute means from above to deliver the bobbin to the chute means.

35. An automatically operable bobbin supply device for use in connection with looms, which includes: a bobbin supply box, pneumatically operable bobbin gripper means for grasping and releasing bobbins, chute means for feeding bobbins to a transfer station, means operatively connected to said bobbin gripper means and including a lever system to impart cyclic motion thereto and two cams operatively connected with said lever system, one of said cams being designed as symmetric double cam, a common shaft supporting both of said cams, and a drive drivingly connected to said shaft for driving same, said means being operable to move said gripper means into said bobbin supply box for picking up a bobbin therefrom and subsequently transferring the same to said chute means.

40. A bobbin supply device according to claim 1, in which said chute means is arranged to receive a plurality of bobbins and which comprises retainer means in said chute means operable to retain the bobbin last received by said chute means until the next bobbin is released into said chute means.

45. A feeding device for use in connection with looms for feeding bobbins to a transfer station, which comprises: chute means having a receiving opening for receiving bobbins from a bobbin depositing device and also having a discharge opening for releasing a bobbin to a loom, and forming part of said transfer station, said chute

means also including means interconnecting said receiving opening and said discharge opening, first lever means comprising a stop arm normally extending into said passage means and operable to block the movement of a bobbin between said stop arm and said receiving opening, second lever means operatively connected to said first lever means and operable by a bobbin released thereupon for temporarily withdrawing said stop arm from said passage means to thereby permit a bobbin stopped by said stop arm prior to the withdrawal thereof to move toward said discharge opening, and means for withdrawing said stop arm from said passage means to release a bobbin held thereby.

8. An automatically operable bobbin supply device for use in connection with looms, which includes: a stand, a bobbin supply box supported by said stand, pneumatically operable bobbin gripper means for grasping and releasing bobbins, chute means for feeding bobbins to a transfer station, means including a lever system having one lever pivotally connected to said stand and also including cam means operatively connected with said lever system to impart cyclic motion thereto, said means being operable to move said gripper means into said bobbin supply box for picking up a bobbin therefrom and subsequently transferring the same to said chute means, drive means drivingly connected to said cam means, thread end grasping means arranged adjacent said chute means for grasping the thread end of a bobbin therein, and control lever means drivingly connected to said drive means for actuating said thread end grasping means.

9. A device according to claim 8, in which said thread end grasping means includes grasping jaws provided with curved toothed sections.

10. A device according to claim 9, in which said toothed sections are of synthetic material.

11. A device according to claim 9, in which the jaws

of said thread end grasping means are provided with extensions acting as additional strippers and provided on the inside thereof with a soft lining.

12. An automatically operable bobbin supply device for use in connection with looms, which includes: a stand, a bobbin supply box supported by said stand, pneumatically operable bobbin gripper means for grasping and releasing bobbins, chute means for feeding bobbins to a transfer station, means including a lever system having one lever pivotally connected to said stand and also including cam means operatively connected with said lever system to impart cyclic motion thereto, said means being operable to move said gripper means into said bobbin supply box for picking up a bobbin therefrom and subsequently transferring the same to said chute means, drive means drivingly connected to said cam means, thread end grasping means arranged adjacent said chute means for grasping the thread end of a bobbin therein, suction means arranged laterally of said chute means, and control lever means drivingly connected to said drive means for actuating said thread end grasping means and causing the same to grasp a thread end and moving the latter to said suction means to be attracted and held by the latter.

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