

No. 883,975.

PATENTED APR. 7, 1908.

H. SCHWARZENBACH & G. LIER.
DOBBY FOR LOOMS FOR WEAVING.

APPLICATION FILED FEB. 27, 1905.

4 SHEETS—SHEET 1.

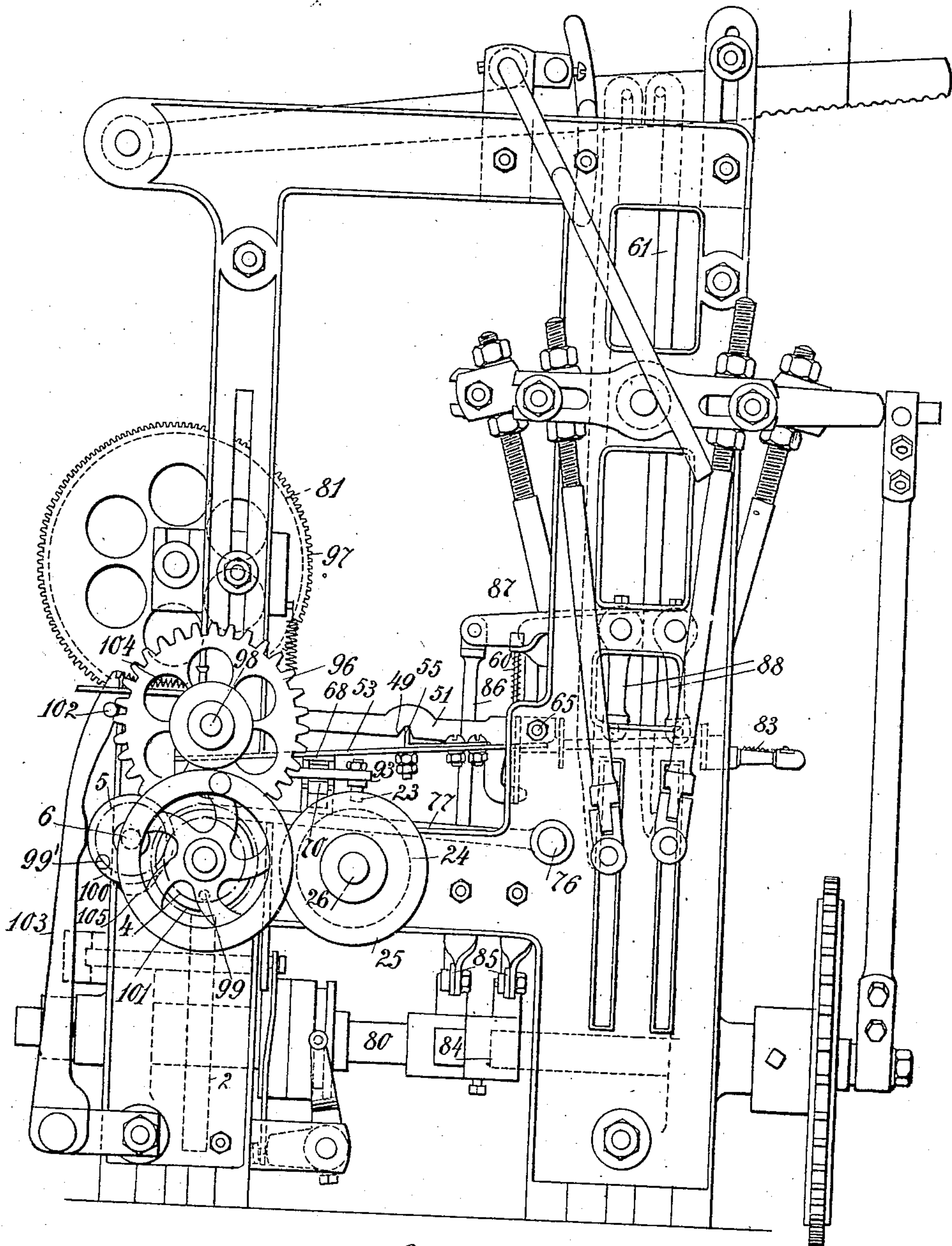


Fig. 1.

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Fred Hoyer

Inventors:
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by *Friedrich Hoyer*
Attorney.

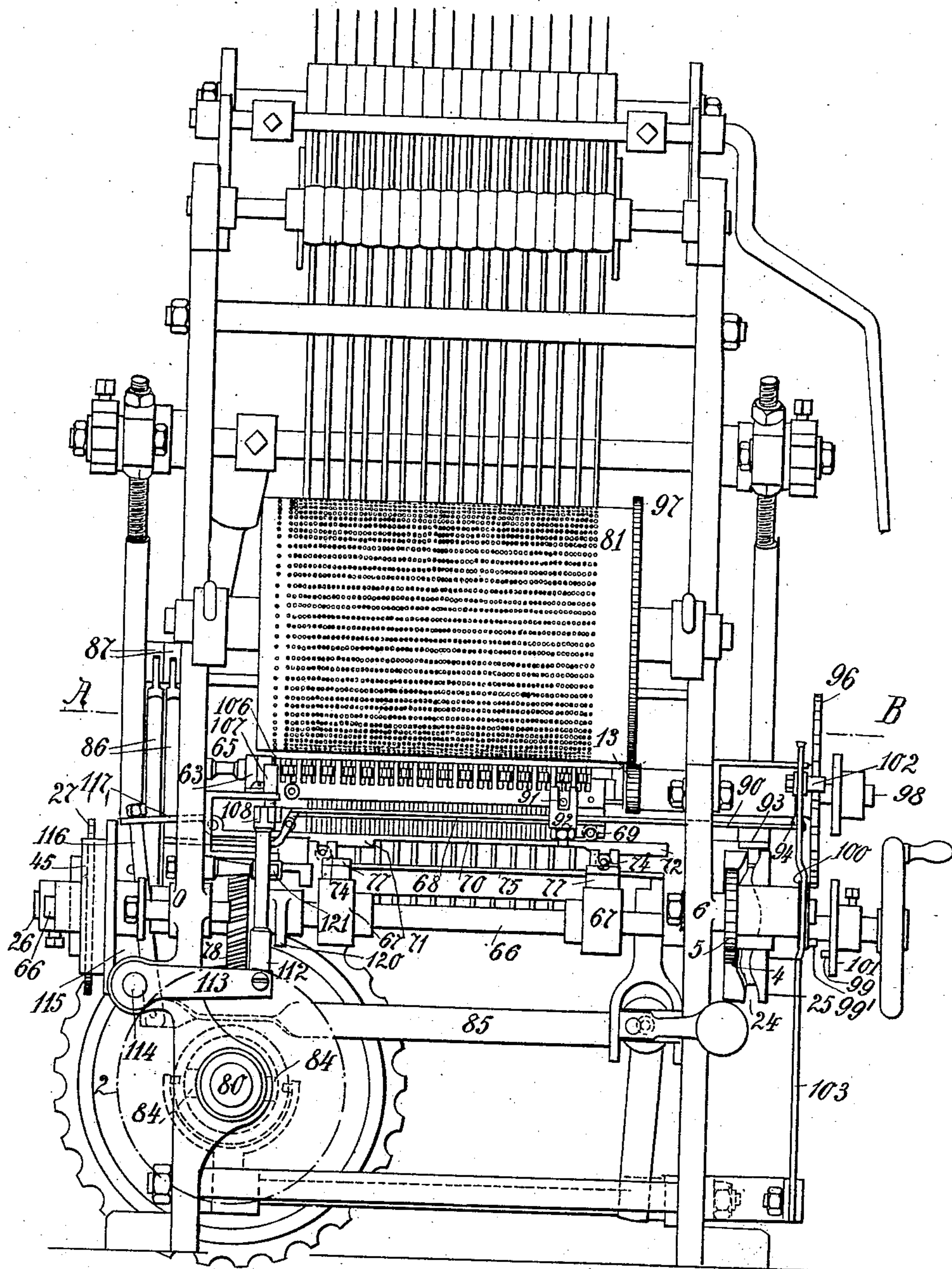
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4 SHEETS—SHEET 2.



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Fig. 2.

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4 SHEETS—SHEET 3.

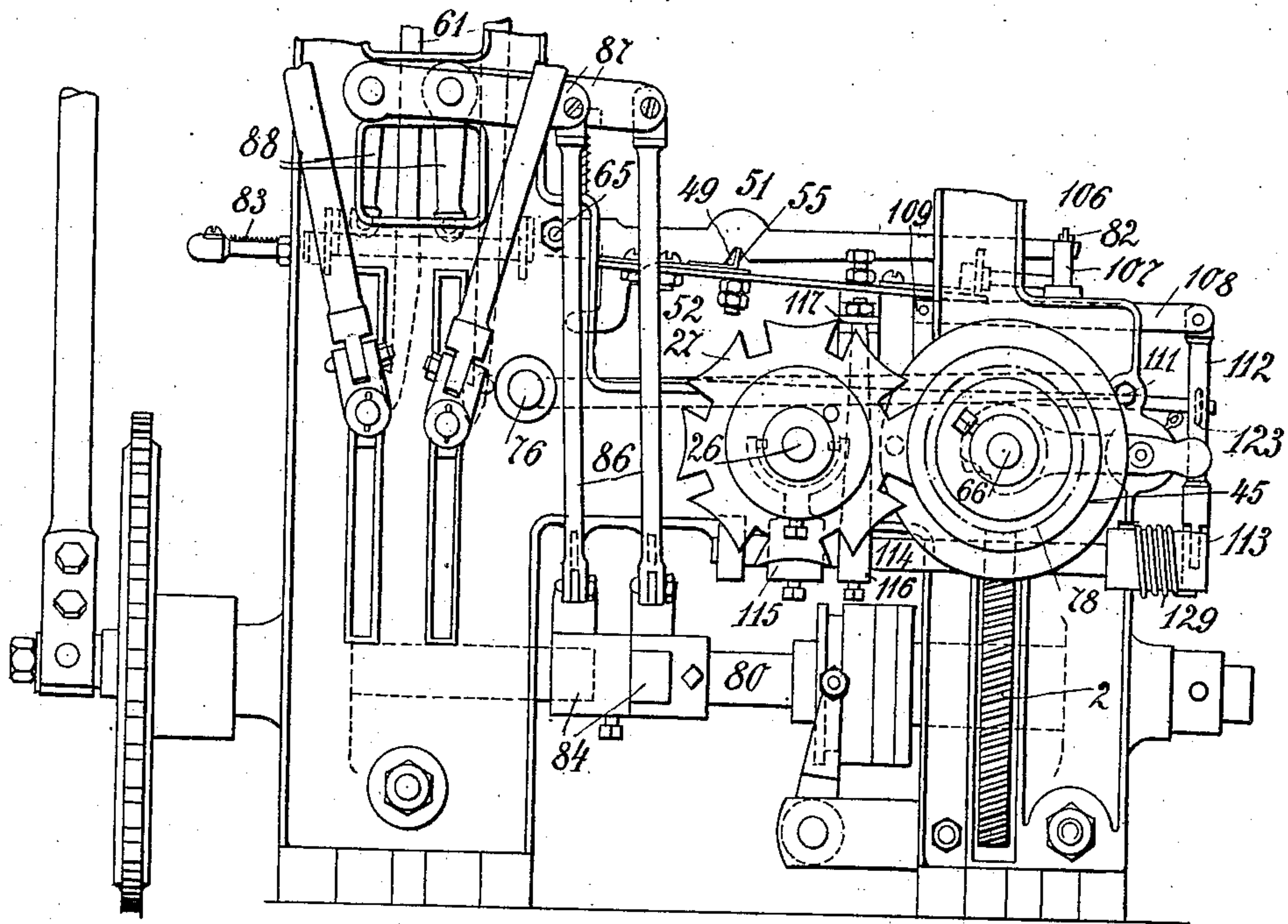


Fig. 3.

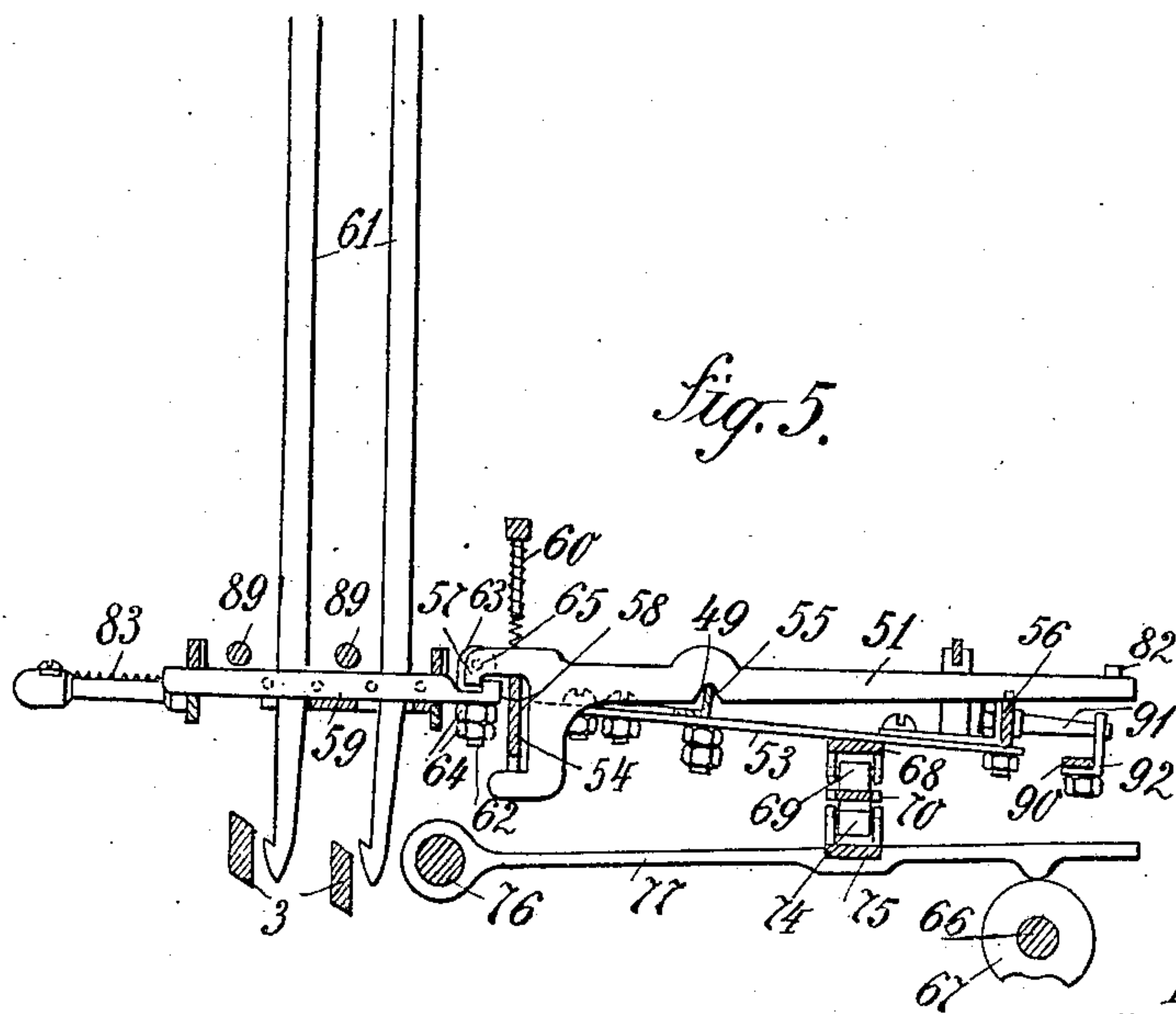


Fig. 5.

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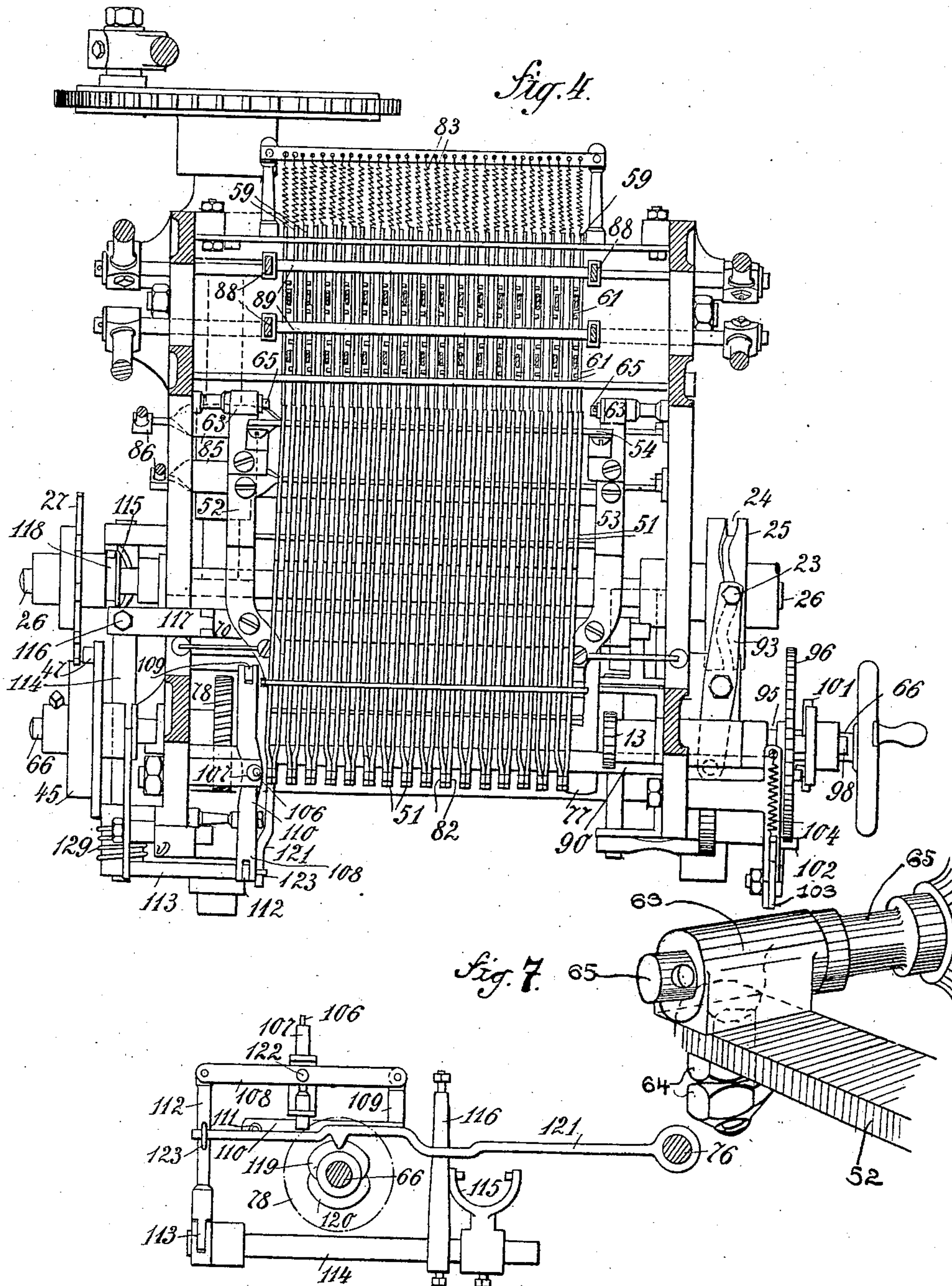
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4 SHEETS—SHEET 4.



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Fig. 6.

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UNITED STATES PATENT OFFICE.

HEINRICH SCHWARZENBACH AND GOTTLIEB LIER, OF LANGNAU, SWITZERLAND; SAID LIER
ASSIGNOR TO SAID SCHWARZENBACH.

DOBBY FOR LOOMS FOR WEAVING.

No. 883,975.

Specification of Letters Patent.

Patented April 7, 1908.

Application filed February 27, 1905. Serial No. 247,631.

To all whom it may concern:

Be it known that we, HEINRICH SCHWARZENBACH and GOTTLIEB LIER, citizens of the Swiss Confederation, and residents of Langnau, have invented new and useful Improvements in Dobbies for Looms for Weaving, of which the following is a specification.

This invention relates to an improvement in the construction of dobbies for looms for weaving, described and shown in our Brit. Patent No. 17660/1902.

According to the construction described in said patent, the heavy perforated cylinder is rotated and displaced axially forwards and backwards, so as to actuate the needles and catches in accordance with the changes required. The displacement of the heavy cylinder has proved to be impractical and the object of the present invention is to dispense with this displacement of said cylinder, for which purpose a separate lever arrangement is provided, which moves sideways and up and downward and is actuated by the pegs in the perforations of the cylinder so as to operate the needles and catches in accordance with the changes required.

In order that our invention may be more fully understood, we have caused to be appended hereunto four sheets of drawings marked with letters of reference indicating like parts in the various figures.

Figure 1 is a side view. Fig. 2 is a view seen from the cylinder. Fig. 3 is a partial side view from the left. Fig. 4 is a section on line A—B of Fig. 2. Figs. 5 and 6 show details of construction. Fig. 7, is a detail perspective view illustrating the connection for pivoting one of the side bars.

In the frame of the machine a shaft 80 is rotatably mounted, which can be rotated from the loom, by means of a chain. On said shaft 80 a worm wheel 2 is keyed, which is in gear with another worm wheel 78 rigidly mounted on a shaft 66 passing through suitable bearings of the machine frame. Upon this shaft 66 a spur wheel 4 is secured which is in gear with a spur wheel 5 mounted on a bolt 6 which is rigidly fixed to the frame of the machine. On the nave of said spur wheel 5 a disk 100 is fixed which carries a stud 99 which is adapted to gear with a toothed wheel 96 which is axially displaceably mounted on an axle 98. This axle 98 carries a pinion 13 which is in gear with the toothing 97 of the cylinder 81. The cylinder

81 has around its periphery rows of holes adapted to receive pegs for actuating the needles and catches.

On the shaft 66 a disk 101 is arranged corresponding to the herein before mentioned disk 100, which disk 101 also carries a stud 99. On the other side of the machine frame a disk 45 is fixed on shaft 66 which disk is in gear with the star wheel 27 secured to shaft 26. This star wheel 27 is adapted to be brought into gear with stud 47 on disk 45 by means of a suitable coupling device so as to be rotated through one-eighth of its periphery (Figs. 2, 3 & 4). Upon the shaft 26 there is further provided at the other side of the machine frame a cam 25 having a curved groove 24. By means of a lever 93, having a stud 23 engaging in said groove 24 lateral motion is imparted to a bar 90 extending across the loom frame (Figs. 2 & 4). This bar 90 operates a frame which carries the levers 51, said frame consisting of the side bars 52, and 53 and of the cross bars 54, 55 and 56 (Figs. 4 & 5). The cross bars 55, 56 have incisions in which the levers are loosely inserted. The cross bars 54, 56 as well as bar 55 are linked to the side bars 52, 53 so that the frame forms a laterally displaceable parallelogram.

The levers 51 rest with their incisions on the cross bar 55 in such a manner that they can balance like a scale beam. The rearward ends of the levers are each provided with a downwardly directed hook 57, which is pressed downwards by a spring 60 so as to engage in the position shown in the drawings (Fig. 5) with the corresponding hook 58 which actuates the needle 59 and the respective catch 61. The side bars 52, 53 of the frame are each placed with its end, which is turned towards the catches, over the stud 62 of an eye 63 and secured in position by a nut 64 (Fig. 5). Each eye 63 is pivoted to a horizontal pivot 65, which is rotatably mounted in the frame of the machine, so that the lever frame can be swung in the vertical direction around the pivot 65.

Below the lever frame, a cross beam 68 is arranged which by means of rollers 69 is supported by another beam 70, which has on its bottom edge projections 71 72 (Fig. 2) with beveled portions. This beam 70 is supported by two rollers 74 of a third cross beam 75, which latter is supported by two arms 77, pivoted to an axle 76. The arms 77 are sup-

ported by two cams 67 of shaft 66, which receives its rotation from the main shaft 80 by means of worm wheels 78 and 2.

The cams 67 are secured upon the shaft 66 in such a manner that with each forward or backward movement of cylinder 81, the noses of the arms 77 (Fig. 5) engage with incisions of the cams 67 so that consequently the front part of the lever frame with the levers 51 is lowered so that the projections 82 of the levers 51 are out of the way of the pegs inserted in said cylinder 81 while when the noses are moved out of the hollows of the cams 67, the frame and with the same the ends of the levers 51 provided with said projections 82 are moved towards the cylinder 81, so that those levers the projections of which abut against pegs, are prevented from participating in the upward movement of the frame and consequently pivot around their support 55 so that the rearward ends of said levers are lifted against the action of the spring 60. Each lever 51 is further provided with a hook 57 engaging in a recess of a needle 59. The needles 59 are under tension of springs 83 which tend to throw them outwardly away from the hooks 57. If now the levers 51 are swung on their support 55 the corresponding needles 59 are released and moved backward under the influence of their springs 83. Each needle 59 is provided with pegs embracing catches 61 so that, when released by hook 57 they bring the catches 61 into the way of the corresponding knives 3. With each lifting of the knives the catches with their needles are returned to their normal position, shown in the drawings, by means of positively driven cross rods 89, actuated from cams 84 of the main shaft through rods and arms 85, 86, 87, 88 whereby the needles are again hooked with their hooks 58 into the hooks 57 of the levers 51.

A stud 23 projecting from the end of a two-armed lever 93 horizontally pivoted to the frame of the machine engages in the curved groove 24 of cam 25, secured upon shaft 26, while the other end of said lever is connected with the horizontal cross bar 90, which is mounted in the frame of the machine axially displaceable. This bar 90 is connected with the frame supporting the levers 51 by means of a stud 91, fixed to the cross bar 56, which stud 91 engages with a fork 92 fixed to said bar 90, so that when said bar 90 is displaced by the curved groove of cam 25, the front part of the frame and the ends of the levers respectively can be displaced in such a manner that the front parts of the levers are brought below another row of holes in the cylinder 81, at the same time the direction of rotation of the cylinder 81 is changed by means of a stud 94 of said cross bar 90 which engages in a groove 95 (Fig. 4) of the nave of a toothed wheel 96, which is axially displaceable but not rotatably mounted on a

short shaft 98. This shaft 98 carries the block wheel 13 which is in engagement with the toothing 97 of cylinder 81. Said toothed wheel 96 is according to its position in engagement with one or the other of the studs 99, 99¹ of disk 100 or 101 respectively. A stud 102 of an arm 103 which is kept in engagement with a space of the toothed wheel 96 through the influence of a spring 104, prevents any unintentional rotation of the shaft 98 and consequently of the cylinder 81, while the cam 105 of disk 100 removes the stud 102 at the proper moment so far away from the corresponding space that the spur wheel 96 can rotate.

The rotation of disk 25 is effected as has already been mentioned, by the star wheel 27 on shaft 26 which is brought into gear with a stud 47 by a suitable coupling mechanism. Said stud being fixed in disk 45 secured upon shaft 66; the star wheel 27 is thus rotated through one eighth of its periphery. For this purpose there is arranged below the row of holes at the extreme left hand side of cylinder 81, a vertical rod 107, which is vertically displaceable and terminates at the upper end in the stud 106 (Fig. 6). This rod 107 is connected with a beam 108 by a stud 122, which on the one hand is connected by a link 109 with one end of an arm 110, and on the other hand by a connecting rod 112 with an arm 113. The other end of the arm 110 is placed over a bolt 111 projecting from the frame of the machine, and the other end of said arm 113 is fixed to a rotatable axle 114 mounted in the frame of the machine upon which axle there is further secured a fork 115 and an arm 116 which latter is connected with the cross beam 70 by a link 117. The fork 115 engages in a groove 118 of the nave of the star wheel 27. On the nave of the arm 113 there is arranged a spring 129 which continuously lifts the arm 113 and consequently the star wheel 27 which is thus brought out of engagement with the catch 47.

The arm 110 is supported by a cam 119 fixed to shaft 66. A second cam 120 is fixed in opposite direction on said shaft 66, on which cam 120 a lever 121 is arranged one end of which is pivoted to shaft 76, while its other end projects into an eye 125 of rod 112.

With each rotation of the shaft 66 the rod 107 is once lifted by the cam 119 and then returns to its normal position by its own weight and by the weight of the parts connected therewith.

If during the upward movement of rod 107 the stud 106 abuts against a peg of the cylinder 81 the upward movement of that rod is stopped, while the arm 110 and beam 108 continue their movement under the influence of cam 119, the beam 108 being forced to pivot on its connecting stud 122 thus pressing downwards the rod 112, whereby the axle

114 is rotated in such a manner that the fork 115 brings the star wheel 27 into the way of stud 47 of disk 45. Consequently said star wheel 27 is rotated with disk 45 through one-eighth of its periphery, whereby the lever frame is displaced laterally. Hereupon the rod 112 is raised again by the action of the cam 120 on arm 121 and the star wheel 27 is thus brought out of the way of stud 47, until during the further upward movement of rod 107 the stud 106 abuts against a peg of cylinder 81 and so on.

The cross beam 70 is usually supported with its projections 71, 72 on the rollers 74 of cross beam 75; when however the star wheel 27 is coupled the cross beam 70 is laterally displaced by means of the arm 116 fixed with the fork 115 on axle 114 and by means of the connecting link 117 so that the projections 71, 72 slide off the rollers 74, and the front end of the lever frame is lowered and the lateral displacement of the same by means of the pegs of the cylinder 81 is not prevented. The cross beam 70 is displaced in opposite direction when the star wheel 27 is brought out of gear and the frame for the levers is again raised.

The dobby described above works as follows: The shaft 66 raises the frame 52, 53 once during each rotation against the pegged cylinder 81 in such a manner that the levers 51 may strike against the pegs, which are inserted in the cylinder 81 and thus release their corresponding needles as described above. At the same time the shaft 66 imparts to the wheel 96 and therewith to the cylinder 81 a part of a rotation equal to the pitch of the peg holes in the one direction by means of the gear 101 with pin 99. If all the pegs of one circular row has come into action or if it is desired to let the pegs of the adjacent row work on the levers 51 the frame for the levers 51 is laterally displaced and at the same time the direction of rotation of cylinder 81 is reversed. This object is obtained by a pin inserted in the last row on the left hand side (Fig. 2) of the cylinder 81 in the following manner: The lever arrangement 107, 108, 109, 110, 112, 113 is lifted twice for each turn of the shaft 66. If pin 106 strikes against a peg of cylinder 81 the lever 113 will cause the shaft 114 to be turned so that the fork 115 displaces the star wheel 27 in such a manner that its teeth enter the path of a pin 47 of a disk 45 fixed to shaft 66. The star wheel 27 performs a part of a rotation which is transmitted to the disk 25 and immediately after the performance the star-wheel 27 again returns in its original position. The disk 25 causes the lever 93 to swing around its pivot and moves thereby the frame for the levers 51 laterally and throws the gear 96 into gear with the pin 99' of disk 100. As the direction of rotation of disk 100 is opposite that of disk 101 the gear 96 and there-

with the cylinder 81 is equally driven in opposite direction. A second reversal of the direction of rotation of the cylinder 81 and a displacement of the frame 52, 53 to its first position is obtained when the lever 107 strikes against a second peg in the last row on the left hand side of the cylinder (Fig. 2) in the same manner as described above.

According to the above described mechanisms each lever 51 commands two rows of pegs which enter successively into action. The change from one row to another can be attained at any position of the cylinder 81 so that large pattern may be woven with little expense of labor and time.

Having fully described our invention, what we claim and desire to secure by Letters Patent is:—

1. In a loom dobby, comprising in combination a cylinder (81) rotatably mounted in the frame of the machine, and provided with parallel rows of holes for the reception of pegs, a toothed ring on said cylinder, an intermediate axle (98), a toothed gear (13) on said axle meshing with said toothed ring, a second axially movable toothed gear (96) on said axle (98), a disk (101) mounted on the driving axle (66) a second disk (100) mounted on a stud of the frame, the disks moving in opposite directions to each other, studs projecting from said disks adapted to engage with the toothed gear (96), a double armed shifting lever (93) engaging said toothed gear (96) on the one side and a cam (24) on the other side, a star wheel (27) axially movable on the shaft (26) carrying said cam (24) a fork (115) engaging the nave of said star wheel, a shaft (114) to which said fork is fixed, a lever arrangement (113, 112, 108, 109, 110) connected to said shaft (114), a pin (106) fixed to one of the levers adapted to act with a peg in the cylinder (81), a cam (119) fixed to the driving axle (66) adapted to raise the said lever arrangement, a cam (120) acting on said lever arrangement (113, 112, 108, 109, 110), a vertically and laterally movable frame, two one-armed levers (77) supporting said frame, cams fixed to the driving axle (66) adapted to raise the levers (77), a cross bar (75) fixed to said supporting levers (77), rollers mounted on said cross bar, a second cross bar (70) having inclined planes its lower side, levers (116, 117) connecting said cross bar (70) with axle (114), one armed frame levers (52, 53) movable in vertical and horizontal direction, a top cross bar (66) supporting said frame levers, a cross bar (90) fixed to said frame levers (52, 53) and connected with the double armed shifting lever (93), a second cross bar (55) fixed to said levers (52, 53), a set of levers (51) balancing on said cross bar (55), a pin at the upper end of each lever (51) adapted to act with the pegs in the cylinder and a hook (57) at the other end of each of the levers (51), rods one for each lever (51) each

having a groove at its end for the reception of the hook of the respective lever (51), a spring (60) for each lever pressing said hook (57) into said groove, a spring (83) fixed to each of said rods (59), pins fixed on said rods (59) needles (61) located between the pins of said rods (59) adapted to swing in the way of the lifting knives, substantially as described and shown and for the purpose set forth.

2. In a loom dobby, the combination of a cylinder rotatably mounted in the frame of the machine and provided with parallel rows of holes for the reception of pegs, a toothed ring on said cylinder, an intermediate axle, a toothed gear on said axle meshing with the said toothed ring, a second toothed gear on said axle, a disk mounted on the driving axle, a second disk mounted on the frame, said disks moving in opposite directions one with relation to the other, studs projecting from said disks adapted to engage with the second toothed gear, a shifting lever engaging said gear on one side, a cam engaging gear on the opposite side, a star wheel movable on the axle, said cam being carried by said star wheel, a fork engaging the star wheel, a shaft to which said fork is fixed, a lever arrangement connected to said shaft, a pin fixed to one of the levers adapted to act with a peg

in the cylinder, a cam fixed to the driving axle adapted to raise said lever arrangement, a cam acting on said lever arrangement, a movable frame, a series of levers supporting said frame, cams fixed to the driving axle adapted to raise said levers, a cross bar fixed to said supporting levers, rollers mounted on said cross bar, a second cross bar, levers connecting said second cross bar with the axle, movable frame levers, a top cross bar supporting said frame levers, a cross bar fixed to said frame levers and connected with the shifting lever, a second cross bar fixed to said frame levers, a set of levers balancing on said cross bar, a pin at the upper end of each lever adapted to act with the pegs in the cylinder, a hook at the opposite end of each of the levers, rods for each lever engaging the hook, pins fixed on said rods, and needles located between the pins of said rods.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

HEINRICH SCHWARZENBACH.
GOTTLIEB LIER.

Witnesses:

RUDOLF LEEMANN,
JOSEPH SIMON.