

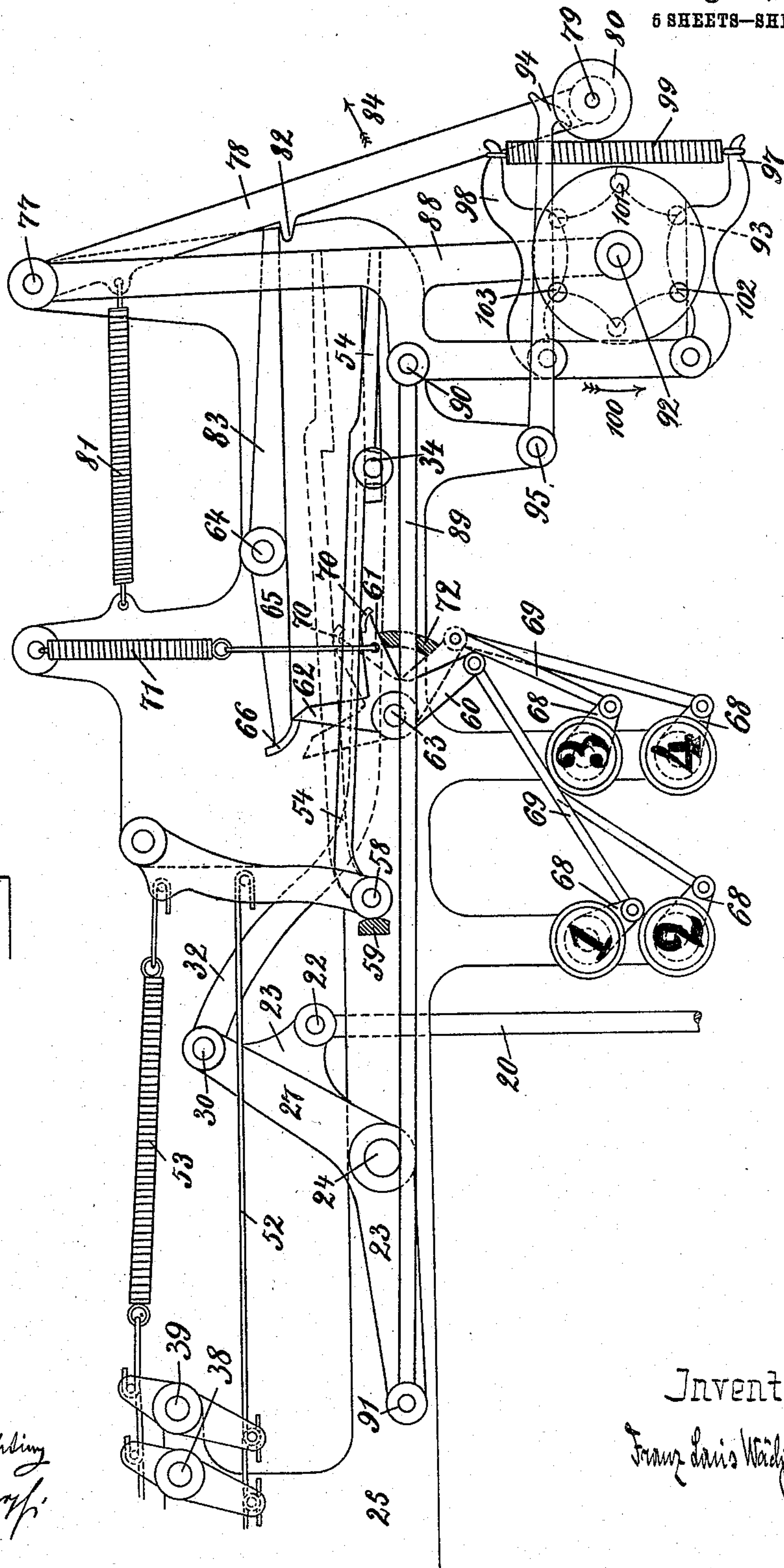
F. L. WÄCHTLER.
CHANGE GEAR FOR MECHANICAL LOOMS.
APPLICATION FILED FEB. 18, 1907.

930,707.

Patented Aug. 10, 1909.

6 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
William Driehling
Rufus Silberknapf

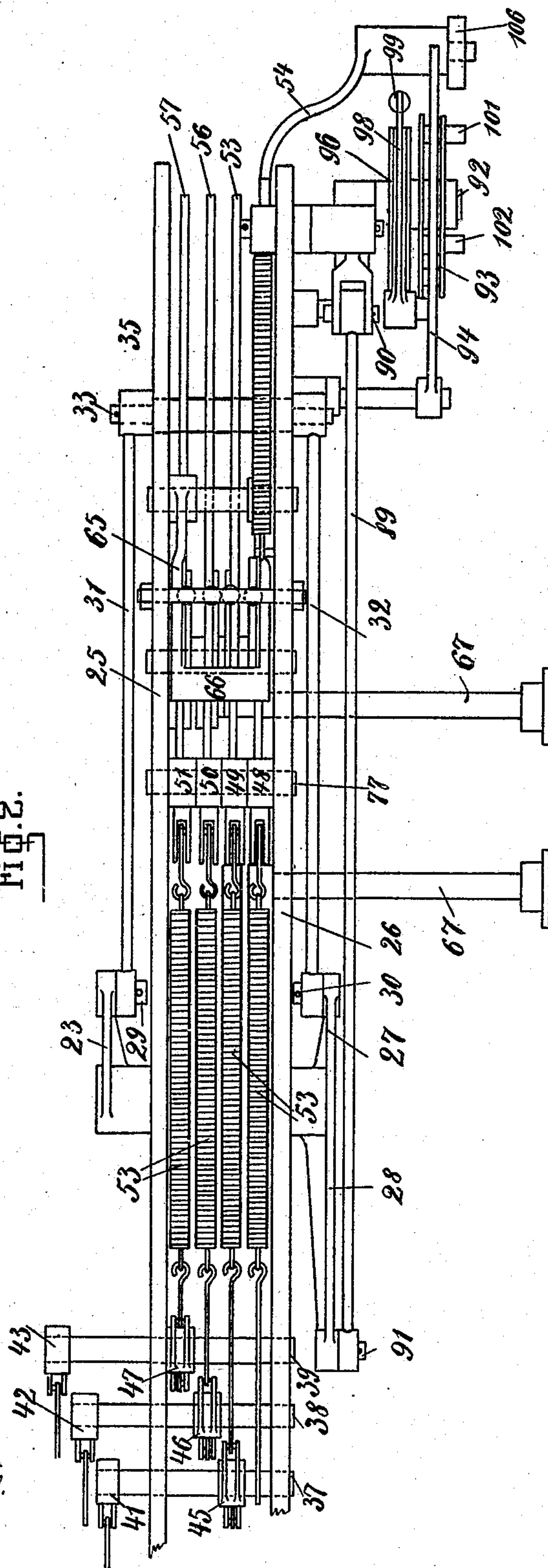
Inventor:
Franz Louis Wächter

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6 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
William Dichtung
Rupert Lilienknecht

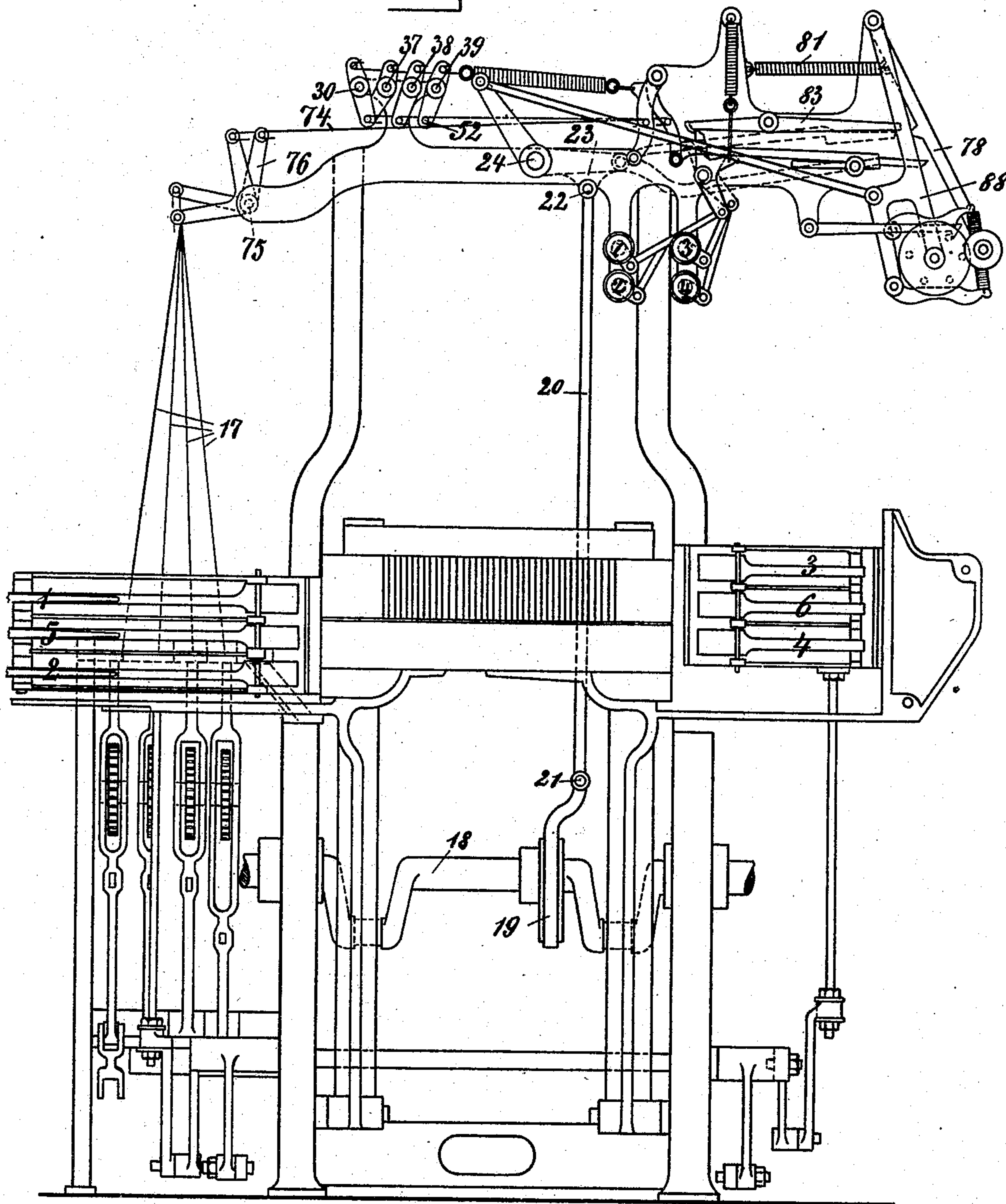
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Fritz Louis Wächter

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5 SHEETS—SHEET 3.

Fig. 3.



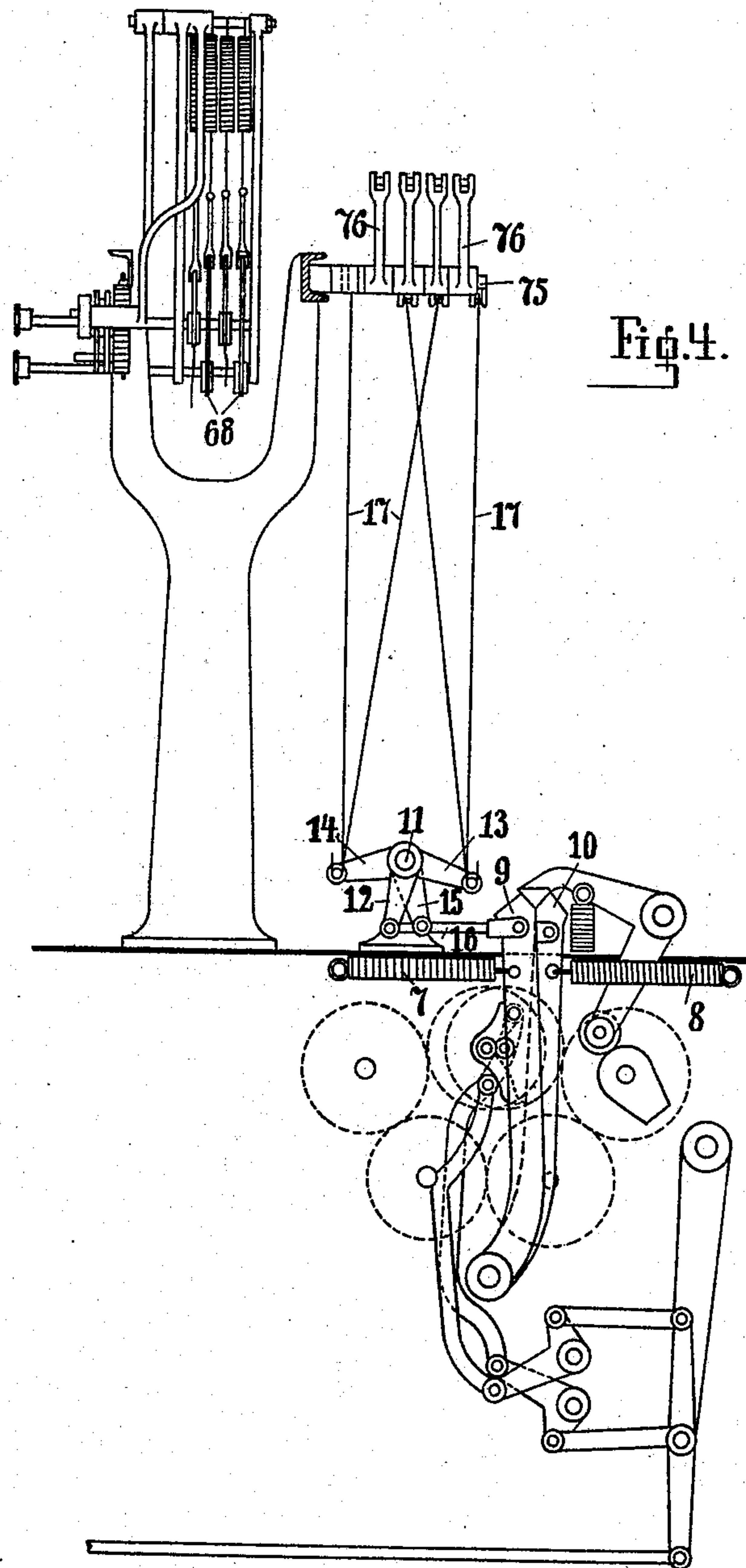
Witnesses:
William Diehlking
Rifort Silberberg.

Inventor:
Franz Louis Wächter.

F. L. WÄCHTLER.
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5 SHEETS—SHEET 4.



Witnesses:
William Dieking
Richard E. Kopp

Inventor:
Franz Louis Wächter

F. L. WÄCHTLER.
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5 SHEETS—SHEET 5.

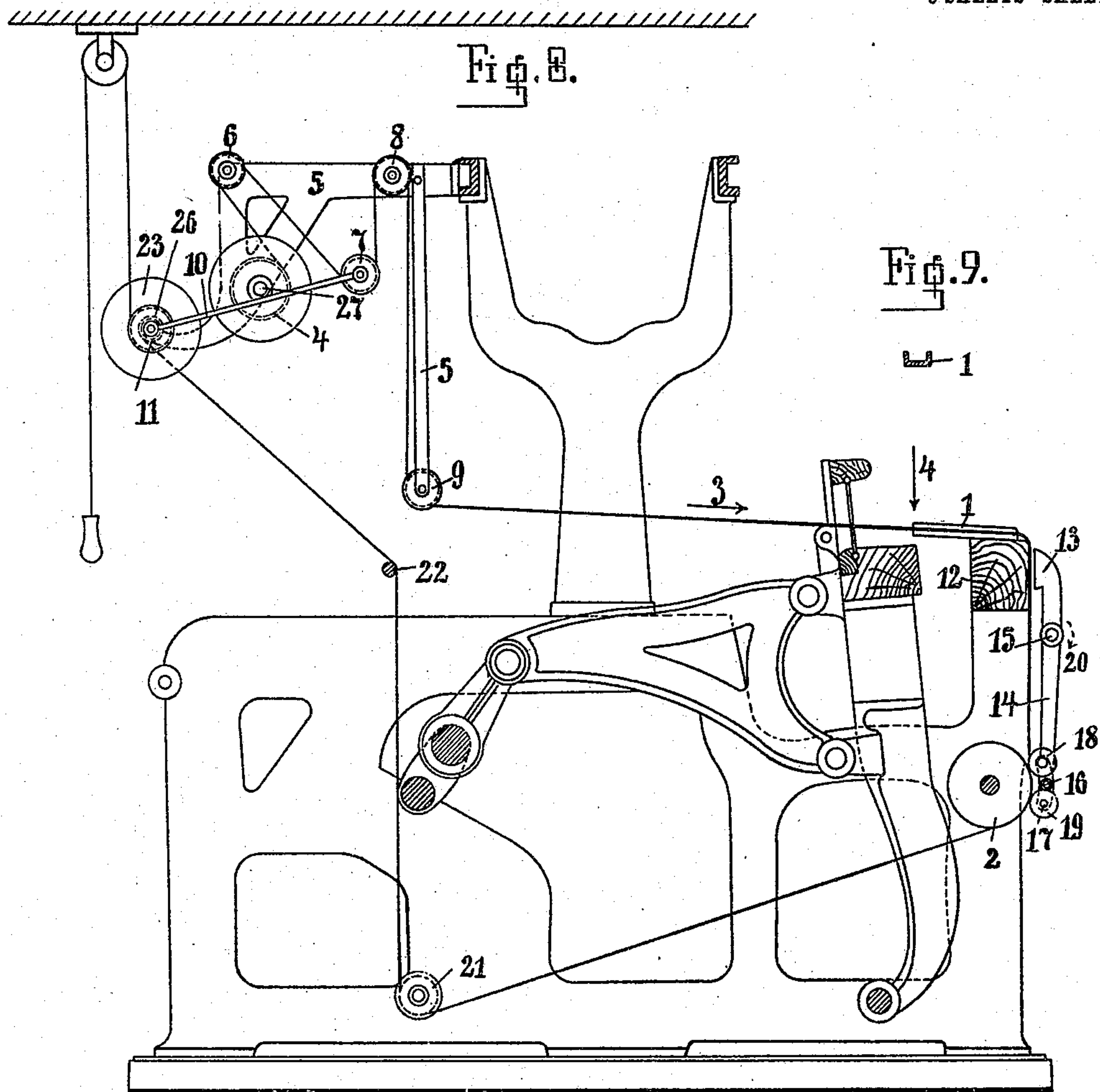
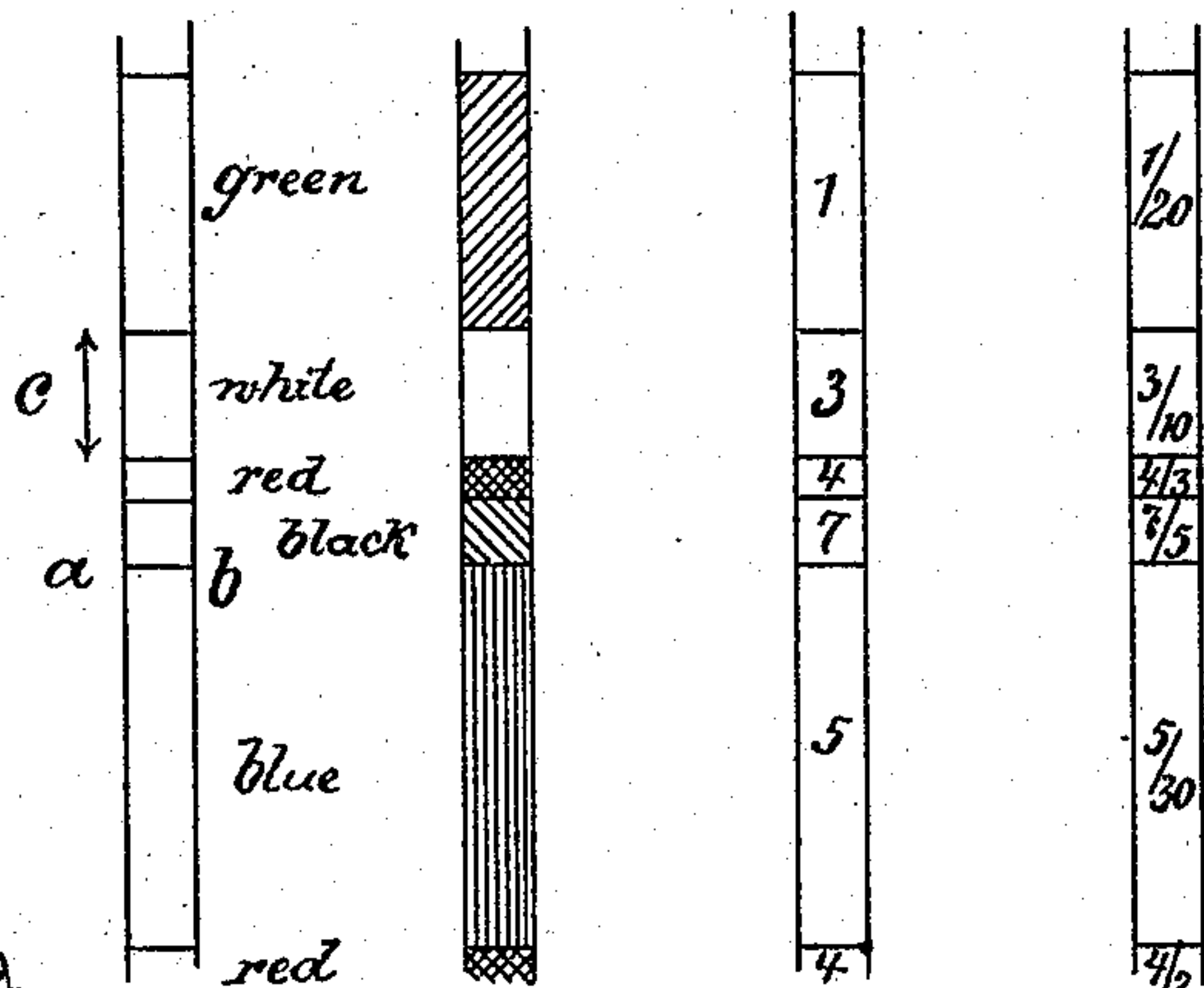


Fig. 5. Fig. 6. Fig. 7. Fig. 10.



Witnesses:
William Dürckling
Richard Lebkörp

Inventor:
Franz Louis Wächler

UNITED STATES PATENT OFFICE.

FRANZ LOUIS WÄCHTLER, OF GROSSENHAIN, GERMANY.

CHANGE-GEAR FOR MECHANICAL LOOMS.

No. 930,707.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed February 18, 1907. Serial No. 357,966.

To all whom it may concern:

Be it known that I, FRANZ LOUIS WÄCHTLER, director, a subject of the King of Saxony and German Emperor, residing at Grossenhain, in the Kingdom of Saxony and German Empire, have invented certain new and useful Change - Gear for Mechanical Looms, of which the following is a specification.

The purpose of the present invention is to allow of working on mechanical looms without change-card, the change being operated by hand by aid of numbered disks, handles or other suitable appliances. Hereby the shuttles will have to always enter the same change-cells on each side of the loom and may not be shot crosswise as is the case when change-cards are used.

In the accompanying drawings, Figure 1 is a front elevation and Fig. 2 a plan of the device. Fig. 3 is a front elevation of the device together with a change-gear, in which the shuttle-boxes are adjusted by two toothed drums turning in opposite directions. Fig. 4 is a side elevation of Fig. 3. The Figs. 5, 6, 7 and 10 show strips of paper, used for the loom. Fig. 8 illustrates the way of such strips of paper. Fig. 9 shows a groove, in which said strips are introduced.

In Fig. 3 the right shuttle box is shown partly removed, in Fig. 4 the known lifting-gear with the shuttle-box has been omitted. The new arrangement, which is arranged above the loom, is fitted with numbered disks, handles or other suitable appliances and has the same number of disks, as shuttles are used for weaving. For reason of greater simplicity of the description and the drawing only four shuttles have been employed, wherefore only disks Nos. 1-4 have been provided. In cell 1 (Fig. 3) there is shuttle No. 1 and in cell 2 shuttle No. 2, in cell 3 shuttle No. 3 and lastly in cell 4 shuttle No. 4. Cells 5 and 6 are empty, cell 5 temporarily receiving shuttles 3 and 4, cell 6 the shuttles 1 and 2.

The change-gear Fig. 4 is arranged in such a manner, that by provision of springs 7 and 8 the levers 9 and 10 are geared in known manner so that the empty cells are brought in line with the lay race from the first. On the frame-pin 11 bell cranks 12, 13 and 14, 15 are pivotally arranged, which are connected with levers 9 and 10 by means of rods 16.

Lever 10 is pulled to the left by bell crank 55 14, 15 and lever 9 to the right by bell crank 12, 13 when the wires 17 are pulled.

On the main shaft 18 of the loom, Fig. 3, is provided an eccentric 19, from which by aid of link bolts 21 and 22 and rod 20, lever 23 of the new gear is operated. The latter is rigidly fitted to the shaft 24, running in bearings in the sides of the frame 25 and 26, Fig. 2, and carrying besides lever 23 levers 27, 28. To bolts 29 and 30 of levers 23 and 27 are linked the rods 31 and 32, to produce a connection with the blade 35 fitted with pins 33 and 34 and oscillating in the slots in frame sides 25 and 26. In these sides are also arranged the shafts 36-39, carrying the single armed levers 40-43 and the double armed levers 44-47. The latter are connected with the lifter-levers 48-51 by wires 52 and a spring 53, so that the lifter-levers to which the lifters 54-57 are linked by means of bolts 58 are forced by the action of the spring against the stop 59 provided between the frames. For each lifter a three armed lever 60, 61, 62 is provided, supported on shaft 63. On shaft 64 moves loosely the tumbler 65, 66, which by its own weight is able to hold levers 62 by means of cross piece 66 in their position farthest to the right. The numbered disks are attached to the shafts 67 at the places marked X, at the back of said shafts are the cranks 68 which by means of rods 69 are linked to levers 60. On the bosses 70 of levers 61 rest the lifters 54-57 which are raised so far by the springs 71 acting on lever 61, until the arms 60 on the cross piece 72 reach a stop and come into the position shown by the dotted lines. The numbered disk 1 belongs to lever 61 beneath lifter 34, disk 2 to lever 61 under lifter 55 and so on. If now disk 1 is turned say to the right, until lever 61 comes in contact with crossbar 72, the respective lifter 54 will be lowered to the blade 35 and carried along by the latter in its motion from left to right, whereby at the same time shaft 36 is moved in direction of the arrow 73 and will by means of connecting wire 74, acting on lever 40, a bell crank 76 on the frame pin 75, Figs. 3 and 4, and wire 17 bring cell 1 in known manner in line with the lay-race. As long as this lever 62 is held by the web 66 of tumbler 65 the lifter 54 will be carried along at each stroke of blade 35, cell 1 remain in line

with the lay race and shuttle No. 1 be shot continuously back and forward. If however another disk is turned to the right by the upper beveled surface of lever 62 the web 66 on the tumbler 65 will be raised, so as to release the former one and hold the one turned last.

In order that the weaver may only be able to turn the disks in the proper moment, and as the case may be for two, four or more successive shots per shuttle, the following arrangement is provided: On frame bolt 77 is arranged a lever 78 with bolt 79 and roller 80. The lever 78 is elastically connected with the frame 26 by means of spring 81. To said lever 78 is attached a hook 82 on which the branch 83 of tumbler 65 will rest, whereby a turning of the adjusted disks is prevented. At every second shot the support is removed, by the lever 78 being moved in direction of arrow 84, until hook 82 is removed from the path of lever 83. This is obtained by the following arrangement: On the bolt 77 is also rigidly mounted the lever 88, which is linked by means of rod 89 and bolts 90 and 91 to lever 28. In lever 88 is fitted a bolt 92. The latter carries the parts as used in a shaft machine with pasteboard cards, namely a wheel with pins 93 in which catches the reversing hook 94 fitted on frame bolt 95; cylinder spider 96 with cylinder holders 97 and 98 and the thereto attached spring 99. At each stroke of frame 88 to the right by lever 28 the lantern 93 with spider 96 is reversed in known manner by the hook 94 by one sixth of its circumference in direction of the arrow 100. The lantern carries three pins 101, 102 and 103 and as soon as at a stroke one of said pins 101-103 strikes against the roller 80, lever 78 is taken along into the position Fig. 3 for releasing the disks and is upon the return of lever 88 instantly returned into its original position by spring 81.

Until now I have described the arrangement for sending the shuttle two successive shots through the shed. It may however also be shot single times, and to obtain this, the web 66 is permanently released, by removing the hook 82 or fixing lever 78 in its farthest position in direction of lever 84. Care must be taken, that wires 17 are so connected with bell cranks 12-15 that by turning the disk 1 the shuttle cells 1 and 3 are adjusted in line with the lay race, on turning the disk 2 the cells 5 and 6, and on turning the disk 3 the cells 2 and 4. Three shuttles may be used, shuttle 1 entering cells 1 and 3, shuttle 2 cells 5 and 6 and shuttle 3 cells 2 and 4.

A strip of paper, the same as used in Morse telegraphing apparatus, must be used for each loom. On it the colors and the numbers of shots are marked successively, as they are to be made in the fabric. The graduation on

said strips in direction *a b*, Fig. 5, is the same in all mills, the distance *c*, Fig. 5, giving the number of shots to be made with the same color. It is once marked on the strip, see Fig. 6, or the color or the shuttles are numbered, see Fig. 7. The strip is introduced in a groove 1, Figs. 8 and 9, directly at the edge of the cloth beam on the side where the numbered disks are and moved at the same time with the finished stuff, from beam 2 in direction of arrow 3. Generally the weaver will read where the arrow 4 points to, the following of the shots, and when a new cross line *a b* reaches this place, he must start the disk on the automatic gear corresponding with the respective following color. It must however be mentioned here that certain mills use strips as shown in Fig. 10 and indicate beneath the line the number of shots, which are to be made in the fabric. In such mills it is supposed that the weaver counts the shots while weaving, which is however not always done.

The strip of paper comes from a roller 4 on a frame 5 and passes over rollers 6, 7, 8 and 9. The rollers 6, 8 and 9 are arranged to turn only on frame 5. Roller 7 however can rise and fall so as to keep the paper always tight. It is pivoted to a bar 10 which swivels around a frame bolt 11. On breast beam 12 is provided a set piece 13, which by means of bolt 15 is linked to lever 14. At the lower end of said lever is hinged by means of bolt 16 the balance 17 with rubber rollers 18 and 19. On bolt 15 is provided a spiral spring, which is so arranged that rollers 18 and 19 are pressed in direction of arrow 20 against the cloth beam 2. As the paper strip is therebetween, only so much is unrolled from the roller 4 as finished fabric is removed from the cloth beam. The paper strip passes over roller 21 and beam 22 and is rolled up on roller 23. To said roller 23 is attached a roller 26 around which a cord is wound. The other end of this cord is run over a roller fastened to the ceiling of the room and is provided with a small weight. When this weight has worked down to the floor, by the paper strip being rolled up, the cord is wound afresh around roller 26. The paper on roller 23 is placed on bolt 27 and worked off again. The paper strip may also be suitably called pattern strip.

Having now described my invention what I claim and desire to secure by Letters Patent of the United States is:

1. In a shuttle box motion means for bringing the required shuttle boxes in line with the lay, consisting of three armed levers corresponding to the number of colors and arranged beneath horizontal lifters, levers and wires for coupling said lifters with the known lifter arrangements for the shuttle boxes, the lower arm of each three armed lever being coupled with a numbered disk

serving for the adjustment, the middle arm being in touch at its widened upper end with its respective lifter, and the upper arm passing through between two lifters, as described.

2. In a shuttle box motion means for bringing the required shuttle boxes in line with the lay, consisting of three armed levers corresponding to the number of colors and arranged beneath horizontal lifters, levers and wires for coupling said lifters with the known lifter arrangements for the shuttle boxes, the lower arm of each three armed lever being coupled with a numbered disk serving for the adjustment, the middle arm being in touch at its widened upper end with its respective lifter, and the upper arm passing through between two lifters, a double armed lever rotatably fitted over the lifters and serving to engage with the tumbler of the weighted end of the upper arm of said three armed levers, as described.

3. In a shuttle box motion means for bringing the required shuttle boxes in line with the lay, consisting of three armed levers corresponding to the number of colors and arranged beneath horizontal lifters, levers and wires for coupling said lifters with the known lifter arrangements for the shuttle boxes, the lower arm of each three armed lever being coupled with a numbered disk serving for the adjustment, the middle arm being in touch at its widened upper end with its respective lifter, and the upper arm passing through between two lifters, a double armed lever rotatably fitted over the lifters and serving to engage with the tumbler of the weighted end of the upper arm of said three armed lever, a blade influencing the lifter, a connecting rod linked to a bell-crank for reciprocating the same, and an eccentric keyed to the loom shaft for oscillating said bell crank, as described.

4. In a shuttle box motion means for bringing the required shuttle boxes in line with the lay, consisting of three armed levers corresponding to the number of colors and arranged beneath horizontal lifters, levers and wires for coupling said lifters with the known lifter arrangements for the shuttle boxes, the lower arm of each three armed lever being coupled with a numbered disk serving for the adjustment, the middle arm being in touch at its widened upper end with its respective lifter, and the upper arm passing through between two lifters, a double armed lever rotatably fitted over the lifters and serving to engage with the tumbler of the weighted end of the upper arm of said three armed lever, a blade influencing the lifter, a connecting rod linked to a bell-crank for reciprocating the same, and an eccentric keyed to the loom shaft for oscillating said bell crank, double armed levers corresponding to the number of lifters arranged on the loom over the wires leading

from the lifters to the lifter arrangements for the shuttle boxes, the lower end of each double armed lever being linked to the respective wire, spiral springs coupling the upper ends of the double armed levers to the lifters, so as to bring the lifter into the final position after the shot, as described.

5. In a shuttle box motion means for bringing the required shuttle boxes in line with the lay, consisting of three armed levers corresponding to the number of colors and arranged beneath horizontal lifters, levers and wires for coupling said lifters with the known lifter arrangements for the shuttle boxes, the lower arm of each three armed lever being coupled with a numbered disk serving for the adjustment, the middle arm being in touch at its widened upper end with its respective lifter, and the upper arm passing through between two lifters, a double armed lever rotatably fitted over the lifters, and serving to engage with the tumbler of the weighted end of the upper arm of said three armed lever, a blade influencing the lifter, a connecting rod linked to a bell-crank for reciprocating the same, and an eccentric keyed to the loom shaft for oscillating said bell crank, an oscillating lever frame, a connecting rod, coupling the oscillating lever frame to the other end of said bell crank, a gear wheel provided in the lever frame, said wheel having pins in even numbers, a reversing hook on the loom, engaging the pins of the gear wheel, as described.

6. In a shuttle box motion means for bringing the required shuttle boxes in line with the lay, consisting of three armed levers corresponding to the number of colors and arranged beneath horizontal lifters, levers and wires for coupling said lifters with the known lifter arrangements for the shuttle boxes, the lower arm of each three armed lever being coupled with a numbered disk serving for the adjustment, the middle arm being in touch at its widened upper end with its respective lifter, and the upper arm passing through between two lifters, a double armed lever rotatably fitted over the lifters and serving to engage with the tumbler of the weighted end of the upper arm of said three armed levers, a blade influencing the lifter, a connecting rod linked to a bell-crank for reciprocating the same, and an eccentric keyed to the loom shaft for oscillating said bell crank, an oscillating lever frame, a connecting rod, coupling the oscillating lever frame to the other end of said bell crank, a gear wheel provided in the lever frame, said wheel having pins in even numbers, a reversing hook on the loom, engaging the pins of the oscillating gear wheel, each second pin of the wheel on the other side of the disk extended, a lever rotatably arranged over the free ends of the lifters, a hook on said lever, the end of the lever

carrying a roll, forced out of its idle position by the extended pin by the oscillating lever frame, as described.

7. In a mechanical loom, a device later-
5 ally secured to the loom for indicating the
adjustment of the mechanism for changing
the shuttle-box, said device comprising a
roll (4) adapted to receive a printed paper
strip, guide-rolls (6 to 9) and a tension roll
10 (7) for leading said strip through a groove
(1) provided in the breast-beam (12) to a

winding-up device consisting of a set-piece
(13), lever (14) and balance (17), thence to
be guided over guide-rolls (21) and a beam
(22) to the receiving roller (23) and means 15
for operating said roll.

In testimony whereof I have hereunto set
my hand in the presence of two witnesses.

FRANZ LOUIS WÄCHTLER.

Witnesses:

ULYSSES J. BYWATER,
PAUL ARRAS.