Sept. 18, 1928. 1,684,789

C. BILHARTZ

LOOM

Filed Sept. 23, 1925 3 Sheets-Sheet 1

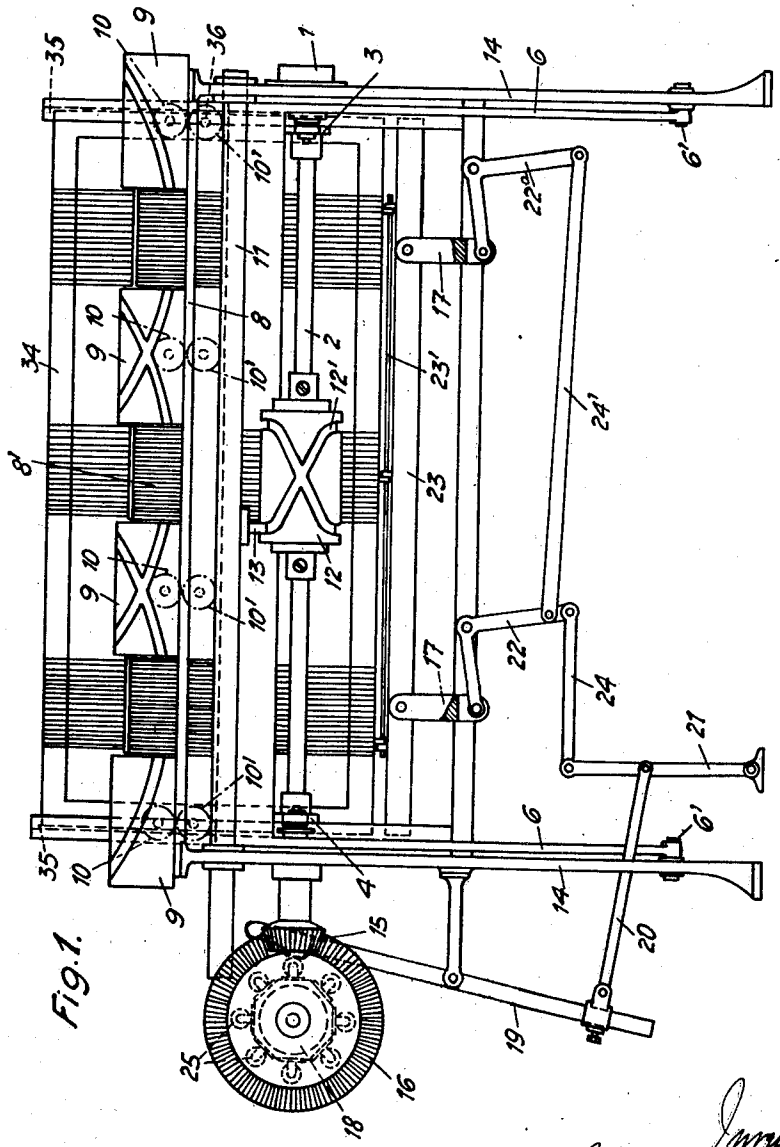


Fig. 1.

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Fig. 2.

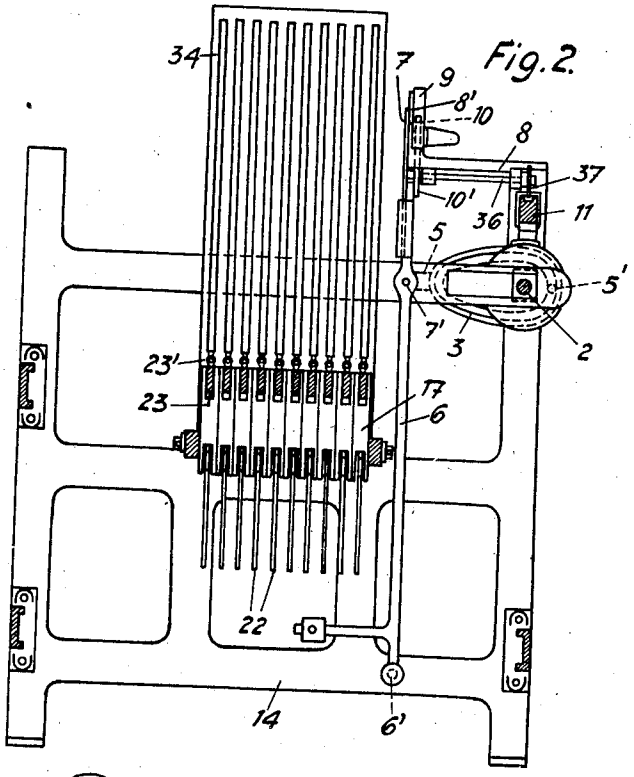


Fig. 5.

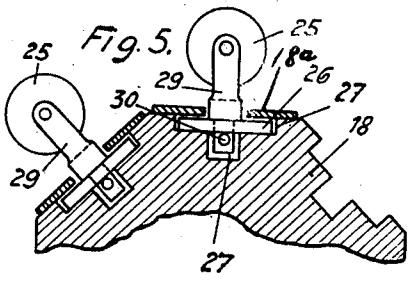


Fig. 6.

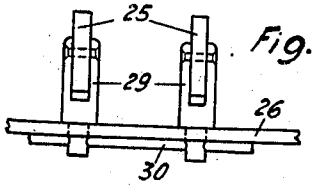


Fig. 4.

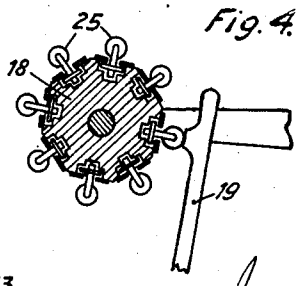
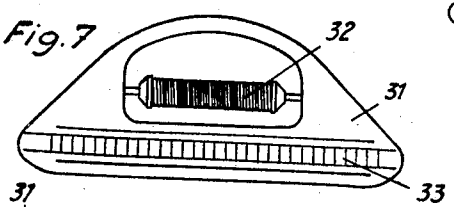


Fig. 7



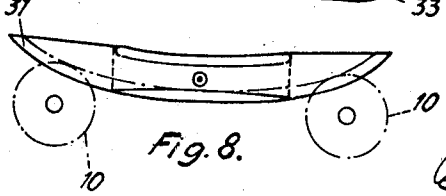


Fig. 8.

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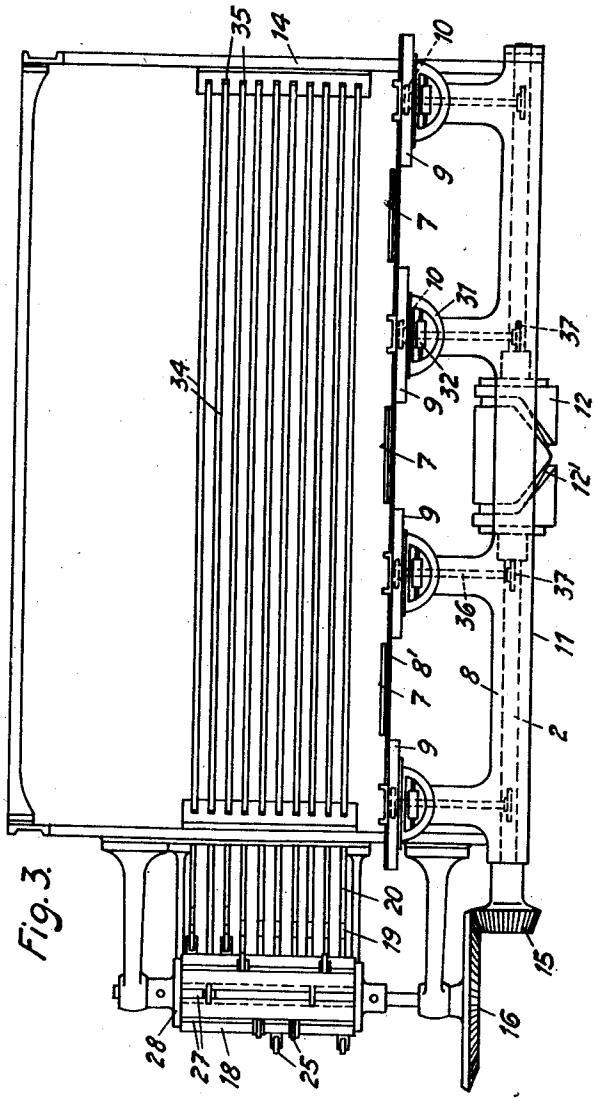


Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES BILHARTZ, OF STRASBOURG, FRANCE.

LOOM.

Application filed September 23, 1925, Serial No. 58,149, and in Switzerland December 22, 1924.

The present invention relates to a new loom for weaving a plurality of ribbons or other narrow work at a time. The main object of the invention is to provide a loom of the said class comprising only positively and automatically driven operative parts permitting a high speed.

The invention relates moreover to the particular construction and combination of parts as more specifically described hereinafter and pointed out in the claims.

In the accompanying drawings the preferred mode of construction is shown by way of an example in a diagrammatical manner.

Fig. 1 represents a side elevation of such portions of a loom as are required to illustrate the action of the invention.

Fig. 2 is a cross-section through the machine.

Fig. 3 shows a top view of the loom.

Fig. 4 shows the dobby drum in sectional elevation.

Fig. 5 shows a part of said drum on a larger scale.

Fig. 6 illustrates in a side view rollers and their fastenings to operate the heddles.

Fig. 7 is a top view of the shuttle and

Fig. 8 is a side view thereof.

Fig. 9 is a detail perspective view of the shuttle and the mechanism for operating the same.

In the end frames 14 of the frame of the loom a shaft 2 is journalled on which the driving pulley 1 is fastened. On the shaft 2 between the end frames 14 of the frame two cams 3 and 4 having grooves are keyed and into each groove a pin 5′ projects which is rigidly fixed to a lever 5 linked to the slay frame 6 by means of a bolt 7′. The slay frame 6 is mounted for oscillation in the loom frame by means of pivots 6′. The reeds 7 are arranged at the horizontal top bar of the frame 6, and are firmly held by two rails between which the reeds are clamped. If shaft 2 is rotated the slay frame 6 is oscillated by the said cams 3, 4 and the grooves in said cams are shaped in such a manner that the slay 6 rests stationary or dwells when drawn back while the shaft 2 makes about half a rotation and that the slay beats up the pick of weft to the web during the second half turn of shaft 2 and returns to its initial position. The reeds 7 move in openings of the stationary lath 8 on which the guides 8′ with raceways 9 for the shuttles 31 are fixed. Spurwheels 10 of fibre or like material project into the shuttle races 9, they drive the shuttle 31 by means of a row of teeth 33 provided on the shuttles with which they mesh. The spurwheels 10 are in engagement with spurwheels 10′ rigidly fixed to shaft 36 journalled in the frame and carrying spur wheels 37. The latter are driven from a rack 11. The rack 11 is slidably mounted in the end frames 14 of the frame of the loom and carries a stud 13 engaging a groove 12′ cut into the mantle of a drum or cylinder 12, keyed to shaft 2 rotatably mounted in the frame of the loom. The groove 12′ is shaped in such a manner that the stud 13 is moved over the whole length of the drum 12 while the latter makes half a turn and retains its position while the shaft makes another half a turn. The rack 11 is moved to and it turns the gears 37, 13′ and 10 which throw the shuttles 31 all in one direction. During the second half turn of shaft 2 and drum 12 the stud 13 and with it the rack 11 is kept stationary, the groove 12′ runs in a plane perpendicular to the shaft 2. The shuttles are at rest during the second half turn of shaft 2 while the beating up of the weft to the web is effected.

To form the shed the healds 34 are moved from the shaft 2 by means of bevel gears 15 and 16. The bevel gear 16 is rotatably mounted in a support of the end frame 14 by means of a shaft on which a drum 18 is rigidly fixed. The drum 18 is provided with grooves 27 and in the grooves 27 the bars 26 are exchangeably mounted; they are held in position by means of disks 28 mounted on the shaft of drum 18 and which bear against the ends of said bars, and by bars 18^a removably fixed to the mantle of the drum and projecting laterally over said bars 26.

In the bars 26 supports 29 are exchangeably arranged each carrying a roller 25. The rollers 25 co-operate with levers 19. All the levers 19 are rotatably mounted on a shaft fixed to the end frame 14 of the frame. At the lower end of each lever one end of a link 20 is adjustably mounted the other end of which is linked to a one armed lever 21. The pivot of the lever 21 is fast and a link 24 connects said lever 21 to a bell crank lever 22 pivoted on a cross rod of frame 14. Each lever 22 is connected to a second bell crank lever 22^a by means of a connecting rod 24′. Two levers 22 are connected to a common bar 23 by means of links 17. The bars 23 are slidably mounted in vertical grooves of the loom frame and to each bar 23 a heald 34 is hingedly connected by means of a rod 23′. The healds 34 are slid-

ably mounted in vertical grooves 35 of the loom frame. It will be seen that the healds 34 are moved and the shed is being formed as soon as the rollers 25 strike against the upper ends of the levers 19. According to the lengths of the lever arms the healds 34 are moved more or less and a shed of suitable size is being formed by a comparatively small movement of the upper ends of the levers 19.

The shuttle 31 is shown in Figs. 7 and 8. It comprises a toothed portion 33 which projects into the curved guide slots in such a manner that the spur wheel 10 is in mesh therewith. The length of the toothed portion 33 is such that the shuttle 31 enters in engagement with a wheel 10 before it comes out of engagement with the preceding wheel 10 by which it is positively driven through the shed (Fig. 8). The shuttles 31 are therefore at all times positively directed by the rack 11 and drum 12.

The new loom operates substantially as follows: The shaft 2 is driven by the pulley 1 and the drum 12 rotating with shaft 2 moves the rack 11 to and fro, a period of rest is given to the rack at each end position during a half turn of shaft 2. The rack 11 moves the shuttles 31 in their races 9 by means of the wheels 37 10, 10′. The shuttle races 9 are very close to the healds 34 and the shuttles 31 are thrown through a widely open shed and are kept securely at rest while the weft is beaten up. The shed is open for a comparatively long period allowing the shuttle 31 to pass the shed, the grooves in the cams 3, 4 being shaped accordingly. The healds 34 are actuated from the shaft 2 which rotates the drum 18. The drum 18 and the healds 34 are moved while the shuttles 31 are positively held stationary.

In the loom described the heald motion and the sweep of the slay is small therefore asmall consumption of power and a great speed is attained, moreover the heald motion as well as the picking motion are positive.

I wish it clearly understood that I do not limit my invention to the particular construction of the looms and the parts thereof as various changes may be made without departing from the spirit of the invention but what I claim and wish to secure by U. S. Letters Patent is:

1. In a loom, a frame having vertical guide grooves, bars having their ends slidably mounted in said grooves, heddle frames slidably mounted in said grooves and each connected to and mounted on one of said bars, a pair of bell crank levers for each of said bars pivotally mounted on said frame, links connecting said bell crank levers to said bars, links connecting said bell crank levers together in pairs, an operating lever for each of said bars pivotally mounted at one end of the frame at a point intermediate its ends, a second lever associated with each of said operating levers and having a fixed pivot, connecting means between each of said operating levers and one of said second levers, a link connecting each of said second levers to one bell crank lever of each pair, a drum mounted for rotation, bars removably mounted on the periphery of the drum and rollers revolubly mounted on said removable bars, said rollers being arranged to engage and actuate said levers.

2. A loom as claimed in claim 1 in which the connections between the second levers and the operating levers are adjustable lengthwise of said operating levers to thereby cause the throw of the bell crank levers and hence also the extent of movement of the heddle frames to be varied as required.

In witness whereof I affix my signature.

CHARLES BILHARTZ.