A. E. CHERNACK.

LOOM.

APPLICATION FILED SEPT. 30, 1913.

1,222,524.

Patented Apr. 10, 1917.

4 SHEETS—SHEET 1.

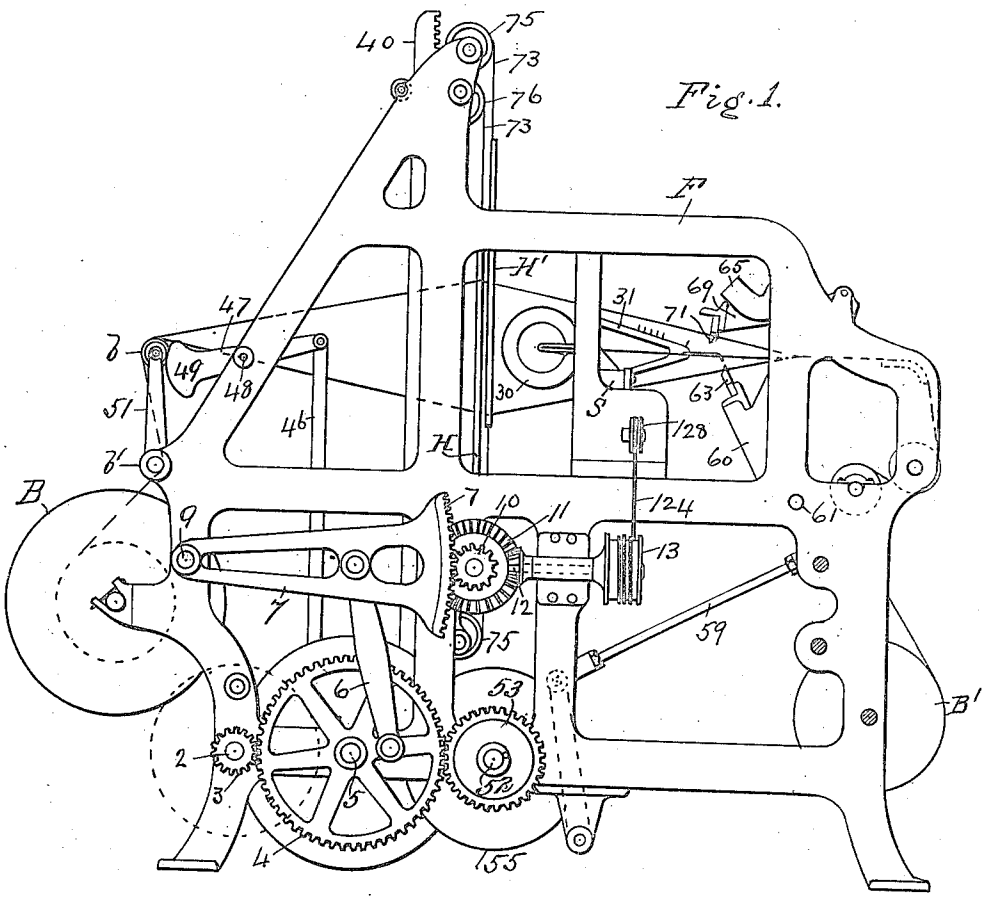


Fig. 1.

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4 SHEETS—SHEET 2.

Fig. 5.

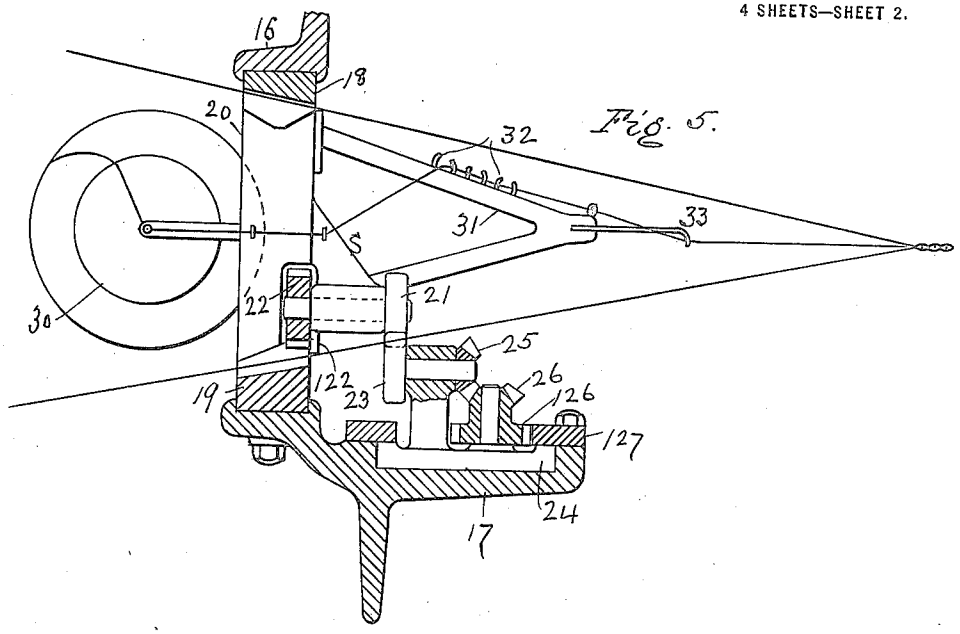
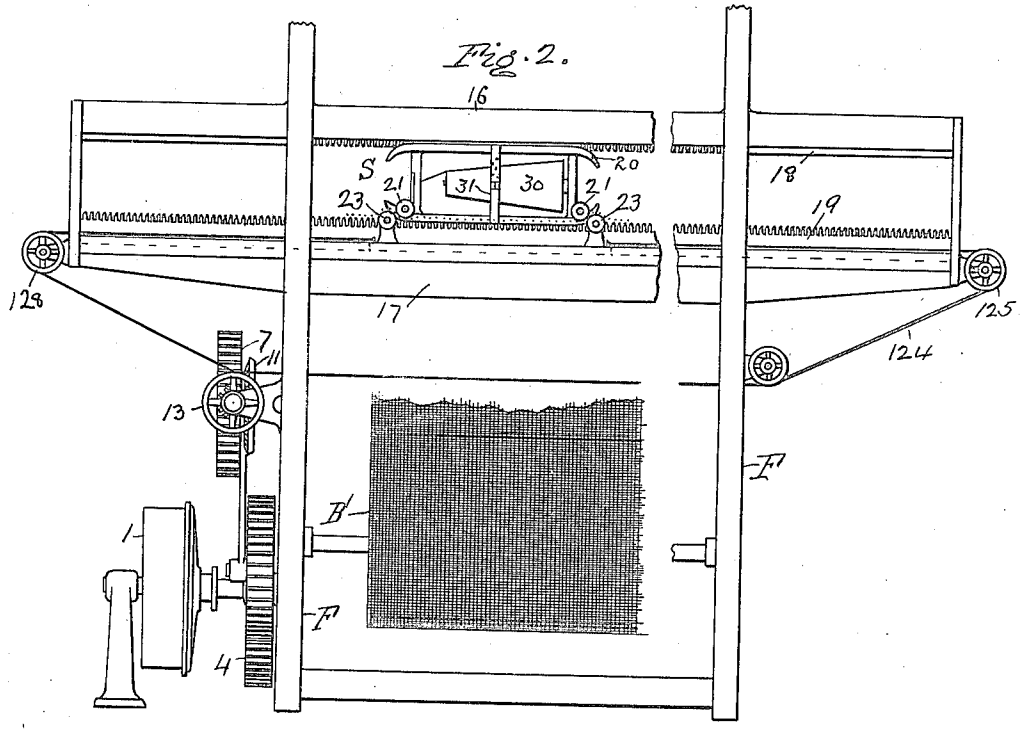


Fig. 2.



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4 SHEETS—SHEET 3.

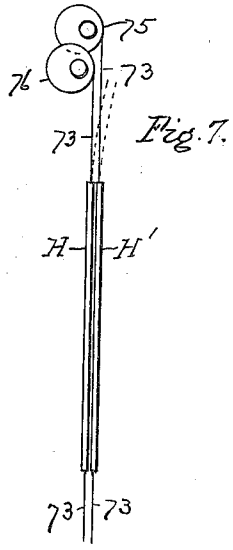


Fig. 7.

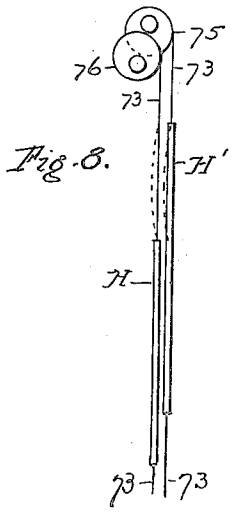


Fig. 8.

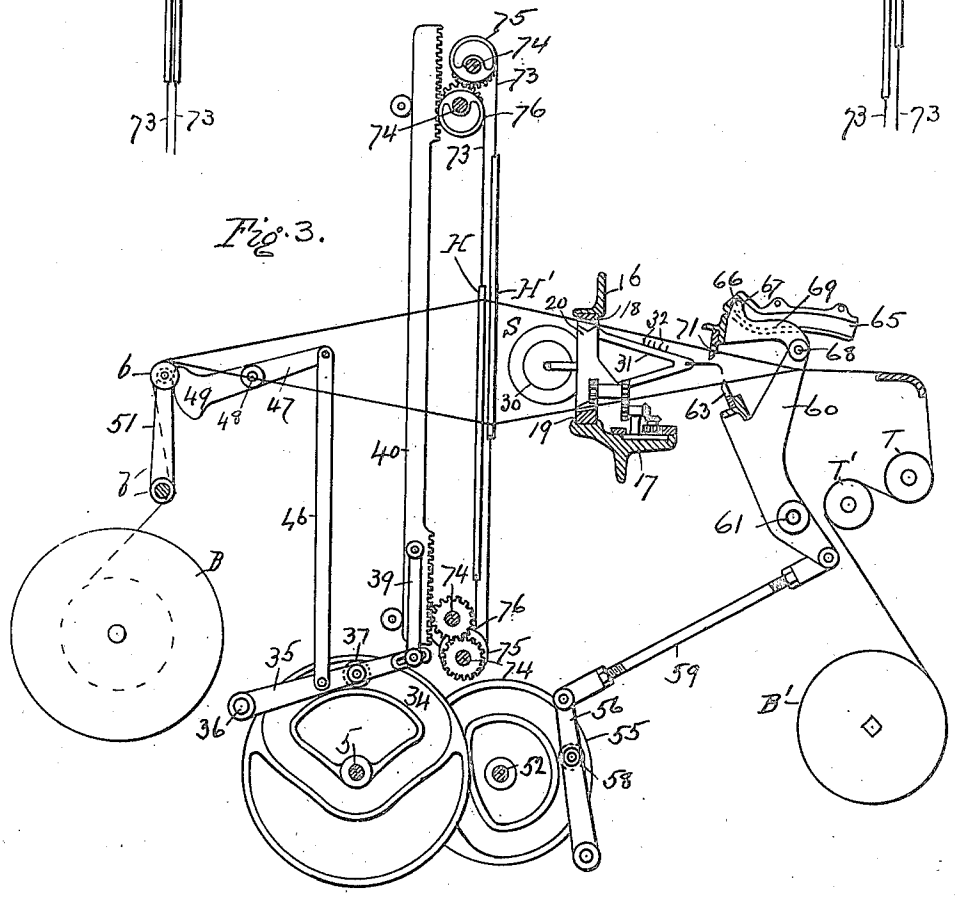


Fig. 3.

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4 SHEETS—SHEET 4.

Fig. 4.

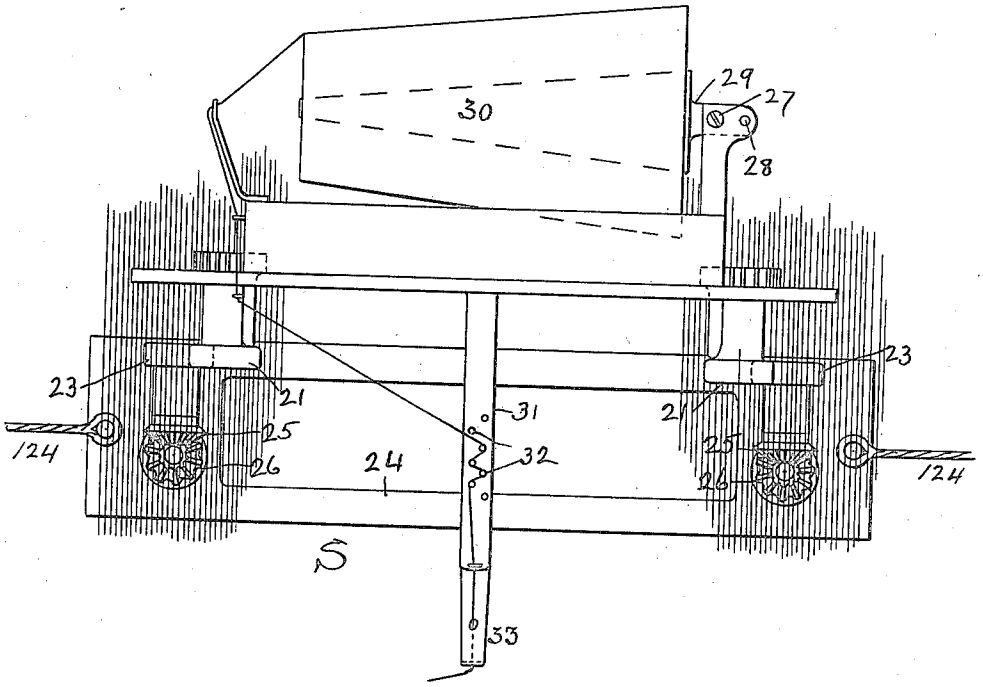
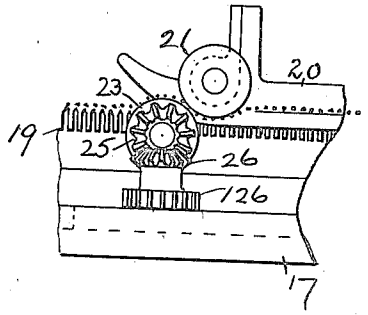


Fig. 6.



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UNITED STATES PATENT OFFICE.

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LOOM.

1,222,524. Specification of Letters Patent. Patented Apr. 10, 1917.

Application filed September 30, 1913. Serial No. 792,635.

To all whom it may concern:

Be it known that I, ABEL E. CHERNACK, a subject of the Czar of Russia, residing in the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Looms, of which the following is a specification.

One of the objects of my invention is to so construct a loom that a large shuttle containing a large bobbin of weft thread and therefore of considerable weight can be driven positively and at suitable speed through a shed of any desired width, without injury to the warps. In connection with my improvements in the shuttle mechanism, there are certain other features of improvement which are fully described hereinafter.

My present invention is an improvement upon and a carrying forward of the invention which forms the subject of my Patent 1,117,791, dated November 17, 1914.

In the accompanying drawings,

Figure 1 is a side elevation of a loom constructed in accordance with my invention;

Fig. 2 is a front elevation, with the cloth and warps broken off;

Fig. 3 is a sectional elevation showing some of the principal working parts of loom;

Fig. 4 is a plan view of the shuttle and driver drawn to a larger scale;

Fig. 5 is a sectional elevation of the same;

Fig. 6 is a corresponding front elevation of one end of the shuttle and driver;

Figs. 7 and 8 are diagrams to illustrate the movements of the heddles.

In the present construction I have shown my invention as applied to a loom in which the heddles are vertical and the warps pass through the loom in a horizontal direction.

The frame F of the machine, which may be of any suitable construction, supports at one end a warp beam B and at the other end a cloth beam B^1, Figs. 1 and 3. The threads from the warp beam pass partly around rollers b and b^1 on a rocking frame 51, controlled as hereinafter described, and thence pass through the eyes of the vertical heddles H, H^1, while the woven cloth passes around the usual or any suitable take-up rollers T, T^1 to the cloth beam B^1.

These heddles H, H^1 are carried by flexible bands 73 secured to and passing over pairs of rollers 75 and 76 above and below, and these rollers are mounted eccentrically on axes 74 in bearings in the frame F, Figs. 1 and 3, for a reason explained hereafter.

The axes of the two upper rollers 75 and 76 are geared together and similarly the two rollers of the lower pair are geared together, and both may be actuated to raise and lower the heddles by means of a rack bar 40, suitably guided to move vertically in the frame and reciprocated from a grooved cam 34, through the medium of a lever 35 pivoted at 36 to the frame and having an antifriction roller 37 running in the groove of the cam 34 and connected by a link 39 to the rack bar 40. This cam wheel 34 is mounted on the countershaft 5, which turns in bearings in the frame and carries a gear wheel 4 driven by a pinion 3 on the power shaft 2, Fig. 1. This power shaft may have any suitable driving pulley and clutch, as indicated at 1 in Fig. 2.

To keep the warps under uniform tension during the opening and closing of the sheds, a suitable oscillating movement is imparted to the upper end of the frame 51 carrying the upper roller b, and this is preferably accomplished by means of levers 47 with cam-shaped ends 49 to bear against rollers on the upper ends of the frame 51, which swings on a center coincident with the center of the roller b^1. These cam levers 47 are pivoted at 48 to the side frames of the machine and are connected by links 46 to the levers 35. Since these levers operate the heddles, the movements of the oscillating frame 51 to keep the warps under uniform tension will be in exact harmony with the up and down movements of the warps in opening and closing the sheds. By using two sets of rollers 75 and 76 for the two heddles, I am able to have the heddles closer to each other than would be possible if the bands were passed over the opposite sides of the same pulleys, as is the common practice.

The eccentric mounting of the rollers 75 and 76 is such as to impart to the heddles a backward and forward movement (to the right and left, Figs. 1 and 3) in harmony with the tensioning movement of the warps due to the oscillating frame 51, so that there shall be no undue wear of the threads in the eyes of the heddles. Figs. 7 and 8 indicate by dotted lines the character of the paths of movement of the heddles.

The shuttle S is mounted to travel to and fro in a stationary raceway consisting of

upper and lower guide bars 18 and 19 carried by cross bars 16 and 17, respectively, on the frame of the loom. The inner faces of the bars 18 and 19 are slotted transversely to form teeth between which the warp threads pass out of the way of the shuttle in the forming of the sheds. The heddles are sufficiently near these bars to guide the warps suitably between the teeth of the comb-like faces of the bars.

The upper bar 18 is preferably V-shaped on its guide face, as shown in Figs. 3 and 5 to receive the correspondingly shaped upper edge of the shuttle frame 20. The guide face of the lower bar 19 is inclined on one half and horizontal on the other, the shuttle being held in place in the raceway by a removable bar 122, attached to the shuttle frame. This shuttle frame stands in an upright position, and in order to make it balanced, I mount on one side the large bobbin 30 and on the other side a projecting arm 31 having suitable guide pins 32 and guide eyes 33 for the weft thread drawn from the bobbin 30. The spindle 29 for the bobbin is mounted on a vertical pivot 28 on the shuttle frame Fig. 4, and an adjustable screw 27 or other suitable means may be provided to secure the bobbin in its operative position, while permitting the spindle, when the screw or other fastening device is released, to be swung outwardly on its pivot to put on a new bobbin.

The shuttle is traversed to and fro within the shed by driving means outside the shed. These driving means consist of a slide 24 traveling in a guide way in the lower bar 17 and having two rollers 23, 23, near its opposite ends. These rollers 23 stand outside of, but overlapping and in the same plane with, rollers 21, 21 on the frame of the shuttle, as seen in Figs. 2, 4, 5 and 6, so that when the driving slide 24 is traversed to and fro in its guide way, the rollers 23 bearing against the rollers 21 will cause the shuttle to be carried along. The warps, as seen in Figs. 2, 4, 5 and 6 pass between the rollers 23 and the rollers 21, but I provide means whereby both sets of rollers are positively rotated at a surface speed equal to the speed of movement of the shuttle so that there shall be no rubbing action upon the warps to wear them out or break them. It is preferable to make these rollers or their surfaces of semi-hard material, such as raw-hide or rubber.

As a convenient way of imparting positive rotary motion to the rollers 21 and 23, they may be geared to fixed racks on the frame. Thus the spindles of the rollers 21 which turn in bearings in the shuttle frame, may carry at their ends pinions 22, 22, meshing with the teeth of the comb of the bar 19. The spindles of the rollers 23 turning in bearings carried by the driving slide 24 may carry bevel pinions 25 meshing with bevel pinions 26 which turn on pins on the slide 24 and carry pinions 126 meshing with a fixed rack 127 on the cross bar 17, Figs. 5 and 6.

As a convenient means for traversing the slide 24 and therefore the shuttle to and fro, there may be attached to the opposite ends of the slide, the ends of a rope 124 passing around idler pulleys 125, and 128 on the frame (Fig. 2), the rope being wound around, and at a suitable point secured to, a driving drum 13, Figs. 1 and 2. A back and forth rotary motion is imparted to this drum by any suitable means. In Figs. 1 and 2, I have shown as applicable for this purpose, a toothed sector 7, pivoted at 9 to the frame and oscillated from the wheel 4 through a connecting rod 6. The toothed sector itself is geared to a pinion 10 whose shaft also carries a bevel wheel 11 meshing with a bevel pinion 12 on the shaft of the drum 13.

The reed consists of two open combs, which are so oscillated together that the combs will be separated to permit the thread-delivery end of the shuttle to pass between the two parts of the reed and deliver the weft in front of the reed, but the combs will at other times and particularly during the changing of the sheds overlap each other with the dents of one comb severally in line with the dents of the other comb in order to confine the warp threads from lateral displacement. The weft-beating portion of my two-part reed consists of the open comb 63, carried by the batten consisting of arms 60, which are pivoted to the opposite side frames of the machine at 61, Figs. 1 and 3. An oscillating motion is imparted to the arms 60 on their pivots to swing this reed comb 63 from the closed position to the position shown in Figs. 1 and 3.

This movement may be effected by a pair of grooved cams 55 on a shaft 52, Fig. 3, which carries a gear wheel 53, Fig. 1, in mesh with the wheel 4; in the grooves of the cams 55 run antifriction rollers 58 upon levers 56 connected by links 59 to the rear ends of the arms 60, which carry the comb 63. The other part of the reed consists of an upper comb 71, having arms 69 pivoted at 68 to the arms 60, so that the two combs 63 and 71 will work in unison, although moving with relation to each other. These arms 69 near their outer ends carry pins 66 with antifriction rollers 67 running in cam grooves 65, secured to the side frames of the machine.

I claim as my invention:

1. A loom having heddles, a reed, a shuttle and a stationary raceway for the shuttle, said raceway consisting of separate upper and lower guide bars with bearing faces transversely slotted to receive the warps,

and means outside the shed for driving the shuttle through the warps.

2. A loom having heddles and a shuttle and a stationary raceway therefor, consisting of upper and lower guide bars with bearing faces transversely slotted to receive the warps, said shuttle having rollers, a driving piece having rollers to bear against the rollers on the shuttle, separate means to impart positive rotary motion to both sets of rollers, and means to reciprocate the driving piece.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses.

ABEL E. CHERNACK.

Witnesses:
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