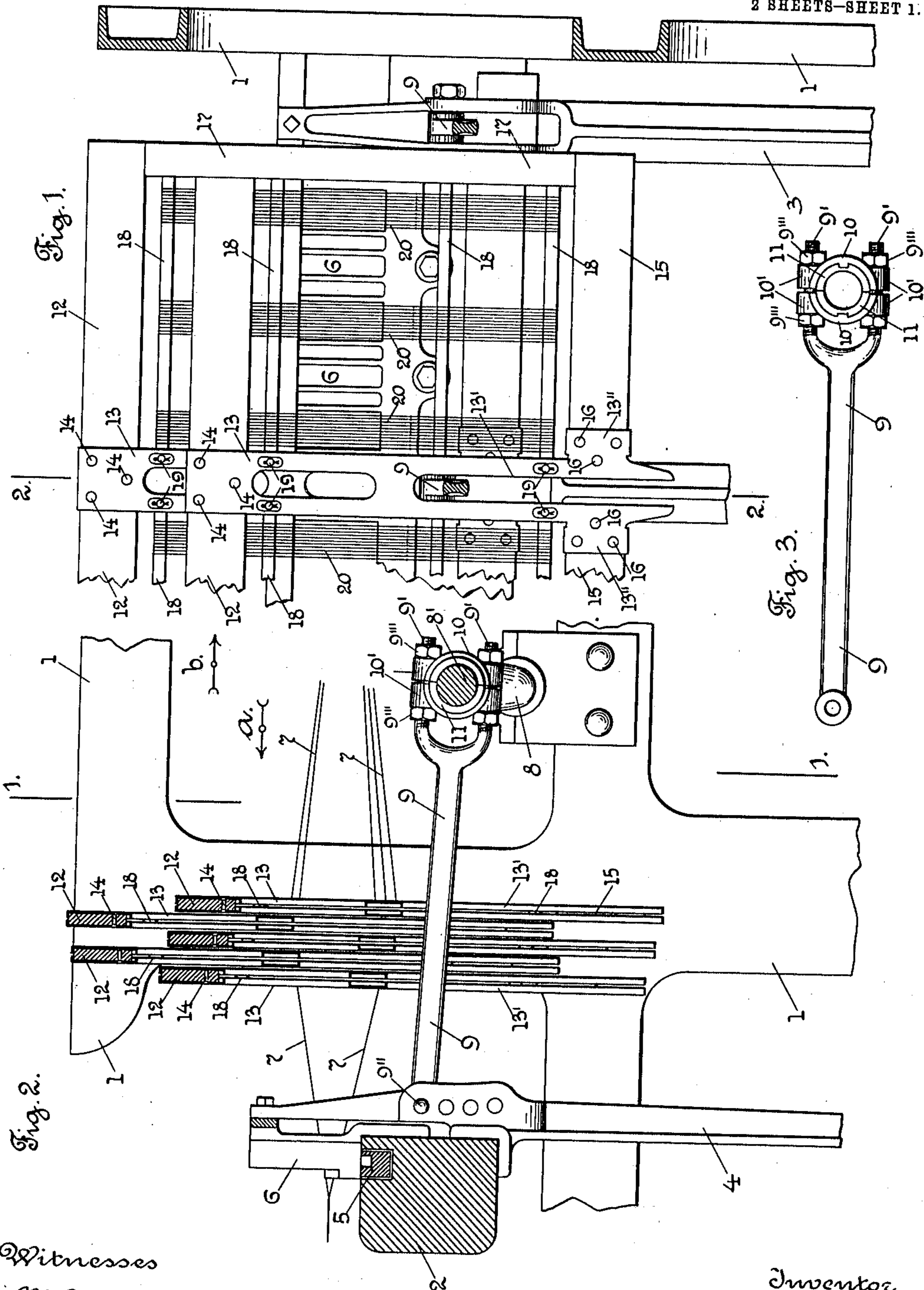


993,685.

Patented May 30, 1911.

2 SHEETS—SHEET 1.



Witnesses
M. Bredt.
M. Kenae.

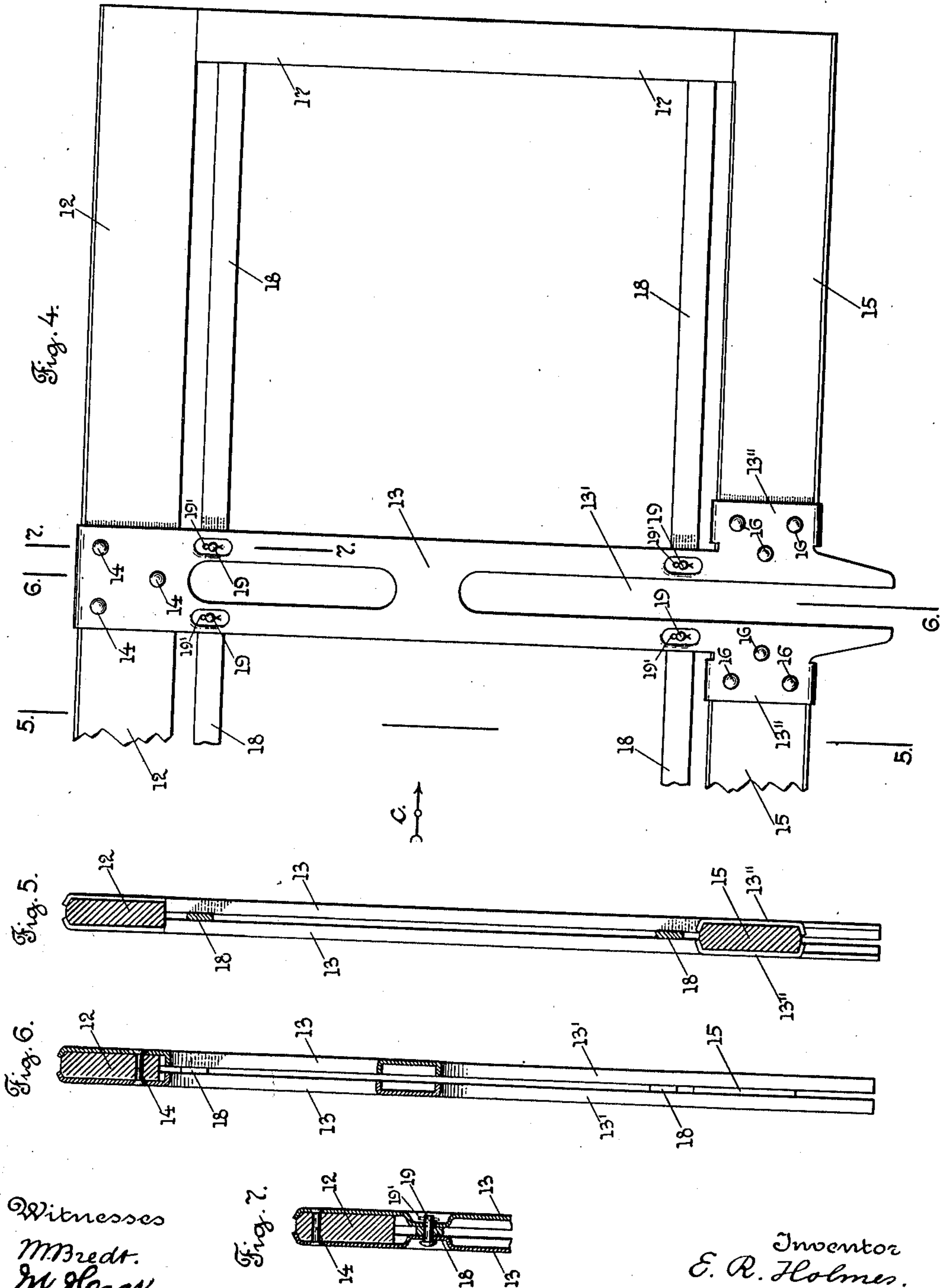
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993,685.

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NARROW WARE LOOM.
APPLICATION FILED DEC. 27, 1809.

Patented May 30, 1911.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

ELBRIDGE R. HOLMES, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, A CORPORATION OF MASSACHUSETTS.

NARROW-WARE LOOM.

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Specification of Letters Patent.

Patented May 30, 1911.

Application filed December 27, 1909. Serial No. 534,916.

To all whom it may concern:

Be it known that I, ELBRIDGE R. HOLMES, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Narrow-Ware Looms, of which the following is a specification.

My invention relates to narrow ware or tape looms, and particularly to narrow ware looms of considerable length, in which more than two crank connectors are used, to operate the lay from the crank shaft.

In looms of the type referred to, there is ordinarily a straight crank connector at each end of the loom, outside of the ends of the harness or heddle frames, to connect the lay with the crank shaft, and one or more intermediate crank connectors, according to the length of the loom, between the two end crank connectors.

The harnesses or heddle frames in the type of looms referred to, as ordinarily made, have an upper bar extending the length of the loom, between the end crank connectors, and also a similar lower bar, and an end bar at each end, connecting the upper and lower bars, said four bars forming the harness frame proper, with one or more intermediate vertically extending brace bars. The crank connectors, for connecting the crank shaft with the lay, located intermediate the end crank connectors, have ordinarily been made with a downwardly extending offset, extending below the lower edge of the harness, to allow of the harness frames being lowered, without the lower bars thereof engaging with the connectors. In some cases the intermediate crank connectors have been made with an upwardly extending offset, to pass between the heddles in the upper part of the harness frame, so as not to interfere with the raising and lowering of a harness frame, and thereof with an intermediate crank connector.

The offset crank connectors referred to are objectionable, in that they are liable to break, unless they are made very strong and heavy, and it is difficult to obtain the exact desired length of said connectors; and in case of a crank connector extending through the harness or heddle frame, between the heddles, it

is necessary to disconnect or remove said connector in order to remove the harness frame.

It has been found in practice that it is very desirable to have the intermediate crank connectors, in the type of looms referred to, straight, and extending in a straight line between the crank shaft and the lay, to obtain a direct thrust or movement of the reed, carried on the lay, throughout its entire length.

In the type of looms referred to, it has also been customary to have the two rods or bars of the harness frame, on which the heddles are strung, extend the whole, or half the length of the harness frame, and be secured at each end to the upright bars of the harness frame. By this construction it has been necessary, in case it is desired to remove one or more intermediate heddles from the harness frame, to disconnect the ends of the rod or bar and withdraw it from all, or half of the heddles.

In my improvements I have made the crank connectors, intermediate the end crank connectors, straight, and extend in a straight line between the crank shaft and the lay sword, and I have made the harness frame, at its lower portion, divided or in separate parts, where the intermediate crank connector is located, with a vertically extending opening for a crank connector, so that a straight intermediate crank connector does not extend through the harness, between the heddles, and does not interfere with the up and down movement of the harness frames, and I have provided improved means for adjusting the length of a crank connector. I have also made the rods or bars, on which the upper and lower ends of the heddle are strung, in sections, so that if it is desired to remove one or more heddles, it is only necessary to remove the section of the bar on which said heddles are strung, without interfering with the other heddles in the harness frame, all as will be hereinafter fully described.

I have shown in the drawings a detached portion of a narrow ware or tape loom, with my improvements applied thereto, sufficient to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawings:—Figure 1 is

a rear view of the harnesses, and some of the parts of a narrow ware loom, and shown as a section on line 1, 1, Fig. 2, looking in the direction of arrow *a*, same figure. Fig. 2 is a section, on line 2, 2, Fig. 1, looking in the direction of arrow *b*, same figure. Fig. 3 shows an intermediate crank connector, detached. Fig. 4 shows, on an enlarged scale, one end of a harness frame, detached, embodying my improvements. Fig. 5 is a section, on line 5, 5, Fig. 4, looking in the direction of arrow *c*, same figure. Fig. 6 is a section, on line 6, 6, Fig. 4, looking in the direction of arrow *c*, same figure, and, Fig. 7 is a section, on line 7, 7, Fig. 4, looking in the direction of arrow *c*, same figure.

In the accompanying drawings, 1 is a portion of a loom side or end frame, 2 is the lay beam, supported on the upper end of the end lay sword 3, only one end sword is shown in the drawings, and of one or more intermediate lay swords 4, only one is shown in the drawings.

5 is the shuttle rack, which has a reciprocating movement in a groove in the upper side of the lay beam, to operate the shuttles, not shown, which travel on shuttle blocks 6, in the usual and well known way.

7 are the warp threads, and 8 is the crank shaft. The end lay sword 3 is connected by a straight crank connector 9 with the crank shaft 8.

There is a crank connector 9 at each end of the loom, outside of the harness frames. Intermediate the end crank connectors 9, are one or more similar crank connectors 9, only one of which is in this instance shown in the drawings. The intermediate crank connector 9 is a straight crank connector, and corresponds in shape and construction with the end crank connectors. Each crank connector 9 is pivotally attached at its forward end, by a stud or rivet 9', to the rear of the lay sword. The rear end of each crank connector is made yoke or forked shape, with screw threaded ends 9'', which extends loosely through bosses 10' on a split washer 10, which in this instance incloses a split bushing 11, loosely mounted on the crank wrist 8' of the crank shaft 8. On the threaded ends 9'' of the crank connector are nuts 9''', said nuts act to hold the split washer and bushing on the crank wrist of the crank connector, being turned up against the bosses 10', as shown. By turning the nuts 9''' on the threaded ends 9'' of the crank connector in one direction or the other, the length of the crank connector may be varied or adjusted, as desired.

Each harness or heddle frame consists preferably of an upper bar 12, which preferably extends the length of the loom. At the place where an intermediate crank connector 9 is located, the upper bar 12 has in this instance secured upon its front side and

on its rear side, by rivets 14, or otherwise, the upper ends of two downwardly extending bars 13. Each bar 13 has a vertically extending open end slot 13' in its lower end, for an intermediate crank connector 9, shown in Figs. 1 and 2. The lower ends of each bar 13 have preferably side extensions 13'' thereon, which extend upon the front and rear side of the lower bar 15 of the harness frame, which is made divided or in sections. The side extensions 13'' are secured to the contiguous ends of the sections of the lower bar 15, in this instance by rivets 16.

17 is the end bar of the harness frame, which secures the end of the upper bar 12 to the end of the lower bar 15.

The upper bar or rod 18, and the lower bar or rod 18', on which are strung the upper and lower ends of the heddles 20, are in this instance made in sections, and the outer ends of said rods or bars 18 and 18' are secured to the end bar 17, and the inner ends are detachably secured between the upright bars 13, by a pin or stud 19, see Fig. 7, and a cotter pin 19'. The intermediate rods or bars 18 and 18' are detachably secured at each end between the upright bars 13, in a similar manner.

The advantages of my improvements will be readily appreciated by those skilled in the art.

I make the crank connectors, intermediate the end crank connectors, straight, without interfering with the free raising and lowering of the harnesses. I also provide for an adjustment of the length of said crank connectors. I also make the heddle rods or bars in separate lengths, so that the same can be removed without interfering with the other parts of the frame.

It will be understood that the details of construction of my improvements may be varied if desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A harness or heddle frame for a narrow ware loom having its lower bar made in sections, and a vertically extending opening between said section for the entrance of a crank connector, and means for attaching said sections together.

2. In a narrow ware loom, a harness or heddle frame having its lower bar divided or made in sections in the direction of its length, and a vertically extending opening between said sections for a crank connector, intermediate the lay and crank shaft, and connected therewith, and means for attaching said sections together.

3. A harness or a heddle frame for a narrow ware loom, having the lower bar thereof made in sections, in the direction of its length, with a vertically extending opening

for a crank connector, and having the rods or bars for the heddles made in sections, and detachably connected to the frame and means for attaching said sections together.

5 4. In a narrow ware loom, the combination with the crank shaft, and the lay sword, and a crank connector connected to said crank shaft and lay sword, and located intermediate the ends of the harnesses, of a plurality of harnesses, each harness having a vertically extending opening in its lower bar through which said crank connector extends.

15 5. In a narrow ware loom, the combination with the crank shaft, and the lay sword, and a crank connector connected to the lay sword, and adjustably connected to the crank shaft, and located intermediate the ends of the harnesses, of a plurality of harnesses, each harness having a vertically extending opening in its lower bar through which said crank connector extends.

20 6. In a narrow ware loom, the combination with the crank shaft, and the lay sword, and a crank connector connected to said crank shaft and lay sword, and located intermediate the ends of the harnesses, of a plurality of harnesses, each harness having a vertically extending opening in its lower bar through which said crank connector extends, and having rods or bars for the heddles made in sections, and detachably connected to the harness frame.

30 7. In a narrow ware loom, the combination with the crank shaft, and the lay sword, and a crank connector connected thereto, and located intermediate the ends of the harnesses, of a plurality of harnesses, each having its lower bar made in sections in the

direction of its length, and a vertically extending opening between said sections, through which said crank connector extends. 40

8. In a narrow ware loom, the combination with the crank shaft, and the lay sword, and a crank connector connected thereto and located intermediate the ends of the harnesses, of a plurality of harnesses, each having its lower bar made in sections in the direction of its length, and a vertically extending opening between said sections, through which said crank connector extends, and means for attaching said sections together and having rods or bars for the heddles made in section, and detachably connected to the harness frame. 55

9. In a harness or heddle frame for a narrow ware loom, the combination with the upper bar, and the lower bar made in sections, of a vertically extending bar, secured at its upper end to the upper bar, and secured at its lower end to the sections of the lower bar, and having a vertically extending open end slot in its lower part for the entrance of the crank connector. 60

10. In a harness or heddle frame for a narrow ware loom, the combination with the upper bar, and the lower bar made in sections, of a pair of vertically extending bars secured at their upper ends to the front and rear of the upper bar, and at their lower ends to the front and rear of the lower bar, and each of said vertically extending bars having a vertically extending open end slot in its lower portion, for a crank connector. 70

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