No. 836,305. PATENTED NOV. 20, 1906.

E. S. CRADDOCK.

PILE FABRIC LOOM.

APPLICATION FILED MAY 2, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

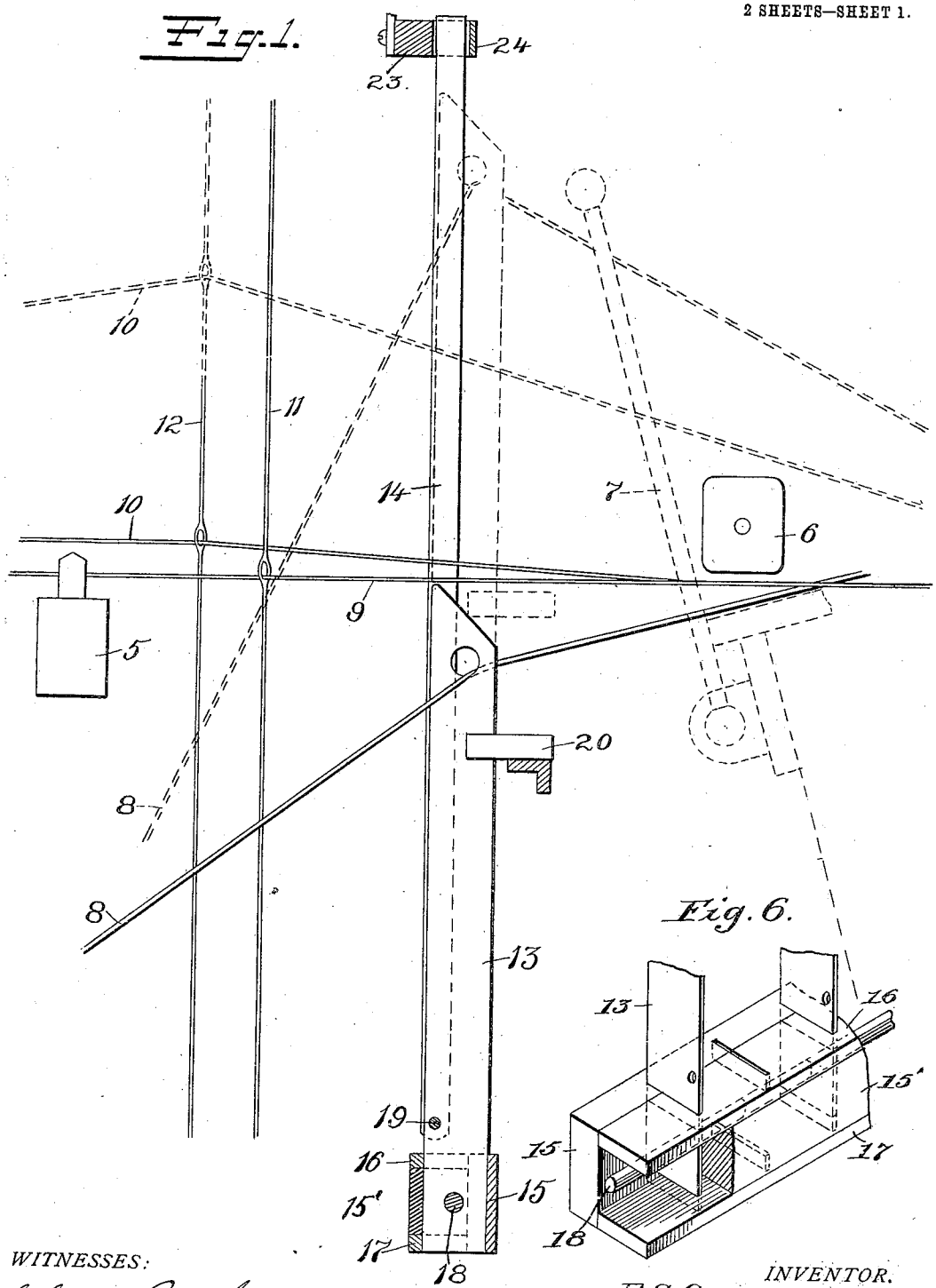


Fig. 6.

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2 SHEETS—SHEET 2.

Fig. 2.

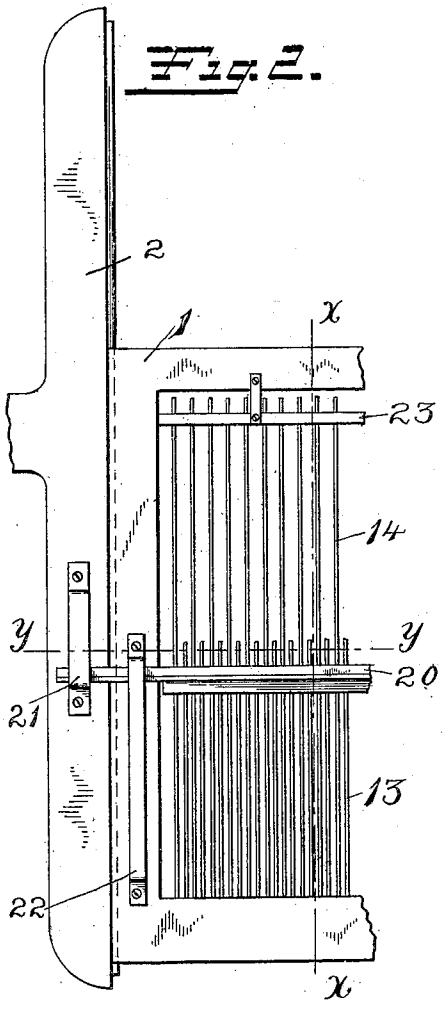


Fig. 3.

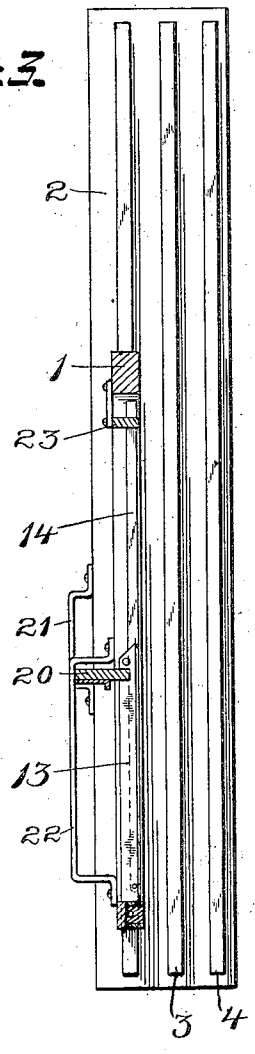


Fig. 4.

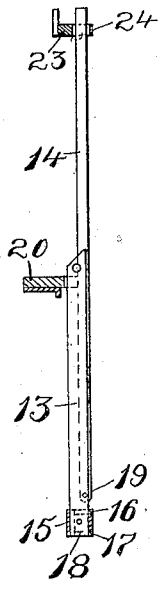
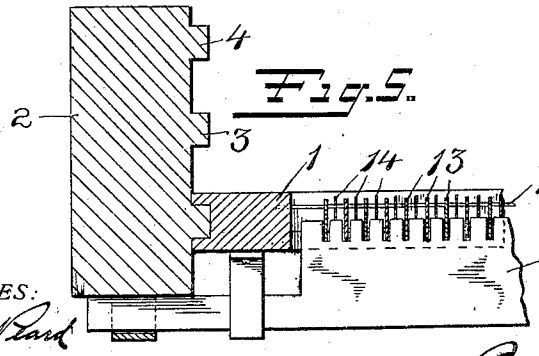


Fig. 5.



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PILE-FABRIC LOOM.

No. 836,305. Specification of Letters Patent. Patented Nov. 20, 1906.

Application filed May 2, 1905. Serial No. 258,467.

To all whom it may concern:

Be it known that I, EDWARD S. CRADDOCK, a citizen of the United States, residing at New York, county and State of New York, have invented certain new and useful Improvements in Pile-Fabric Looms, of which the following is a full, clear, and exact description.

My invention relates to improvements in looms, and particularly for weaving pile carpets or rugs.

The object of the invention is to improve the construction of looms so that the operating will be more uniform and reliable. In mechanism of this character the needles which carry the pile-threads are of considerable length and during their upward movement are subjected to strains which are likely to cause vibrations which interfere with the accuracy of the work. In this particular construction the warp-threads are moved up and down for the shuttle movement and relatively from side to side alternately to bring them into proper position for the opposite sides of the needles. This side-to-side movement of the warp-threads has a tendency to move the separators and the ends of the needles, so that occasionally the needle passes up on the wrong side of the warp-thread, thus failing to bring the pile-thread into the weave. The needles and separators are also likely to be injured in operation and need to be replaced. In my construction I have provided mechanism for avoiding uncertain action and facilitating repair.

The invention consists in improvements the principles of which are illustrated in the accompanying two sheets of drawings.

Figure 1 is a view, largely diagrammatic, showing the position and general operation of the needles and separators and their supports, the heddle-wires, shifting-comb, needle-guide, and shuttle, together with warp and pile threads. Fig. 2 is a fragmentary detail on a smaller scale, showing a front view of the needle frame and guide. Fig. 3 is a vertical sectional view of the same on the plane of the line x x, Fig. 2. Fig. 4 is a detail of a needle and separator and the guides and supports. Fig. 5 is a horizontal section of a fragment of the needle-frame, showing the guide, the section being taken on the plane of the line y y, Fig. 2. Fig. 6 is a detail perspective view showing the means for mounting the needles.

Suitable supports and operating mechanism are provided, as is customary in looms of this general character.

1 indicates the needle-carrying frame.

2 is one of the frame-guides for the needle-frame, also providing guides 3 and 4 for the heddle-frames. (Not shown.)

5 is a laterally-shifting comb-bar.

6 is a shuttle.

7 is one of the reeds of the reed-frame. Suitable knives are also provided for cutting the pile-thread.

8 represents one of the pile-threads.

9 and 10 represent a pair of warp-threads.

11 and 12 are the heddle-wires for these warp-threads, respectively.

13 is a needle. 14 is an adjacent separator. The needles and separators are carried vertically by the needle-frame and moved up and down together. In the preferred form of construction the needle is supported in the following manner: 15 is a plate carried by the needle-frame or constituting a part thereof, which is slotted on the back edge vertically for receiving the edges of the lower ends of the needles. 16 and 17 are plates slotted on the front edges and located with regard to the plate 15 so as to form a channel. 18 is a pin which extends from end to end and passes through all of the needles when in place. When the parts thus far described are assembled, the space between the plates 15, 16, and 17 and the needles is filled with some composition 15′, such as lead or other compound, which can be readily flowed into place to set and rigidly retain the needles in their proper positions.

19 is a pin or rod which extends through from side to side of the needles and forms a support for the separators 14. It is thus possible to very readily remove or insert one or more of the separators without interfering with the needle-frame in any way. The needles are so carried that it is impossible to break them from their proper position by any ordinary operation of the machine.

20 is a guide bar or member located adjacent to the upper ends of the needles and slotted on its rear edge to afford passages substantially as shown in Fig. 5. This guide member 20 is carried by the guide-frame 2. As the needles move up and down they change position relatively to the guide member 20, which must always remain below the warp-threads. The operation of the

shifter-comb 5 from side to side carries the warp-threads over against the separators alternately as the needles rise and fall, first on one side of the needle and then on the other. This lateral pressure tends occasionally to deflect the separators and also the needles, so as to close up the space which should be present on the farther side of the needle. This absolutely prevents the warp from being brought down into coöperation with the pile-thread. By my construction, however, this difficulty is avoided, since the needles are always guided just below their points and always present the proper spaces for the passage of the warp-threads. Since the effective length of the needle is substantially the same as its upward stroke, and since the guide member 20 must always remain below the warp-thread, I have mounted the guide member 20 in such a manner that it may have a relatively stationary position while the needle is in the upper part of its stroke. Normally the ends of the guide member 20 rest in the yokes 21 on the sides of the guide-frame 2.

22 is a yoke carried by one end of the needle-frame, which picks up the guide member 20 just before the needles reach their uppermost position and carries it through the remaining upward movement of the needle-frame. Of course the guide at this time is a considerable distance below the eye of the needle; but there is no lateral strain upon the needle at this time, but only when the shifter-comb is operating—namely, while the pile-thread is below the warp-thread.

23 is a slotted guide-bar loosely supporting the upper ends of the separators 14.

24 is a cap on the front of the guide-bar 23 for preventing the separators from falling out toward the front. The upper ends of the separators are not, however, held rigid by this bar, but are allowed considerable freedom of movement as they must have when the separators are laterally moved by contact of the shifting warp-threads. The separators may, however, be readily removed for the purpose of repair or replacement without interfering with the other parts of the mechanism.

Other advantages than those set forth herein will be apparent to those who are skilled in the art without further description. It may be stated, however, that the use of my invention makes it possible to operate a loom of this character with a laterally-moving warp-thread for producing a long-pile weave—for instance, like the oriental weave—which it has not before been possible to accomplish with any degree of certainty.

What I claim is—

1. In a pile carpet or rug loom having a vertical and horizontal shifting movement of the warp-threads, a set of vertically-operable needles, flexible separators between the needles and a rigid slotted guide for said needles located below the position of the warp-threads to prevent relative lateral displacement of the needles.

2. In a pile carpet or rug loom having a relative horizontal shifting movement of the warp-threads, a set of vertically-operable needles, a rigid slotted guide therefor located below the position of the warp-threads, and means for permitting relative upward movement of the guide at the upper part of the stroke of the needle.

3. In a pile-fabric loom, a series of vertically-movable needles for carrying the pile-threads and flexible separators between the needles for coöperating with relative laterally-shifting warp-threads, and means for guiding said needles below the warp-threads and preventing relative lateral displacement.

4. In a loom for pile rugs and carpets having laterally-shifting warp-threads, the combination of a set of vertically-movable needles for carrying the pile-threads, a set of separators for guiding the warp-threads, and means for coöperating with the needles below the warp for preventing lateral displacement of the points of the needles when the warp-threads are being laterally shifted.

5. In a pile rug or carpet loom, a needle-frame having a series of needles, a support therefor comprising three slotted bars forming a pocket, a pin extending through said needles and a metallic composition filled in between said bars and said needles.

6. In a pile rug or carpet loom, the combination of a series of vertically-movable needles, a support therefor, flexible separators for the warp-threads arranged between the needles and a pin or rod passing through said needles for supporting said separators independently of the needle-support.

7. In a loom for pile carpets and rugs, having vertically-shifting warp-threads, the combination of a set of vertically-disposed needles for the pile-threads, a series of vertically-disposed flexible separators arranged alternately with the needles, means for supporting the lower ends of the separators and a slotted bar or guide for loosely holding the upper ends of the separators in position.

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Witnesses:

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