No. 776,375. PATENTED NOV. 29, 1904.

R. BEATTIE & A. McKENDRICK.

PILE WIRE MOTION FOR LOOMS.

APPLICATION FILED MAR. 14, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

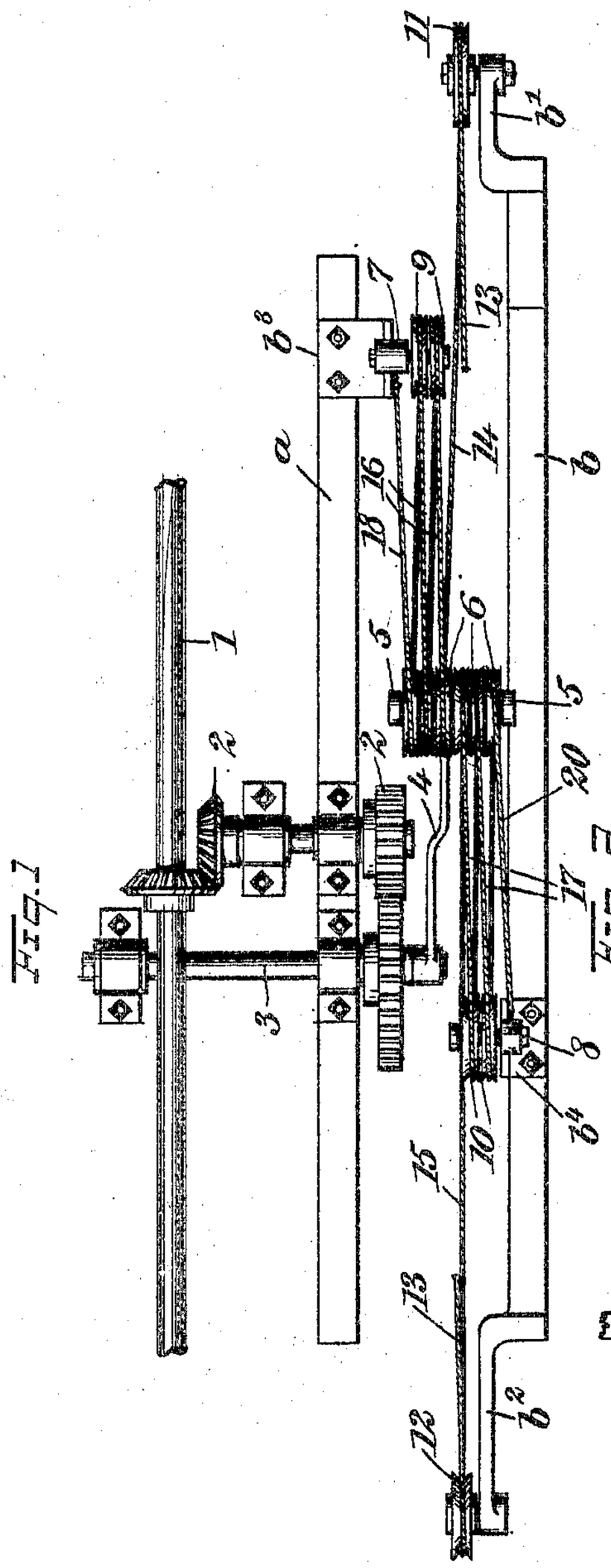

FIG. 1

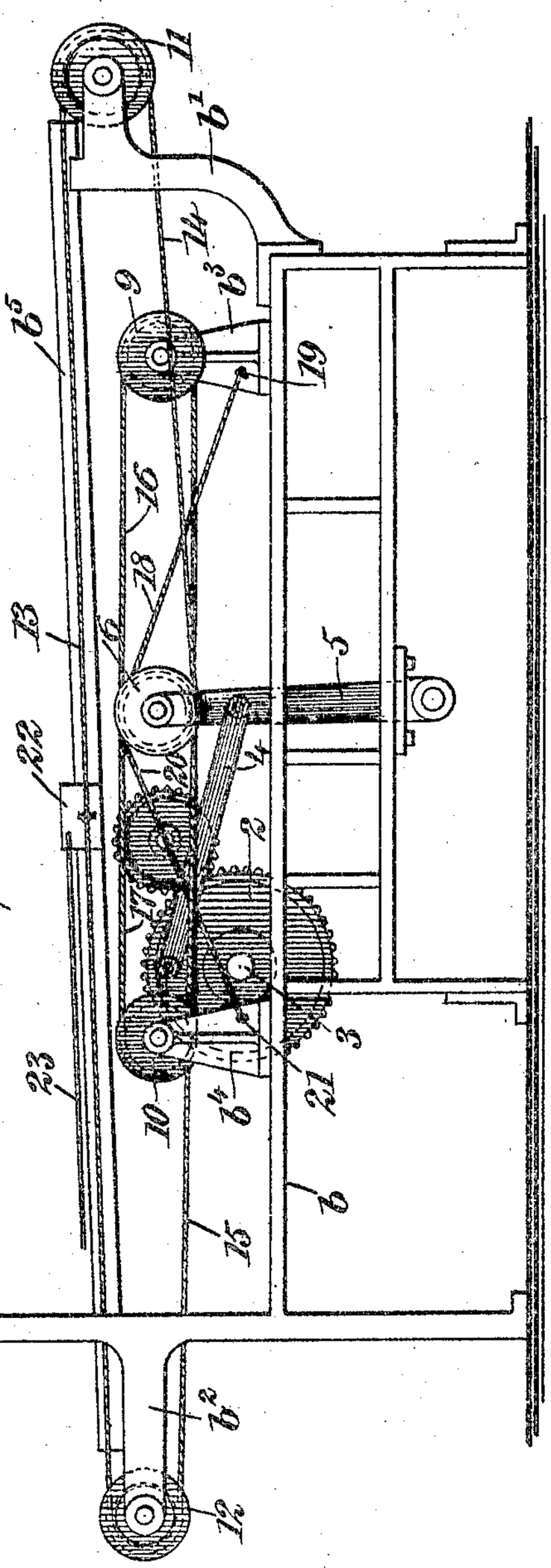

FIG. 2

WITNESSES:

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

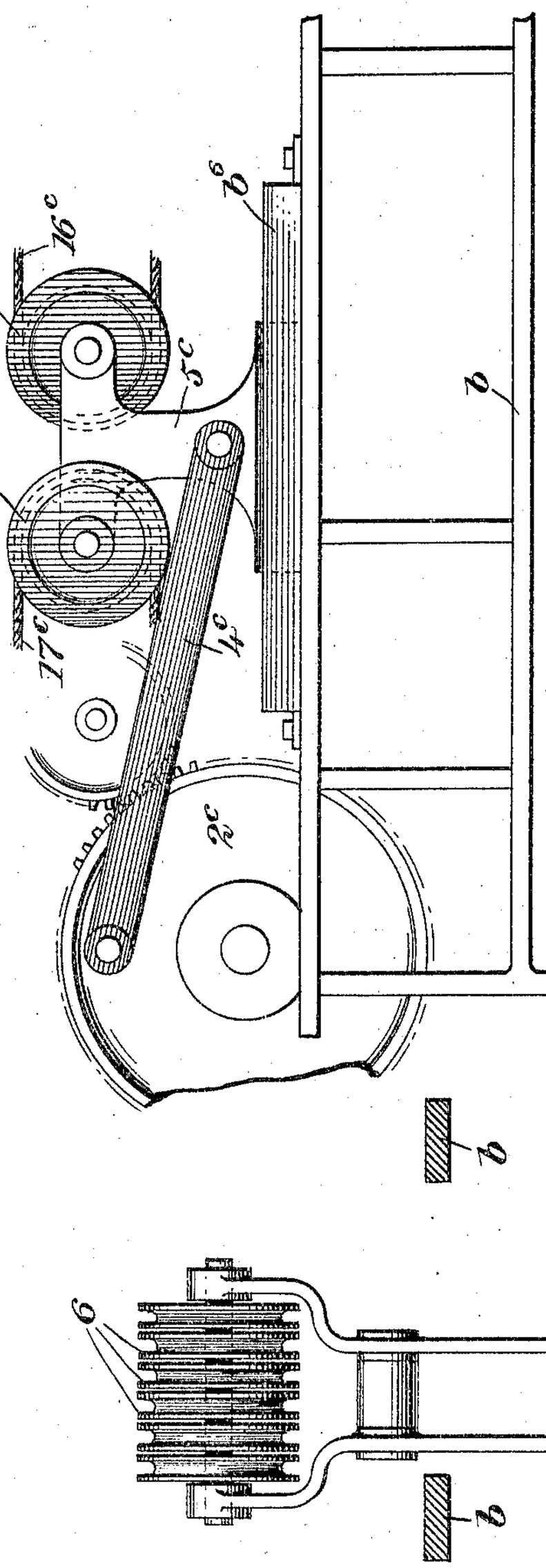

Fig. 5.

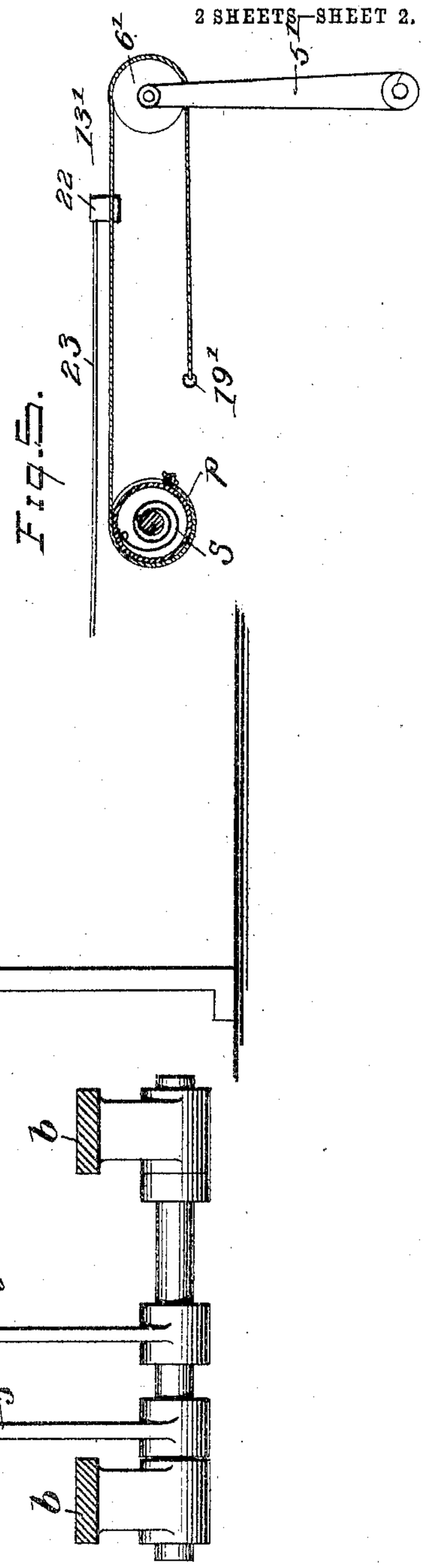

Fig. 3.

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No. 776,375. Patented November 29, 1904.

UNITED STATES PATENT OFFICE.

ROBERT BEATTIE, OF LITTLEFALLS, AND ALEXANDER McKENDRICK, OF PATERSON, NEW JERSEY; SAID McKENDRICK ASSIGNOR TO SAID BEATTIE.

PILE-WIRE MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 776,375, dated November 29, 1904.

Application filed March 14, 1904. Serial No. 198,042. (No model.)

To all whom it may concern:

Be it known that we, ROBERT BEATTIE, a resident of Littlefalls, and ALEXANDER McKENDRICK, a resident of Paterson, in the county of Passaic and State of New Jersey, citizens of the United States, have invented a new and Improved Pile-Wire Motion for Looms, of which the following is a full, clear, and exact description.

Our invention relates to a new and improved pile-wire motion which is especially adapted for use in wide carpet-looms.

The invention is designed for use on looms six-quarters wide and wider, where the wires used for raising and cutting the pile of the carpet must have a very long reciprocating motion.

The principal object of our invention is to do away with the large and cumbrous grooved wheel and the equivalents thereof which are now used on all looms of this character and at the same time to provide a less complicated motion as a substitute for the cam-motion now employed which will require less power and allow the loom to run at a greater speed and with fewer stoppages, thus increasing the production.

Further objects of our invention will appear in the course of the subjoined description.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of a preferred form of our invention. Fig. 2 is a side view of the same. Fig. 3 is an end elevation with parts in section, and Fig. 4 is a fragmentary side view showing a modified construction. Fig. 5 is a diagrammatic view of a modification.

Ordinarily on carpet-looms which are of the width mentioned above a large grooved wheel is employed for the purpose of reciprocating a belt or rope to which is attached the pile-wire. In order to provide for the proper motion of this grooved wheel, which cannot rotate continuously, but must oscillate back and forth, a complicated system of cams is ordinarily used. All cams are known to require a large amount of power for their operation. They also are expensive to make and materially increase the cost of construction, as well as the operation of the machine.

For overcoming these objections we have devised a new system and means of operating the pile-wire. This system, reduced to its simplest terms, as shown in Fig. 5, comprises a movable sheave or grooved pulley 6′, around which passes a rope 13′, belt, or its equivalent, one end of the belt being secured in a stationary position at 19′ and certain parts of the belt being so mounted as to be capable of reciprocating without disturbing the fixed relation of the end of the belt. This could be accomplished by coiling the second end of the belt around a drum or pulley *p*, mounted to rotate, or rather oscillate, on a stationary axis and provided with a spring *s* or other device for allowing the belt to unwind from the pulley or drum and for causing it to be wound thereupon when the force was removed from the belt. It will be obvious that the grooved pulley or sheave, around which the rope was coiled one or more times, as desired, would upon being shifted toward and from the two ends of the belt upon its pivoted arm 5′ cause the part of the belt attached to the spring-tensioned drum, with the block 22 and pile-wire 23, to reciprocate at twice the speed and twice the distance of the movable sheave. What we regard as a more practical way of accomplishing this result is illustrated in the other figures. In this construction both ends of the belt are fixed and a more complicated system of pulleys and sheaves is employed.

In Fig. 1, 1 indicates the main shaft of the loom or a shaft operatively connected thereto. By means of gearing 2 2 a shaft 3, which for convenience in the present instance is situated at right angles to the shaft 1, is given a rotary motion. Operated from the shaft 3 in any desired manner is a link 4, which, as shown, is attached to a part of the gearing and which in turn is intended to operate an oscillating arm 5, pivoted, preferably, at the bottom of the framework *b*. This arm 5 supports at its upper end preferably a series of

grooved pulleys or sheaves 6. Upon another part of the framework *a* or in any desired position is secured a bearing 7, and upon the main part of the framework *b* is secured another bearing, 8. These two bearings are provided with shafts which are designed for the purpose of carrying a plurality of grooved pulleys 9 and 10, respectively. The framework *b* is provided with projections *b'* and b^2, upon which are journaled in any desired manner two grooved pulleys 11 and 12 at opposite ends of the frame. Over the two pulleys 11 and 12 passes a belt 13, which may be made in the form of a cord, cable, chain, or any equivalent thereof. This belt passes around the pulley 11 and underneath it in a strand 14, connecting the pulley 11 with the pulley 6. On the other end of the frame the belt passes in a similar manner around the pulley 12 and underneath it to one of the pulleys 6 in a strand 15. From the pulleys 6 these two strands 14 and 15 pass upwardly and outwardly again in the strands 16 and 17 to the upper side of one of the pulleys 9 on one side and 10 on the other side, thence backwardly to the pulleys 6, then around and again over the pulleys 9 and 10, and finally the two ends of the belt are passed from over the pulleys 6 in the strands 18 and 20 to fixed pins 19 and 21. It will be obvious that any number of pulleys may be employed at 6, 9, and 10 so long as they correspond in number in such a way that those at 6 exceed those at 9 and 10 by two. Upon the belt 13 at a point between the pulleys 11 and 12 is fixed a block 22, which carries the pile-wire 23. It will be seen that a machine constructed in this manner will operate according to the principle mentioned above. Upon the oscillation or reciprocation of the pulleys 6 the belt 13 will be given a motion of reciprocation in all parts except the strands 18 and 20, and that in the part designated by 13 will be multiplied several times in proportion to the movement of the pulleys 6, according to the numbers of pulleys located at the points 6, 9, and 10. It will of course be understood that the device would operate in the same manner, but merely in a different degree, if one pulley only were used at 9 and 10 and four at 6 or if any larger number were used at 9 and 10 and correspondingly larger numbers at 6. The ends of the strands 18 and 20 may of course be attached to any stationary part of the frame—as, for instance to the brackets b^3 and b^4, one being located on the frame *b* and the other on the frame *a*. The frame *b* is also preferably provided, as is usually the case, with ways or a guide b^5, in which the block 22 runs.

It will of course be understood from this description that many modifications may be made without departing from the spirit of our invention as set forth in the annexed claims, and for purposes of illustration we have shown in Fig. 4 certain modifications which we have contemplated employing; but we do not wish to be limited to those shown. In said Fig. 4 the gearing 2^c operates a link 4^c, which in turn reciprocates a slide 5^c, working in ways b^6 on the frame *b*. This may take the place of the oscillating arm 5, (shown in Fig. 2,) and it may be otherwise employed in the same manner as that shown in Fig. 2, or instead of placing all the pulleys 6 on one shaft they may be placed on two different shafts, as shown at 6^c 6^c in Fig. 4. These two shafts may be employed also with the oscillating link 5, if desired. In this case the strands 16^c, corresponding to the strands 16 in Fig. 2, will pass over one set of pulleys 6^c and back, and on the other side the strands 17^c will pass over the other set of pulleys 6^c and back. The operation will be substantially the same in all of these cases.

It will of course be obvious that a cam-motion may be substituted for the gearing employed to operate the arm 5 but for a simple rotation like that employed for two-shot fabrics an exceedingly simple cam would be used, if any, and gearing would be more desirable. For three-shot fabrics, however, some sort of a cam-motion would have to be employed; but it would not be necessary to employ the complicated and cumbersome device used in the machines now known. A cam or any other operating means could be connected to the arm 5 either directly or indirectly in any desired way without departing from the spirit of our invention. While it is not in general necessary to apply such a multiplying motion to looms of less than six-quarters width, we do not wish to limit our invention to any particular size of looms.

Our invention presents many advantages over the forms of pile-wire motions now in use, among which may be mentioned the following: It can be used on any machine; any length of motion may be obtained; it can be adjusted with the greatest ease and accuracy; all strokes are exactly alike; it requires no brake, as the whole device acts in that capacity; there is very little lost motion, and it is very simple and cheap, easily constructed and repaired, and increases the production of the loom.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a loom, the combination of a pile-wire block or holder, a flexible connection attached thereto, and means for reciprocating said flexible connection, comprising a plurality of wheels over which said flexible connection passes.

2. A pile-wire motion for looms, comprising a plurality of shafts, pulleys on said shafts, a flexible member in contact with said pulleys, and means for shifting one of said pulleys with respect to the other.

3. A pile-wire motion comprising a plural-

ity of parallel shafts, a plurality of pulleys on certain of said shafts, a flexible member in contact with said pulleys, and means for bodily moving one of said shafts.

4. A pile-wire motion comprising a stationary shaft, a movable shaft, pulleys rotatably mounted on each of said shafts, a flexible member in contact with said pulleys, and means for moving said movable shaft.

5. A pile-wire motion comprising a plurality of rotatable pulleys, means for bodily moving one of said pulleys, and a flexible member in frictional contact with the circumferences of said pulleys, said flexible member having a fixed point.

6. A pile-wire motion for looms, comprising a pulley mounted on a shiftable axis, a pulley mounted on a stationary axis, a belt passing over said pulleys, and means for holding one end of said belt in fixed position.

7. A pile-wire motion for looms, comprising a pulley rotatably mounted on a shiftable axis, a belt passing around said pulley and having one end fixed, and means for permitting a portion of said belt to reciprocate.

8. A pile-wire motion for looms, comprising a set of pulleys mounted on a shiftable axis, two sets of pulleys rotatably mounted on stationary axes, and a belt passing over all of said pulleys and having fixed ends.

9. A pile-wire motion for looms, comprising two pulleys, three sets of pulleys located between said first-mentioned pulleys, one of said three sets being bodily movable, and a belt passing over all of said pulleys.

10. A pile-wire motion for looms, comprising five sets of rotatable pulleys, one of said sets being bodily movable, and a belt in frictional contact with all of said pulleys.

11. The combination of a frame, a rotatable pulley mounted at each end of said frame, two sets of rotatable pulleys mounted on fixed axes on said frame, a set of pulleys mounted on a movable axis, a link pivoted to said frame and supporting said last-mentioned set of pulleys, means for oscillating said link about its pivot, and a belt passing between said first-mentioned pulleys and from each of said pulleys into contact with a pulley of said last-mentioned set, and thence into contact with a pulley of each of said stationary sets, and thence again into contact with a pulley of said movable set.

12. A pile-wire motion, comprising a plurality of rotatable pulleys, means for bodily moving one of said pulleys, and a flexible member in frictional contact with the circumferences of said pulleys, said flexible member having parallel strands, one leading to and one leading from the bodily-moving pulley, and also having a fixed point.

13. A pile-wire motion, comprising a pulley mounted on a shiftable axis, a pulley mounted on a stationary axis, a belt passing over said pulleys, and means for holding one end of said belt in fixed position at a point on the side of said shiftable axis on which said stationary axis is located.

14. A pile-wire motion, comprising a pulley rotatably mounted on a shiftable axis, a belt passing around said pulley and having one end thereof fixed, and means for permitting a portion of said belt to reciprocate; said means and fixed end being located on the same side of said pulley.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ROBERT BEATTIE.
ALEXANDER McKENDRICK.

Witnesses to the signature of Robert Beattie:

WILLIAM G. MCCLINCEY,
WILLIAM H. BEATTIE.

Witnesses to the signature of Alexander McKendrick:

WILLIAM G. MCCLINCEY,
HARRY DUNNING.