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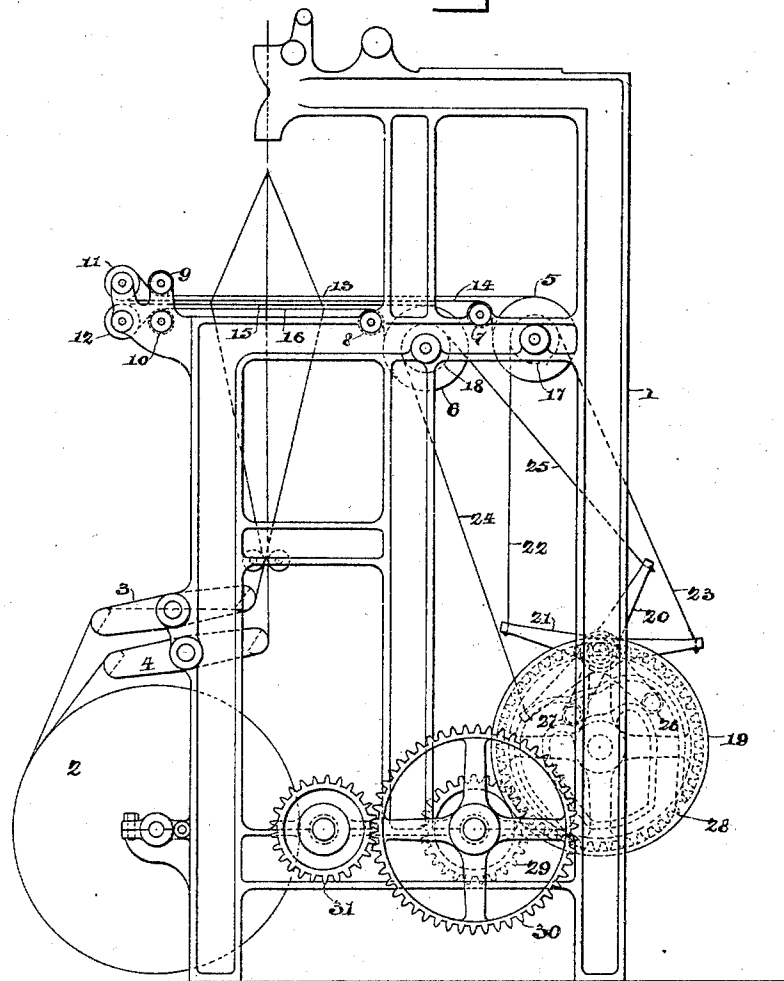
3 Sheets—Sheet 1.

A. D. EMERY.
SHEDDING MECHANISM FOR LOOMS.

No. 503,469.

Patented Aug. 15, 1893.

Fig. 1.



Witnesses.

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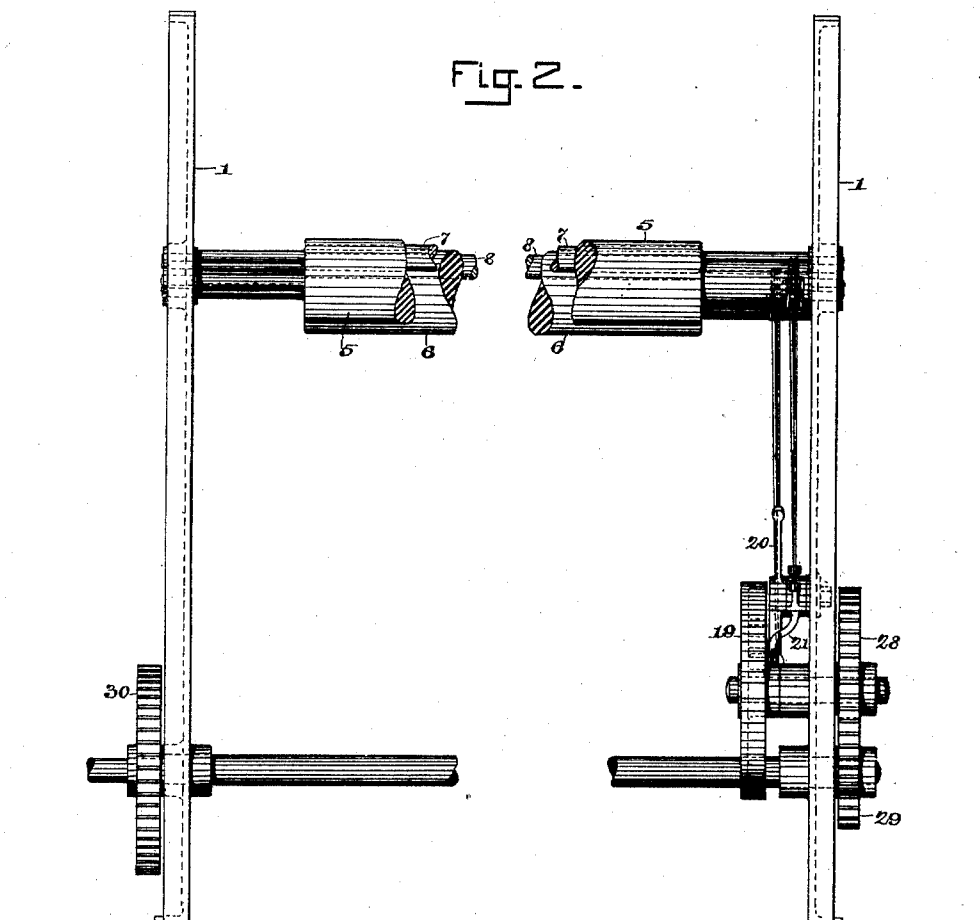
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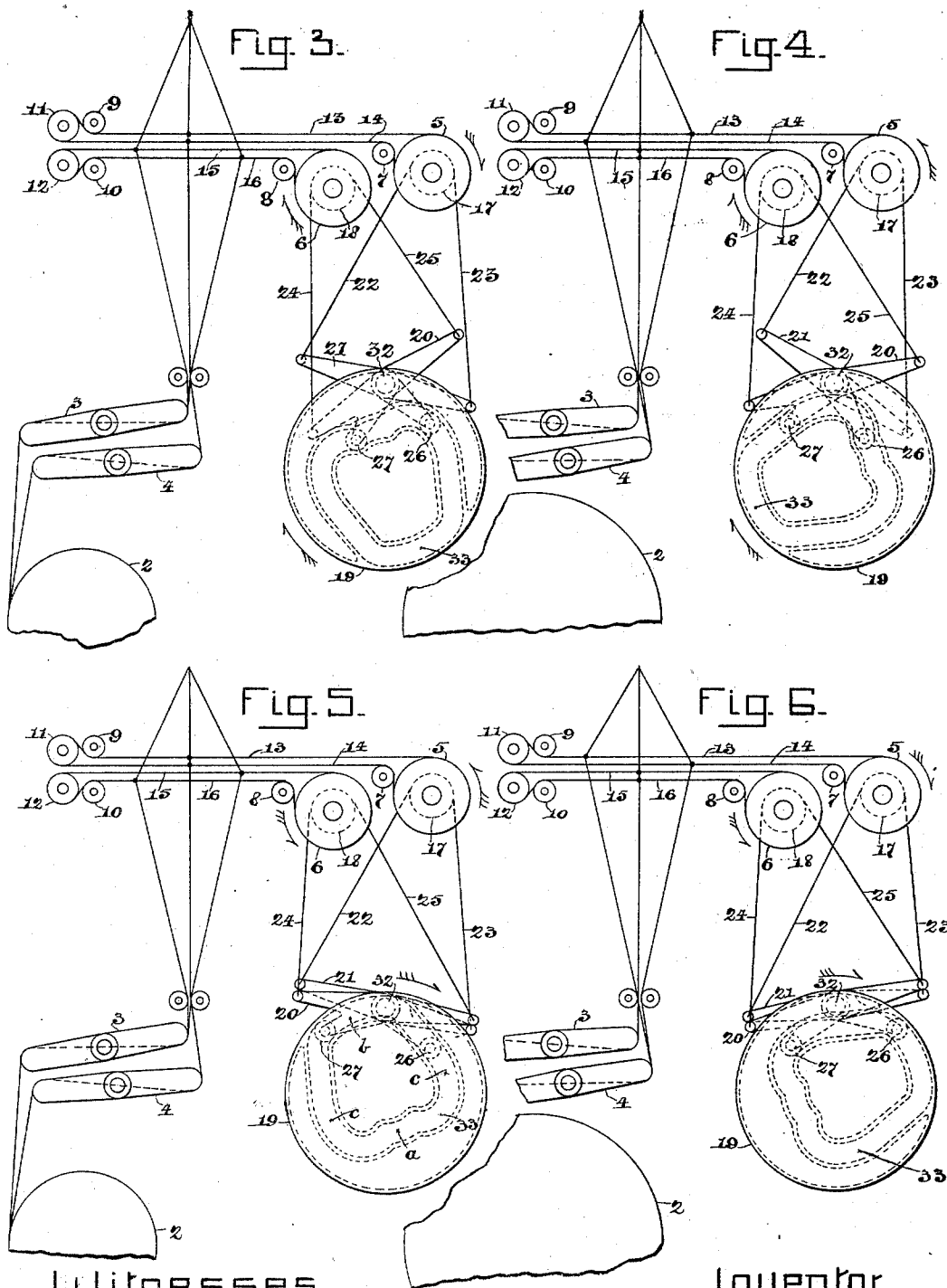
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SHEDDING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 503,469, dated August 15, 1893.

Application filed August 22, 1890. Renewed January 19, 1892. Again renewed December 1, 1892. Serial No. 453,696. (No model.)

To all whom it may concern:

Be it known that I, ABRAM D. EMERY, of the city of Taunton, county of Bristol, and State of Massachusetts, have invented an Improvement in Shedding Mechanism for Looms, of which the following is a specification.

This invention consists of certain mechanism for forming the chain threads into double sheds affording two parallel paths through which the two shuttles are simultaneously passed in the process of weaving double weight goods. The chain threads are divided into four groups governed respectively by separate heddles by means of which the groups of chain threads are successively passed into the positions required to form the series of sheddings, described in my Patent No. 441,230, dated November 25, 1890.

The accompanying drawings and diagrams illustrating the invention are as follows:

Figure 1, is a side elevation of a loom, containing the improvement. Fig. 2, is a front elevation of a portion of the loom a part being in section. Fig. 3, is a diagram illustrating the first position of the several parts of the shedding mechanism. Fig. 4, is a diagram illustrating the second position of the said several parts. Fig. 5, is a diagram, showing the said parts in the third position, and Fig. 6, is a diagram showing the said parts in the fourth position.

The drawings represent the side frames, 1, of the loom, the warp roll, 2, of chain or warp and two equalizing levers or whip rollers, 3 and 4, such as are described in my Patent No. 443,612, dated December 30, 1890.

The heddles are divided into two pairs. One pair, consisting of the heddles 13 and 14, are connected together ends to ends, thus forming the endless cord which is stretched around the larger roller 5, and the smaller roller 11, and is held taut with its parts in proper alignment by the idler rollers 7 and 9. The other pair of heddles is composed of heddles 15 and 16 in like manner joined together ends to ends forming the endless cord which is stretched around the larger roller 6, and the smaller roller 12, and is held taut with its parts in proper alignment by the idler rollers 8 and 10. The heddles 13 and 14, which pass around the roller 5, are actuated by the rocking lever, 21, the opposite ends of which are

respectively connected by means of the cords 22 and 23, to the reduced part 17 of the roller 5. The heddles 15 and 16 are actuated by the rocking lever 20, the opposite ends of which are connected to the reduced part 18, of the roller 6, by the cords 24 and 25. The rocking lever 21, has a projecting arm, carrying the cam pin roller 26, and the rocking lever 20 has a like arm carrying the cam pin roller 27. The rollers 26 and 27 are engaged by the cam groove 33, in the four throw cam 19 by the rotation of which the rocking levers 20 and 21 are rocked in regular order of succession into the four relative positions in which they are shown in Figs. 3, 4, 5 and 6 respectively. Of course the heddles 13 and 14 may at one end be fastened to the roller 5 and similarly the heddles 15 and 16 may at one end be fastened to roller 6. In any case the said rollers are as a matter of fact the heddle-operating rollers. As will be seen the gearing is such that the cam 19, makes one revolution to every four picks of the loom. Thus the gear wheel, 31, affixed to the lay shaft makes one revolution to every pick of the loom or passage of the two shuttles. The picker driving wheel, 30, attached to the picker shaft makes one revolution to two of the wheel 31. The picker shaft also has attached to it the pinion, 29, which engages the wheel 28, (of twice its own diameter) attached to the shaft carrying the cam, 19. Hence the cam 19 makes one revolution while the picker driving wheel 30 is making two revolutions, and the wheel, 31, attached to the lay shaft is making four revolutions. The four relative positions which the rocking levers, 20 and 21, are made to assume, respectively, at the end of each quarter revolution of cam, 19, enable those levers by their connection with the heddle operating rollers, 5 and 6, to form the four groups of chain threads into the succession of double sheddings indicated in Figs. 3, 4, 5 and 6. As represented in Fig. 3, the cam pin roller, 26, of the rocking lever 21, occupies its median position in the cam groove 33. In that position the chain threads controlled by the heddles 13 and 14, as indicated in Fig. 3, are in their middle positions, or in other words, in the normal plane of the warp. By the next quarter turn of the cam 19 the cam pin roller 26 is carried toward the center of the cam to

its innermost position, and the roller, 5, is thereby rotated in the direction indicated by the arrow in Fig. 3. This carries the group of chain threads controlled by the heddle 13 into their extended position away from the normal plane of the warp toward the roller, 5, and concurrently carries the group of chain threads controlled by the heddle 14, into their extended position on the opposite side of the normal plane of the warp. The next quarter turn of the cam 19 carries back the cam pin roller, 26, to its median position, and by rotating the roller, 5, in the direction indicated by the arrow in Fig. 4, returns the groups of chain threads controlled by the heddles, 13 and 14, to the normal plane of the warp. The next quarter turn of the cam 19 throws the cam pin roller, 26, to its most distant position from the center of the cam, and by continuing the rotatory movement of the stretching roller, 5, in the direction indicated by the arrow in Fig. 5, carries the chain threads controlled by the heddle, 14, outward from the normal plane of the warp toward the roller, 5, and at the same time carries the group of chain threads controlled by the heddle 13, outward to their extended position on the opposite side of the normal plane of the warp, as represented in Fig. 6. The next quarter turn of the cam carries the cam roller, 26, inward to its median position, thus returning all the parts to the positions in which they are represented in Fig. 3. It will be seen that the cam rollers, 26 and 27, are at like radial distances from the pivot, 32, which constitutes the common axis of rocking levers, 20 and 21, and that the arcs of the circle described by the cam pin rollers in their movements, are at equal distances from a line intersecting the axis of the cam and the axis of the rocking levers. In Fig. 3 the cam pin roller, 27, is represented in the position in which it is nearest to the axis of the cam, and the groups of chain threads controlled by the heddles 15 and 16, are respectively thrown into their extreme outward positions on opposite sides of the normal plane of the warp. In Fig. 4 the cam pin roller, 27, is represented in its median position and the groups of chain threads controlled by the heddles 15 and 16, as having been returned to the normal plane of the warp. In Fig. 5 the cam pin roller, 27, is represented in the position in which it is farthest from the axis of the cam, and the groups of chain threads controlled by the heddles 15 and 16, have again been carried outward from the normal plane of the warp, but to positions opposite those in which they are represented in Fig. 3. In Fig. 6, the cam pin roller 27 is represented as again occupying its median position and the groups of chain threads controlled by the heddles 15 and 16, as having been brought back to the normal plane of the warp. It will be seen that the cam groove 33 has four concentric portions, *a*, of the smallest diameter; *b*, of the largest diameter but of the same number of degrees as

a, and *c*, *c'*, which are of like diameter and which when engaging the cam rollers hold them in their median position. While the cam rollers remain in engagement with the concentric portions of the cam, the chain threads remain stationary in the positions in which they have been carried to form the double shedding.

It will be seen that the groups of chain threads controlled by the heddles 13 and 14 in their movements, always move in opposite directions at the same time, and that each group of chain threads is moved in two steps, first from its extended position on one side of the normal plane of the warp to its middle position in the plane of the warp and then to its extended position on the opposite side of the normal plane of the warp, and so on. The same thing is true of the groups of chain threads controlled by the heddles 15 and 16.

It will of course be understood that when the described mechanism is employed and the double sheds formed in the manner described, the selection of chain threads to form the various groups controlled by the heddles, respectively, may be varied for the production of various effects in the fabrics.

Various methods of threading in the threads in the heddles for the production of different fabrics are shown and described in my said Patent No. 441,230.

What is claimed as the invention is—

1. The combination in a shedding mechanism of the four-throw cam, 19, the rocking levers, 20 and 21, provided with the cam pin rollers, 26 and 27; the heddle-operating rollers 5 and 6, connected respectively with the said rocking levers, 20 and 21, and the heddles 13, 14, 15, and 16, as and for the purposes described.

2. The combination in a shedding mechanism of the cam 19; the rocking levers, 20 and 21, provided with the cam pin rollers 26 and 27; the heddle-operating rollers 5 and 6; the cords 22, 23, 24 and 25, respectively connected with the opposite ends of the said levers and with the said heddle-operating rollers for giving the same the described intermittent motions; and the heddles 13, 14, 15 and 16, respectively connected with and partaking of the motions of, the said heddle-operating rollers 5 and 6.

3. The combination in a shedding mechanism of the heddle-operating roller 5 and the stretcher roller 11; the heddles 13 and 14 deriving their motions from said roller 5; the heddle-operating roller 6 and the stretcher roller 12; the heddles 15 and 16, deriving their motions from said roller 6; and means for giving the heddles, respectively, a series of intermittent motions first, two steps in one direction and then two steps in the opposite direction, substantially as set forth.

4. The combination in a shedding mechanism of the rollers 5 and 11; the heddles 13 and 14, connected at their opposite ends, respectively, with said rollers 5 and 11; the idler roll-

ers 7 and 9, for holding taut and properly aligning the heddles 13 and 14, and the rollers 6 and 12 the heddles 15 and 16, connected at their opposite ends, respectively, with the said rollers 6 and 12, and the idler rollers 8 and 10 for holding taut and properly aligning the heddles 15 and 16, substantially as described.

5. The combination in a shedding mechanism, as herein set forth, of the cam, 19, provided with a single cam groove, 33; and the rocking levers 20 and 21, having a common axis and provided, respectively with cam pins of like radius carrying the rollers 26 and 27, and so arranged that the arcs of motion described by the said cam pin rollers are on opposite sides of and equi-distant from a line intersecting the axis of the cam and the axis of the said rocking levers.

6. The combination in a shedding mechanism as herein set forth, of the cam, 19, having a single cam groove, 33; for engaging the cam pin rollers 26 and 27; the rocking levers 20 and 21, with which the said cam pin rollers are connected; the rollers 5 and 6; the cords 22, 23, 24, and 25, connecting the said rollers 5 and 6, respectively, with the opposite ends of said rocking levers, 20 and 21, for operating the heddles by imparting to them a series of intermittent motions, each series consisting of two steps in one direction, followed by two steps in the opposite direction.

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