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R. LAUFER

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GEARED HEAD MOTION FOR LOOMS

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2 Sheets-Sheet 1

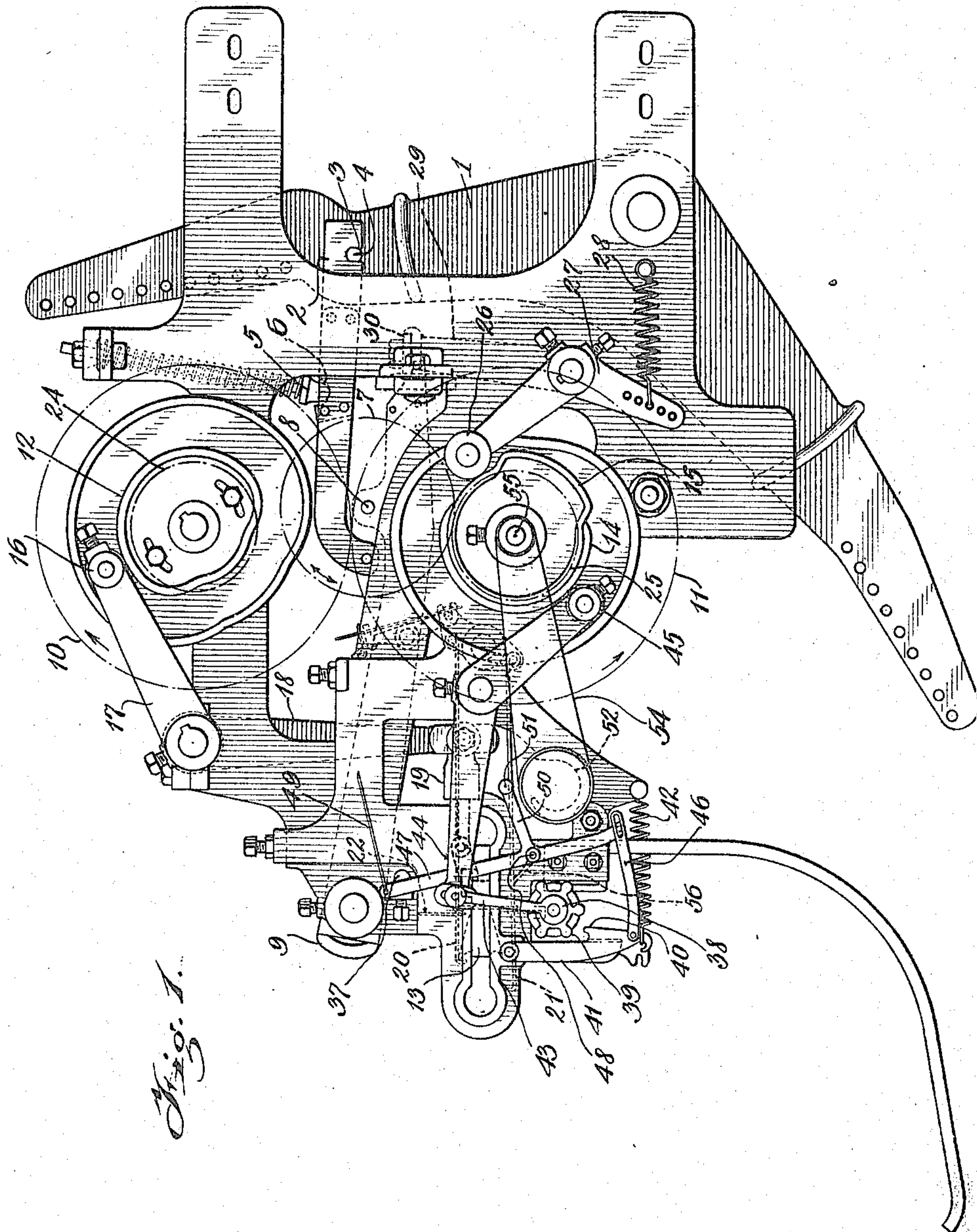


Fig. 1.

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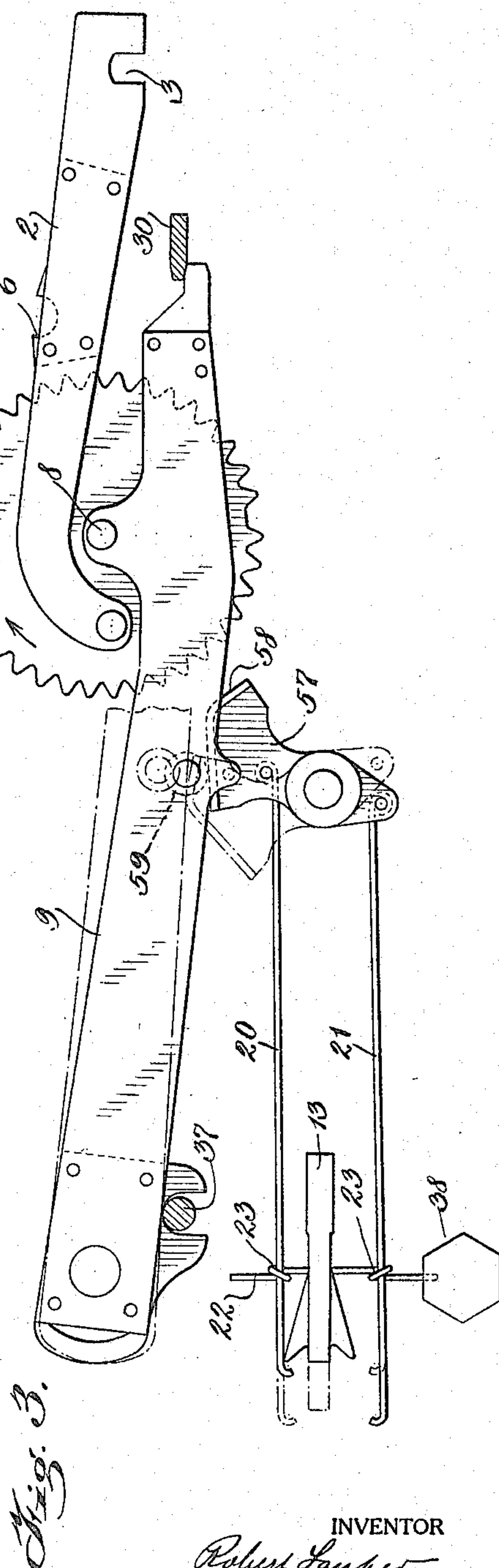
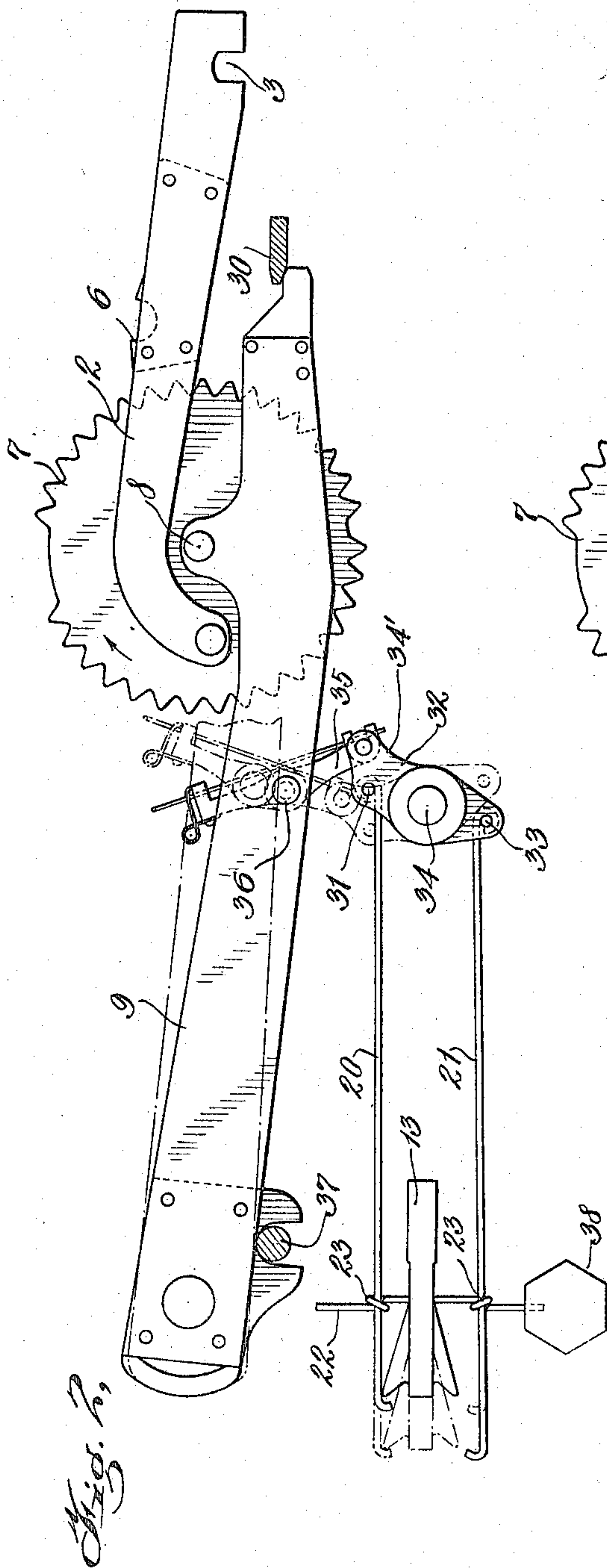
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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE.

ROBERT LAUFER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO FLETCHER WORKS, INCORPORATED, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

## GEARED HEAD MOTION FOR LOOMS.

Application filed September 19, 1923. Serial No. 663,523.

*To all whom it may concern:*

Be it known that I, ROBERT LAUFER, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Geared Head Motions for Looms, of which the following is a specification.

My invention relates to an improvement in looms and is particularly directed to an improved geared head motion for looms.

In my improved loom, the knives have a to and fro motion alternately in and out, lowering and raising the harness through the medium of the jack and its attachment, and one of the objects of my invention is the provision of means for quickly levelling the harness by pulling a cord attached to a leveller which may be done from any position of the loom. The harness at this operation is dropped and is, therefore, in the most advantageous position for the operator to reach over the harness frame and draw any broken ends of the warp through the eye of the heddle. The loom does not have to be stopped for this operation and automatically readjusts itself without any attention on the part of the operator.

A further object of my invention is the provision of improved vibrator mechanism.

In the accompanying drawings:—

Figure 1 is an elevational view of one end of a loom embodying my improved mechanism;

Fig. 2 is a detail, somewhat enlarged, view of the vibrator operating mechanism; and

Fig. 3 is a similar view of a modified form of vibrator operating mechanism.

Referring to the drawings in detail, and first of all to Figs. 1 and 2, 1 designates the jack-angle lever to which the harness of the loom is attached and to which is also attached a vibrator lever 2. This vibrator lever is attached to the jack-angle lever by a slot and pin, 3 and 4, respectively, and held thereto by a spring-actuated rod 5, the end of which is received by a depression in the upper side of the vibrator lever.

The vibrator lever is also attached to a mutilated floating vibrator gear 7, the point of attachment of the lever to the gear being eccentric to the center 8 of the gear

and at which point the gear is attached for rotation to a vibrator 9.

The floating vibrator gear 7 is adapted to be driven in reverse direction indirectly by two relatively large gears 10 and 11 in constant mesh with each other, the gear 10, or rather the shaft carrying the gear, being provided with a cam-track 12 for operating the knives 13, as will be presently described, while the shaft carrying the gear 11 is provided with two cams, a cylinder-operating cam 14 and vibrator lock-controlling cam 15.

The knife-operating cam-track 12 co-operates with a roller 16 which is carried by one arm 17 of a bell-crank lever, the other arm 18 of this lever being attached by a connection 19 to the knives 13. From this it will be seen that rotation of the gear 10 will cause the cam-track 12 to function so as to effect reciprocation of the knives 13. The knives 13 are adapted to effect independent movement in a forward direction of the rods 20 and 21, the engagement of the hooked ends of these rods with the forward end of the knives being controlled, in part at least, by the needles 22 which are provided with a pair of spaced eyes 23 through which the rods are inserted. It will be understood, of course, that my loom is provided with a knife 13, rods 20 and 21, and needles 22, depending upon the design of the loom.

The gears 10 and 11 are always driven in the same direction, the direction of rotation of these gears being indicated by the arrows thereon. The floating vibrator gear 7, however, is rotated alternately in a clockwise and an anti-clockwise direction, as above pointed out, the direction of rotation of the floating vibrator gear depending upon whether it is in mesh with the gear 24, which in effect is integral with the gear 10, or in mesh with the gear 25, which in effect is in mesh with the gear 11. The meshing of the vibrator gear 7 with the gear 24 or the gear 25, as the case may be, is under the control of the rods 20 and 21, to the extent at least that forward movement of one rod will bring the vibrator gear into mesh with the gear 24, while the forward movement of the other rod will bring the gear into mesh with the gear 25.

As previously pointed out, the floating vibrator gear 7 is mounted for rotation on



the vibrator 9, and means have been provided for locking one end of the vibrator, this locking means being controlled by the cam 15, in effect integral with the gear 11.

From an inspection of Fig. 1, it will be seen that this locking mechanism comprises also a roller 26 co-operating with the cam 15 and carried by one arm of the bell-crank lever 27, this roller being held against the cam at all times by a spring 28. The bell-crank lever is in turn provided with a lock-controlling arm 29 which carries a latch 30 adapted, as the arm is rocked by the cam 15, to be moved into and out of locking engagement with the end of the vibrator 9. The latch 30 is shown in locking position in Figs. 2 and 3.

Referring to the actuation of the vibrator 9 by the rods 20 and 21, it will be seen from Fig. 2 that the rods 20 are attached at 31 to one end of a pivoted lever 32, while the end of the rods 21 are attached to the other end 33 of the same lever. This lever pivots about a pivot or fulcrum 34 intermediate the points of attachment of the rods 20 and 21. On one side of this pivot, the lever 32 is provided with an offset 34' to which is attached the forked end of a lever 35 pivotally connected intermediate its ends, as indicated at 36, to the vibrator 9. It will be obvious, therefore, that as the rods 20 and 21 are actuated alternately by the knives 13, the lever 32 will be rocked about its pivot to cause the vibrator 9 to be moved about its fulcrum 37 to raise and lower the mutilated floating vibrator gear 7 and thereby bring the same into engagement alternately with the gears 24 and 25. The gear 7, by reason of this fact, will be caused to rotate alternately in a clockwise and an anti-clockwise direction to in turn cause the jack-angle lever 1 to be rocked about its pivot to lower and raise the harness of the loom.

The rods 20 and 21 must necessarily be brought into operative relation to the knives 13 so as to be actuated thereby, and this is brought about through the medium of a card and card cylinder 38 and its associated mechanism. The card and card cylinder are of usual construction, but the cylinder is, periodically rotated for a sixth of a turn, if a six-sided cylinder is employed, by lowering the cylinder so as to bring the projections or teeth 39 thereon into engagement with an abutment or shoulder 40 formed on a pivoted member 41 which is normally held in proper position for this operation by a coil spring 42. In Fig. 1 the member 41 is shown in operative position, so that when the cylinder and its card are dropped, the cylinder will be given a sixth of a turn. The card cylinder is supported by an arm 43 which is attached to one arm of a bell-crank lever 44, the other arm of which carries a roller 45 co-operating with the cylinder-

operating cam 14 already referred to. As the cam 14 is rotated, due to rotation of the gear 11, the bell-crank lever 44 will be rocked to raise and lower the cylinder 38 to thereby cause the cylinder to be intermittently rotated to advance the card carried by the cylinder. The card, of course, is punched depending upon the pattern to be woven, so that the proper needles 22 will be raised to cause the vibrator 9 to be vibrated accordingly.

The member 41 is adapted to be moved to inoperative position to interrupt the rotation of the card cylinder 38 and also to level the harness of the loom, which is one of the objects of this invention, without necessitating stopping of the entire loom. From an inspection of the drawings it will be seen that to the lower end of the member 41 I attach a link 46, the other end of which is attached to a lever 47. This lever is pivoted at 48 and may be manually rocked about its pivot against the action of the spring 42 by a cord 49, the operation of this cord rocking the member 41 to the left, as viewed in Fig. 1, so as to carry the shoulder or abutment 40 out of the path of the card cylinder entirely. This, of course, will interrupt the intermittent rotation of the cylinder and permit the harness to be levelled. The cord 49 need not be held after it has been operated, the lever 47 being provided with an arm 50 carrying a roller 51 which is adapted to enter a cam 52 when the cord is operated, where it will remain to hold the member 41 in inoperative position until the opening 53 of the cam has made a complete revolution and moves into register with the roller 51 again. The cam 52 is driven by a chain 54 in turn driven from the gear shaft 55. The lever 47 also carries a leveller 56 provided for the purpose of lifting the rods 20 and 21 when the cord 49 is actuated to raise the needles 22 away from the card and card cylinder 38 entirely to thereby hold the needles against reciprocation and thence bring the rods 20 and 21 out of operative relation to the knives 13 so that, although the knives 13 are being reciprocated, the rods 20 and 21 are at rest and the harness will remain levelled.

It will be seen, therefore, that I have provided means for positively actuating the vibrator 9 and also means whereby, when desired, the harness of the loom may be levelled without necessitating stopping of the entire loom.

In Fig. 3 I have shown a modified vibrator-operating mechanism. In this embodiment of my invention I provide a pivoted lever 57 to which the rods 20 and 21 are attached in a manner similar to the attachment of these rods to the lever 32 of Fig. 2. This lever is provided on its upper end with a cam surface 58 which is adapted, when the rods 20



are moved forward by the knives 13, to raise the vibrator 9, this cam surface engaging a roller 59 which is carried by the vibrator. On the reverse movement of the lever 57, due to the forward movement of the rods 21, the vibrator drops by cam movement.

While I have shown a specific embodiment of my invention, it is to be understood that changes may be made in the details thereof without departing from the spirit and scope of the invention.

What I claim is:

1. In a geared head motion for looms, a vibrator, a lever pivoted thereon, a second pivoted lever pivotally attached to the first lever, a reciprocable knife, rods reciprocated by said knife, said rods being attached to the second named lever at each side of the fulcrum of said lever, whereby as the rods are reciprocated said vibrator is actuated.

2. In a head motion for looms, a vibrator, a knife, a rod at each side of said knife and adapted to be reciprocated thereby, a card cylinder for moving the rods into and out of operative position relative to said knife, and a lever attached to said rods and to said vibrator whereby as the rods are reciprocated said vibrator will be positively actuated.

3. In a loom, needles, a card for effecting vertical reciprocation of said needles, a card cylinder, means for effecting vertical reciprocation of said cylinder to actuate said needles in predetermined order, means for moving said needles as a unit out of the path of said card and a cam for holding said needles in such position, said cam being operable to automatically release the needles at a predetermined instant.

4. In a loom, needles, rods attached to

said needles, a vertically-reciprocating card for effecting predetermined reciprocation of said needles, and means for raising said rods to lift the needles out of the path of said card to permit the card to reciprocate without actuating the needles, and a continuously rotating cam for locking said rods in raised position, said cam being operable to release the rods after a predetermined interval of time.

5. In a loom, needles, a card for reciprocating said needles in predetermined order, a cylinder carrying said card, means for automatically raising and lowering said cylinder to effect intermittent rotation of said cylinder to thereby bring different portions of said card into operative position relatively to said needles, and means for stopping the rotation of said cylinder and at the same time moving said needles out of the path of said card whereby the cylinder and card may be raised and lowered without reciprocating said needles.

6. In a loom, needles, a card for effecting reciprocation of said needles in predetermined order, rods attached to said needles, means for levelling said rods to level the needle as a unit and simultaneously therewith to move said needles out of the path of said card.

7. In a loom, needles, a card for reciprocating said needles in predetermined order, means for levelling said needles and holding them levelled for a predetermined period, and means for automatically releasing said needle-holding means.

This specification signed this seventh day of September, 1923.

ROBERT LAUFER.