

No. 756,235.

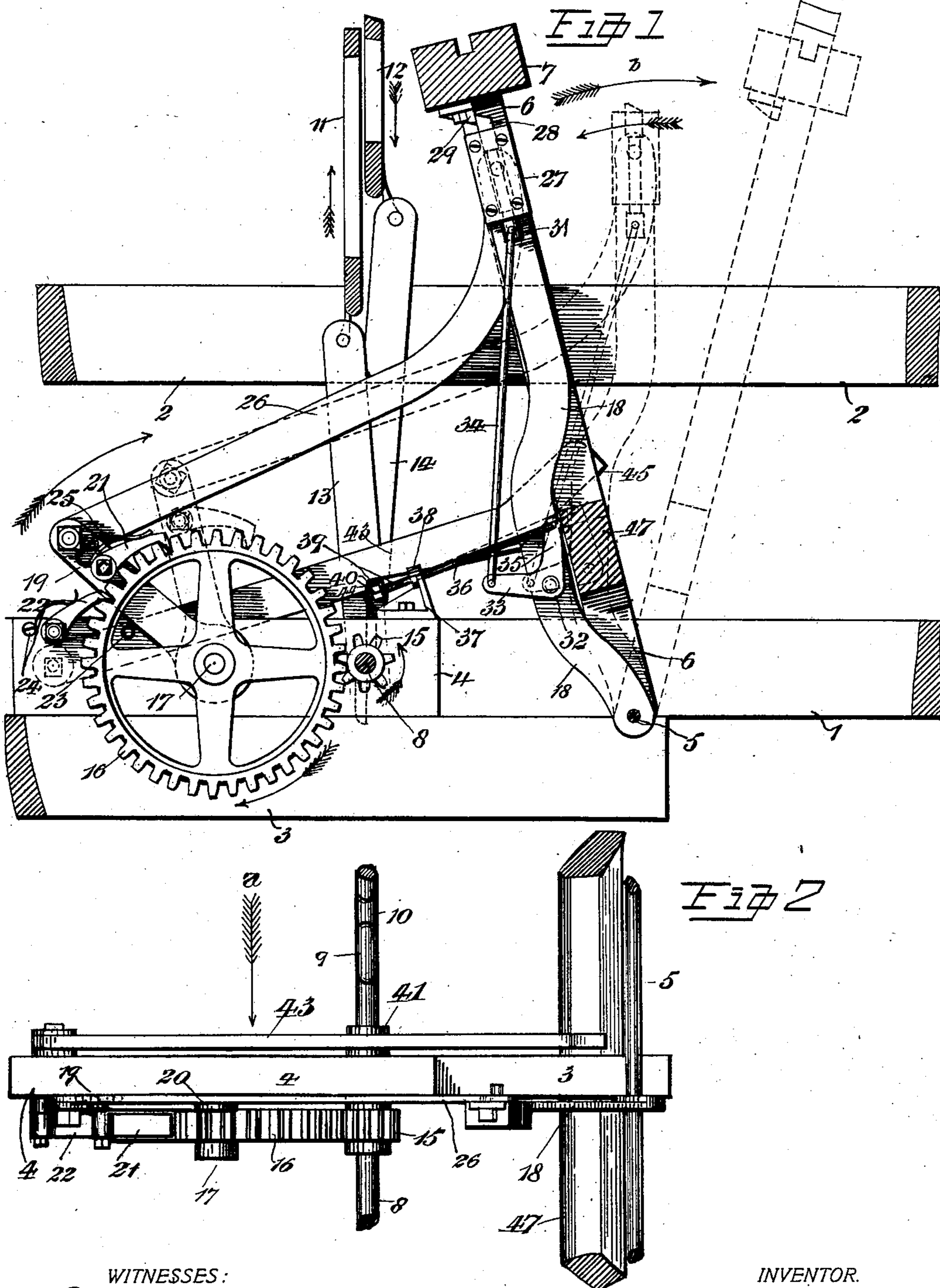
PATENTED APR. 5, 1904.

A. S. HORLACHER.
HEDDLE MOVEMENT FOR HAND OPERATED LOOMS.

APPLICATION FILED FEB. 26, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:
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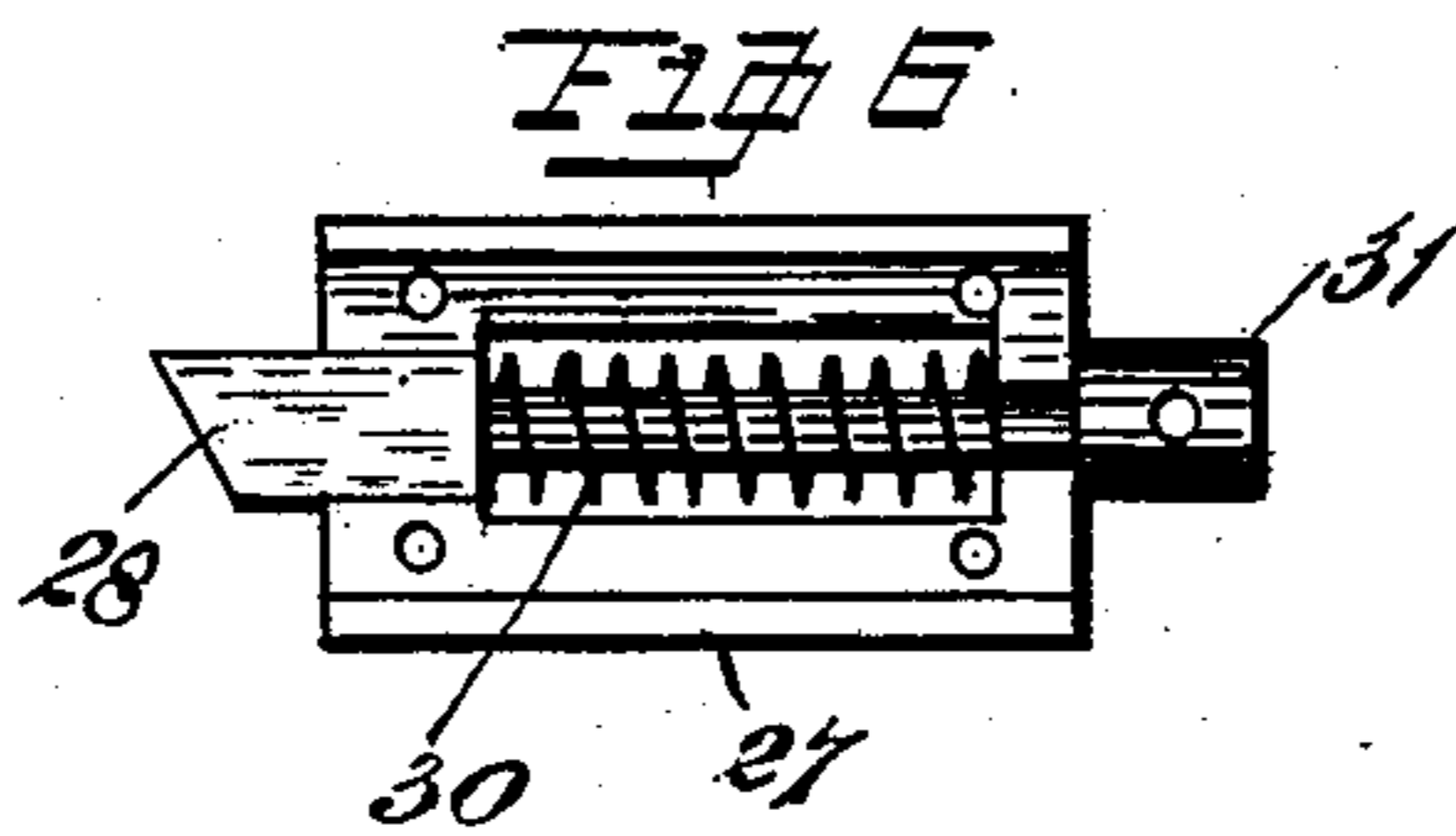
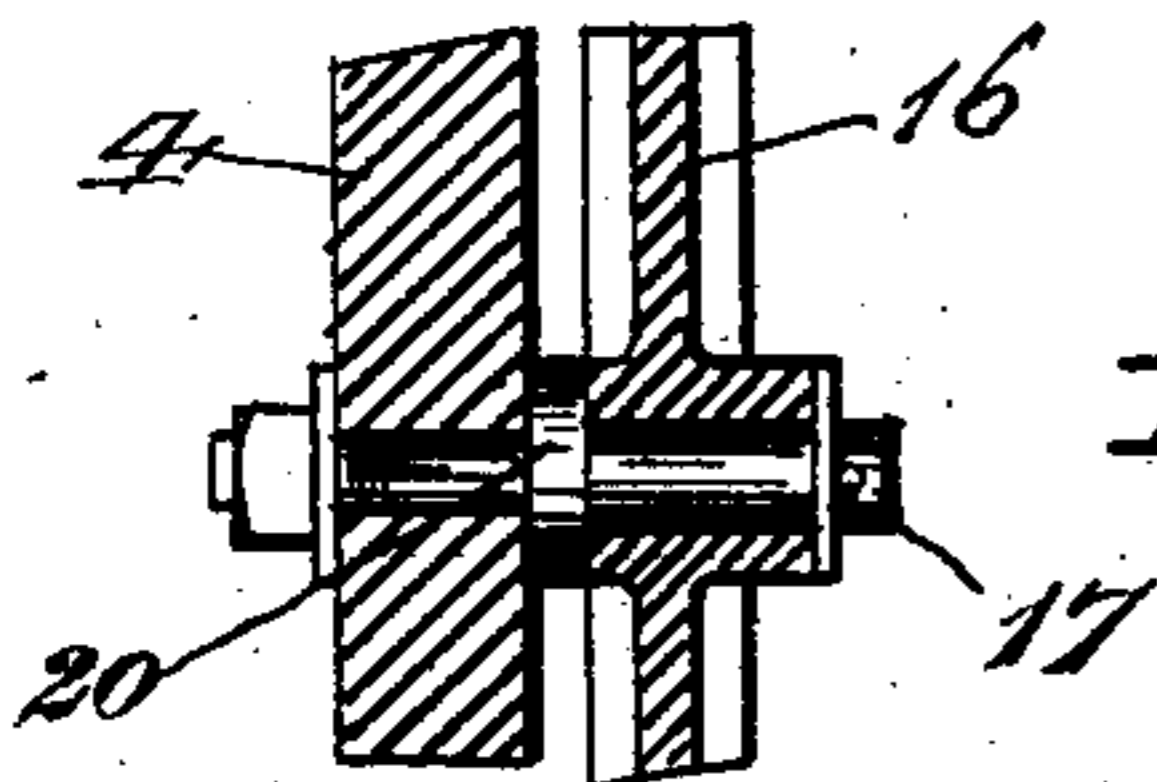
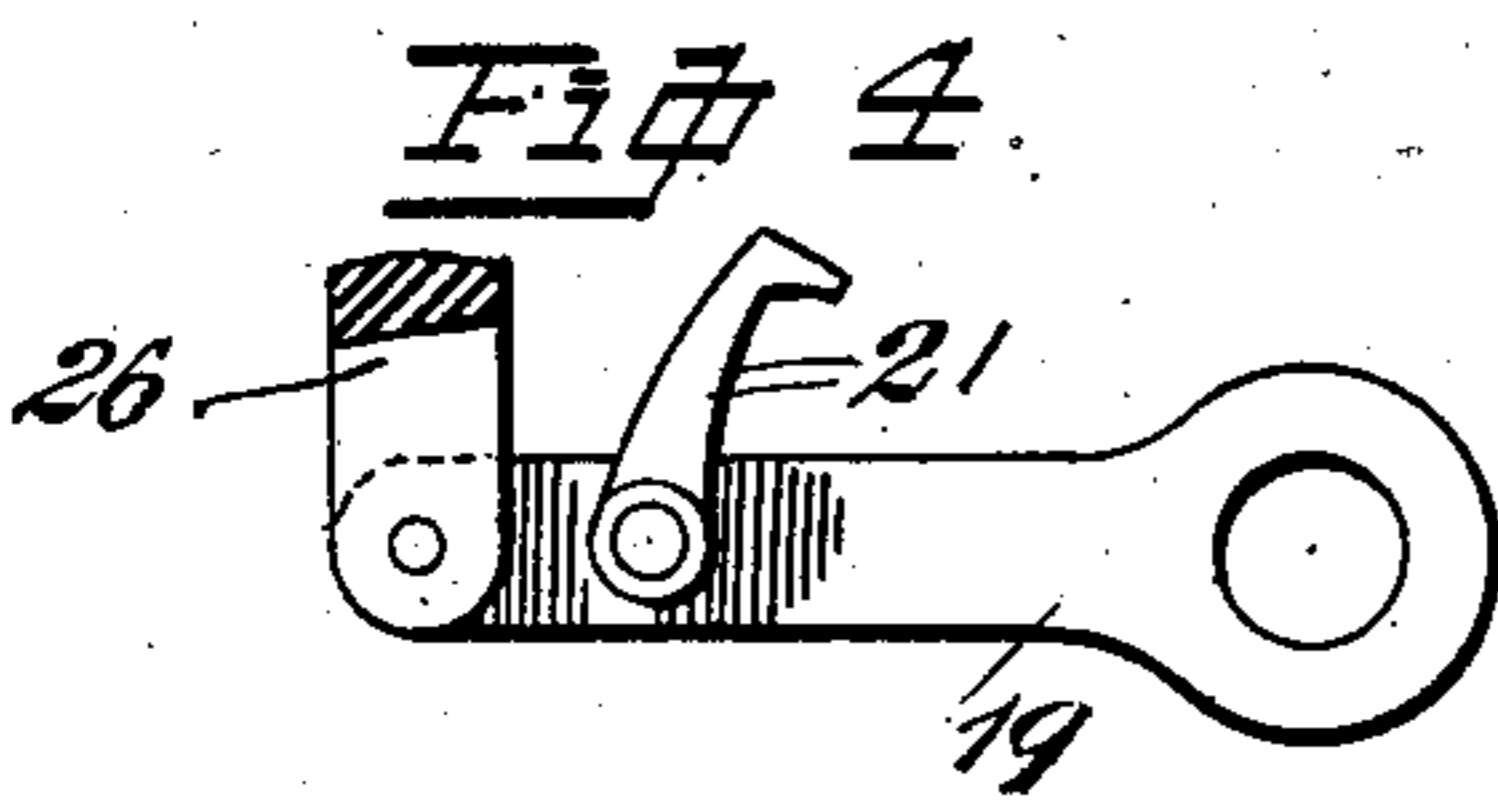
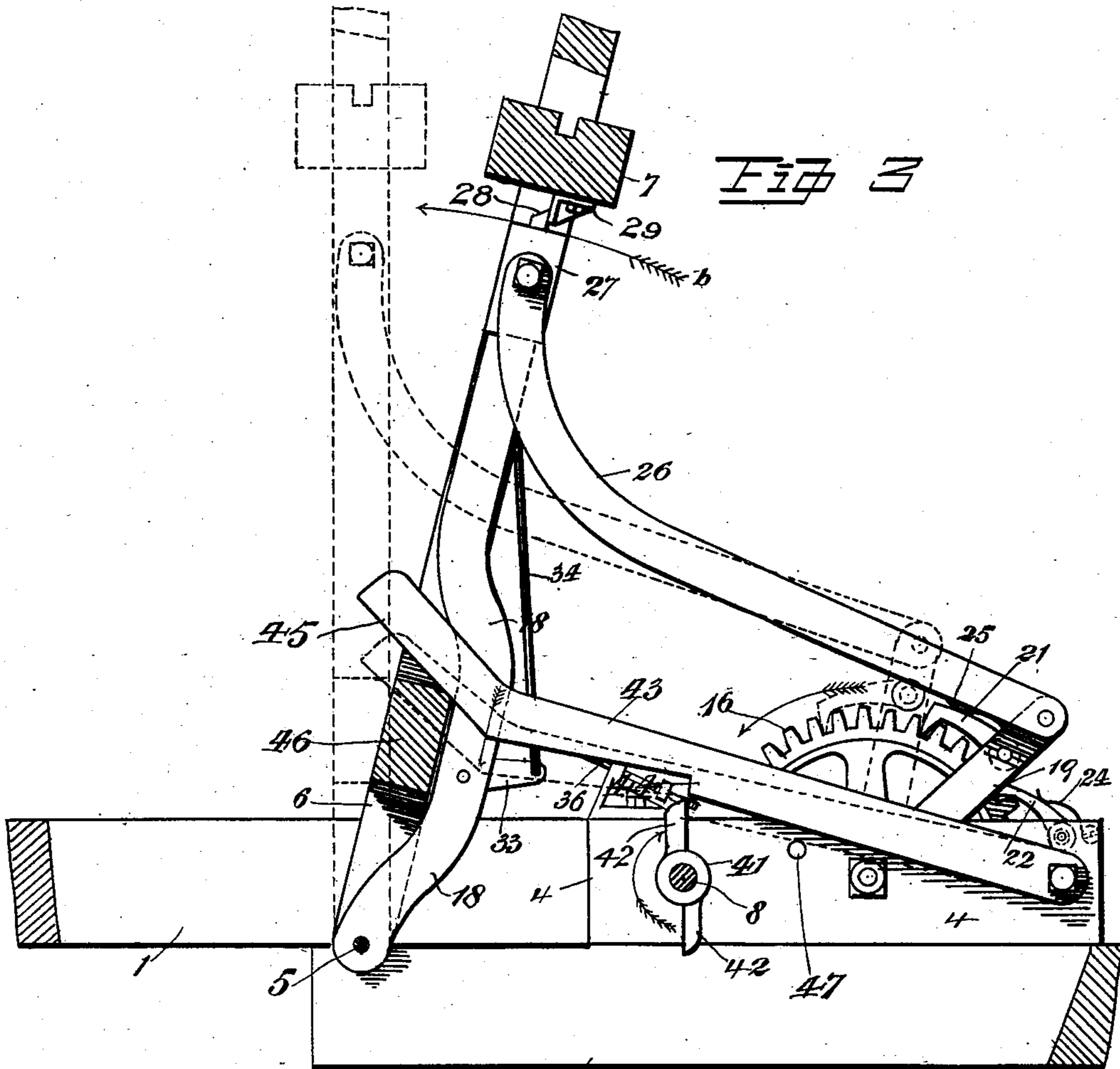
A. S. HORLACHER.

HEDDLE MOVEMENT FOR HAND OPERATED LOOMS.

APPLICATION FILED FEB. 28, 1903.

NO MODEL.

2 SHEETS—SHEET 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ADAM S. HORLACHER, OF INDIANAPOLIS, INDIANA.

HEDDLE-MOVEMENT FOR HAND-OPERATED LOOMS.

SPECIFICATION forming part of Letters Patent No. 756,235, dated April 5, 1904.

Application filed February 26, 1903. Serial No. 145,208. (No model.)

To all whom it may concern:

Be it known that I, ADAM S. HORLACHER, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented new and useful Improvements in Heddle-Movements for Hand-Operated Looms, of which the following is a specification.

My invention relates to certain new and useful improvements in heddle-movements for hand-operated looms; and it consists in mechanism whereby the heddles are positively operated, as will be hereinafter set forth, and particularly pointed out in the claims.

The objects of my invention are, first, to provide a gear wheel and pinion drive mechanism in a hand-operated loom for operating the heddle-operating shaft whereby by slight rotation of said drive-gear, caused by the operator in drawing the lay or beater forward to beat up the weft, the pinion and the shaft whereon said pinion is secured will make a one-half revolution—that is, the heddles will be moved or changed from and to either extreme position for each half-revolution of the said pinion and its shaft; second, to provide a means connected to the beater of the loom whereby the required motion will be imparted to said drive-gear of said heddle-operating shaft or heddle crank-shaft to revolve the latter not to exceed one half-revolution, and thus for each one-half revolution of said shaft one of said heddles is moved from extreme lower to extreme upper position, while the other heddle is simultaneously moved from extreme upper to extreme lower position; third, to provide a tripping means whereby said heddle-drive-gear mechanism is disengaged from the beater of the loom, thereby permitting the independent use of said beater when such is required; fourth, to provide a heddle-operating-shaft stop or lock whereby said shaft is automatically locked or held in position to retain said heddles in their opposing extreme upper and lower positions while said beater is disengaged from said heddle-driving gearing or heddle-shaft-driving mechanism. I attain these objects by means of the mechanism illustrated in the accompany-

ing drawings, in which similar numerals of reference designate like parts throughout the several views.

Figure 1 is a broken transverse sectional elevational view of a portion of a loom, showing the heddles and beater thereof and my invention of a heddle-shaft-driving mechanism applied thereto. Fig. 2 is a plan view of the same and showing the beater of the loom removed. Fig. 3 is a broken transverse sectional view similar to that of Fig. 1, but looking in the direction of the arrow *a*. (See Fig. 2.) Fig. 4 is a broken detail of the pawl-carrying swinging arm and its connecting-rod. Fig. 5 is a broken sectional view of the drive-gear of the heddle-operating shaft and the heddle-operating-shaft-bearing block and showing the stud upon which said driving-gear is mounted, and Fig. 6 is a detail view of the latch-case and latch and showing the latch-spring.

The portions marked and designated by the numerals 1 and 2 are broken-off portions of the end frame of a loom, and the cross-beam 3 is situated intermediate the ends of the loom or intermediate the end frames thereof, and said cross-beam 3 is provided for the purpose of supporting the heddle-operating-shaft bearing 4 and the beater-shaft 5, on which the beater 6 is hinged or journaled to swing, as indicated by dotted lines in Fig. 1. It will be noted that the lower portion 6 and the lower reed-carrying rail 7 of the beater are shown in Figs. 1 and 3 of the drawings.

The heddle-operating or crank shaft 8 is adapted to turn in suitable bearings formed in the bearing-block 4 and the end rails of the end beams of the loom, and said shaft 8 is provided with the heddle-cranks 9 and 10, which are connected to their heddles 11 and 12, respectively, by the connecting-rods 13 and 14, and said cranks 9 and 10 are situated on diametrically-opposed sides of said shaft, or at an angle of one hundred and eighty degrees, for the purpose of simultaneously operating said heddles 11 and 12 to move into alternate opposing positions up and down.

A gear-pinion 15 is keyed or otherwise secured on the shaft 8 to turn therewith, and

the said pinion 15 is adapted to mesh with a driving-wheel 16 of suitable diameter. The driving-wheel 16 is mounted on a stud 17 to turn freely thereon, and said stud 17 is securely bolted or otherwise secured in position relatively to said shaft 8 on the bearing-block 4 to secure the proper degree of mesh of the teeth of said wheel 16 with the pinion 15. The driving-wheel 16 is preferably of large diameter relatively to its pinion 15, preferably in the ratio of one to five, and the said gears are thus proportioned for the purpose of positively transmitting or imparting a one-half revolution to said pinion 15 and its shaft 8 for each full single stroke or oscillation of the trip-lever 18.

The pawl-carrying swinging arm 19 is pivotally mounted on the collar 20 of the stud 17 to swing freely thereon, and mounted on said arm 19 is a pawl 21, which is adapted to engage the teeth of said driving-wheel 16 to turn the latter when said pawl-carrying arm 19 is swung in the direction of the arrow, (see Figs. 1 and 3,) but is adapted to be disengaged from the teeth of said wheel when said arm 19 swings or is swung in the opposite direction. A locking-pawl 22 is pivotally mounted on the bearing-block 4 in position thereon to engage the teeth of said driving-wheel 16 to prevent a backward or reverse movement of the latter. A stop-pin 23 is also secured on said bearing-block 4 in position thereon and in the plane of the pawl-carrying arm 19, and the said stop-pin is provided for the purpose of a rest or stop against which said pawl-carrying arm 19 rests when it has moved backward the full extent of its backward stroke or swing. Any suitable spring, as the spring 24, may be employed in connection with said pawl 22 for the purpose of preventing the same from being moved entirely out of engaging position with the teeth of said driving-wheel 16. A similar spring 25 may also be employed in connection with the pawl 21 on the swinging pawl-carrying arm 19 for the same purpose.

A connecting-rod 26 connects the top end of said pawl-carrying arm 19 to the trip-lever 18 at or near the top end of the latter. A trip-lever 18 is mounted on the beater-supporting shaft 5, and on the top end of said lever is secured a latch casing or case 27, in which works a spring-latch 28, which latter is adapted to engage a suitable catch 29, secured to the under side of the rail 7 of the beater 6. The latch-case incloses a latch-spring 30, which operates to return said latch into and maintain same in engaging position. The stem end 31 of said latch 28 is prolonged to project through the bottom end of said latch-casing 27 sufficiently far to be connected to the tripping mechanism, which I will now proceed to describe.

A bell-crank lever 32 is pivotally mounted on the trip-lever 18 at a point intermediate the free or swinging end and the pivotal end

of the latter, and said bell-crank lever has its arm 33 connected to the lower projecting end of the latch-stem 31 by a suitable connecting-rod 34, and the other arm 35 is connected to the trip-rod 36. A trip 37 is secured or bolted to the bearing-block 4, and said trip 37 is provided with a boss 38, through the bore of which extends the threaded end 39 of the trip-rod 36, and said rod is adapted to work freely therein. A trip-nut 40 is secured on said threaded end 38 of said trip-rod and is provided for the purpose of adjusting the length of stroke of the trip-lever 18 to regulate the amount of rotation of the driving-gear 16 to impart the proper degree of rotation to the heddle-operating shaft 8, which is accomplished by setting said nut 40 to contact the hub or boss 38 of the trip 37 at a later or earlier portion of the stroke or swing of the beater 6, according as it is necessary to impart a greater or lesser degree of rotation to said driving-gear to cause a one-half revolution of the pinion 15 and its shaft 8.

A lock or stop 41, having the stop-arms 42, is secured or keyed on the shaft 8 to turn therewith. A locking-lever 43 is pivoted on the bearing-block 4 in position to be directly over and in the same plane as the stop 41, and said lever is provided with a notch or stop 44, which is formed in its bottom edge, and said stop is adapted to engage the stop-arms 42 to lock the shaft 8, simultaneously with which engagement of the said stop-arm 42 the latch 28 is disengaged, provided the operator swings the lay or batten 6 its full extent or swing in one movement. If the operator should swing the lay 6 a fraction of a stroke at one time, then the latch 28 would not disengage its catch 29, but would remain in engagement with it and the entire mechanism would be locked. It is therefore clear that the lay must be swung backwardly its full extent to release the stop-arms 42 and permit a full forward swing of the lay 6. A releasing-cam 45 is formed on the free swinging end of said stop-lever or locking-lever 43, and said cam 45 is of such form or has its face so inclined that when the beater 6 is in the position shown in Fig. 3 the rail 46 of said beater engages said cam 45 to raise said stop 44 out of engagement with the stop-arm 42, so that when the said beater, which is operated manually by the hand of the operator, is started to move or swing outwardly and has moved or swung in a slight degree in the direction of the arrow (see Figs. 1 and 3) the shaft 8 is free to rotate, and immediately said beater 6 has reached the position shown in dotted lines in Fig. 3 the lever 43 is again in position to lock said shaft 8, which result obtains when the shaft has completed its one-half revolution. A stop-pin 47 is provided for the purpose of preventing said lever 43 from dropping too low when released and to form a rest therefor.

The practice of my invention I will now

proceed to describe. Suppose the beater 6 to be in the position indicated in full lines in Figs. 1 and 3—that is, at the beginning of the stroke of said beater—in which position the latch 28 of the trip-lever 18 is in engagement with its catch 29. The trip-lever 18 must therefore swing along with the beater 6 as long as the engagement of the latch 28 with its catch 29 continues. The trip-lever 18 being connected by the connecting-rod 26 to the pawl-carrying arm 19, carrying the pawl 21, the latter arm must swing with said trip-lever 18 to turn the gear-wheel 16 to operate the heddle-operating shaft 8. It will be also noted that when the beater 6 is in the position shown in Figs. 1 and 3 the stop-lever 43 is elevated from its lower position (shown in dotted lines in Fig. 3) by its cam 45 to disengage the notch 44 from the stop-arm 42, and thus permit the free rotation of the said heddle-operating shaft 8, and immediately said beater 6 is moved from its starting position in the direction of the arrow *b* a small fraction of its stroke the rail 47 recedes from the cam 45 and permits the lever 43 to drop into the position shown in dotted lines in Fig. 3, so that the stop-notch 40 will be in position to engage one of the stop-arms 42 before the latter arm has made or completed its one-half revolution, and thereby positively assuring the locking of said heddle-operating shaft 8 at the completion of each of its one-half revolutions. Suppose the beater 6 moving in the direction of the arrow *b* till said beater reaches about half-stroke or mid-position, at which position the trip-nut 40 contacts with the stop 38 to release the trip-lever 18, as shown, which when released immediately swings backwardly, as indicated by the arrow, (see Fig. 3,) to and into its starting and normal position by reason of the force of gravity of the connecting-arm 26 and the pawl-carrying arm 19, the combined weights of which move and maintain said trip-lever 18 to and into its former primary or starting position, together with the parts connected thereto, as the pawl-carrying arm 19, ready to again be engaged by the catch 29 to swing simultaneously with the beater 6. It is clear that after the beater 6 has been released from the trip-lever 18 the former may be operated independently of the latter, provided said beater is not swung forward into its primary or starting position, as shown in full lines in Figs. 1 and 3, at which position the catch 29 of said beater 6 is engaged by the latch 28 of said beater. The beater therefore can be used independently to beat and compact the fabric, being woven when so required, and this operation can be conducted independently of the heddle-operating mechanism and without in any manner disturbing the positions of said heddles, provided said beater is not swung into its forward or primary position, as previously stated.

Having thus fully described this my inven-

tion, what I claim as new and useful, and desire to cover by Letters Patent of the United States therefor, is—

1. In a loom, the combination with the heddles and the heddle-operating shaft thereof, of a trip-lever, a heddle-shaft gear, means connecting said trip-lever and said heddle-shaft gear whereby said heddle-shaft gear is operated to impart motion to said heddle-shaft and means for automatically releasing said trip-lever when the required motion is imparted to said heddle-shaft.

2. In a loom, the combination with the heddles and the heddle-operating shaft thereof, of a swinging trip-lever, a heddle-shaft gear, means connecting said heddle-shaft gear and said trip-lever whereby said heddle-shaft gear is operated to impart one-half of one revolution to said heddle-shaft and means for automatically releasing said trip-lever at each half-revolution of said heddle-shaft.

3. In a loom, the combination with the heddles and the heddle-operating shaft thereof, of a swinging trip-lever, a heddle-shaft gear, means connecting said heddle-shaft gear and said trip-lever whereby said heddle-shaft gear is operated to impart one half-revolution to said heddle-operating shaft, a heddle-shaft stop, and means for automatically releasing said trip-lever at each one-half revolution of said heddle-operating shaft.

4. In a loom, the combination with the heddles and the heddle-operating shaft thereof, of a swinging trip-lever, a heddle-shaft gear, means connecting said heddle-shaft gear and said trip-lever whereby said heddle-shaft gear is operated to impart one half-revolution at a time to said heddle-operating shaft, means for locking said heddle-operating shaft at each half-revolution of same, and means for automatically releasing said trip-lever at each one-half revolution of said heddle-operating shaft.

5. In a loom, the combination with the heddles and the heddle-operating shaft thereof, of a swinging trip-lever, a gear-pinion on said heddle-operating shaft, its drive-wheel, a pawl, a pawl-carrying arm, means connecting said pawl-carrying arm and said trip-lever whereby said pawl is operated to drive said driving-gear to impart one half-revolution to said heddle-operating shaft for each full stroke or swing of said trip-lever, and means for automatically releasing said trip-lever at the required portion of its stroke.

6. In a loom, the combination with the heddles and the heddle-operating shaft thereof, of a swinging trip-lever, a gear-pinion on said heddle-operating shaft, its drive-wheel, a pawl, a pawl-carrying swinging arm, means connecting said pawl-carrying arm and said trip-lever whereby said pawl is operated to rotate said driving-gear to impart one half-revolution to said heddle-operating shaft for each fixed stroke or swing of said trip-lever, means for locking said shaft at the end of each half-

revolution of the latter, means for automatically releasing said trip-lever at the end of its fixed swing and for releasing said heddle-operating shaft at the beginning of the stroke or swing of said trip-lever.

7. In a loom, the combination with the heddles and the heddle-operating shaft thereof, of a swinging trip-lever, a gear-pinion on said heddle-operating shaft, its driving-wheel arranged to rotate in one direction only, a pawl, a pawl-carrying swinging arm, means connecting said pawl-carrying arm and said trip-lever whereby said pawl is operated to drive said driving-gear to impart one half-revolution to said heddle-operating shaft for each fixed stroke or swing of said trip-lever, means for automatically tripping or releasing said trip-lever at the end of the stroke of the same and means for automatically unlocking said heddle-shaft.

8. In a loom, the combination with a loom-beater, heddles, and a revoluble heddle-shaft, of a trip-lever, mechanism connecting said trip-lever to said beater to swing simultaneously therewith, a heddle-shaft gear, means connecting said heddle-shaft gear and said trip-lever whereby said gear is rotated to impart a one-half rotation to said heddle-shaft, means for automatically locking said heddle-shaft at the end of each of its half-revolutions and means for automatically releasing or disengaging said trip-lever and said beater.

9. In a loom, the combination with a loom-beater, heddles and a revoluble heddle-shaft, of a trip-lever, a latch, a latch-catch carried by said beater, a latch-trip whereby said trip-lever is released at a desired portion of the swing of said beater, mechanism for rotating said heddle-shaft and means connecting said heddle-shaft gearing and said trip-lever whereby a one-half revolution is imparted to said heddle-shaft.

10. In a loom, the combination with a loom-beater, heddles, and a revoluble heddle-shaft, of a trip-lever, a latch carried by said lever, a latch-catch carried by said beater, a latch-trip mechanism, means connected to said trip-lever whereby a one-half revolution is imparted to said heddle-shaft, a stop on said heddle-shaft, a stop-lever, means connected to said stop-lever whereby, when the said beater is moved or swung into position to engage said trip-lever, said beater operates to disengage said stop-lever to permit the rotation of said heddle-shaft during the reverse movement or swing of said beater.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ADAM S. HORLACHER.

Witnesses:

THOMPSON R. BELL,
WM. O. MORCK.