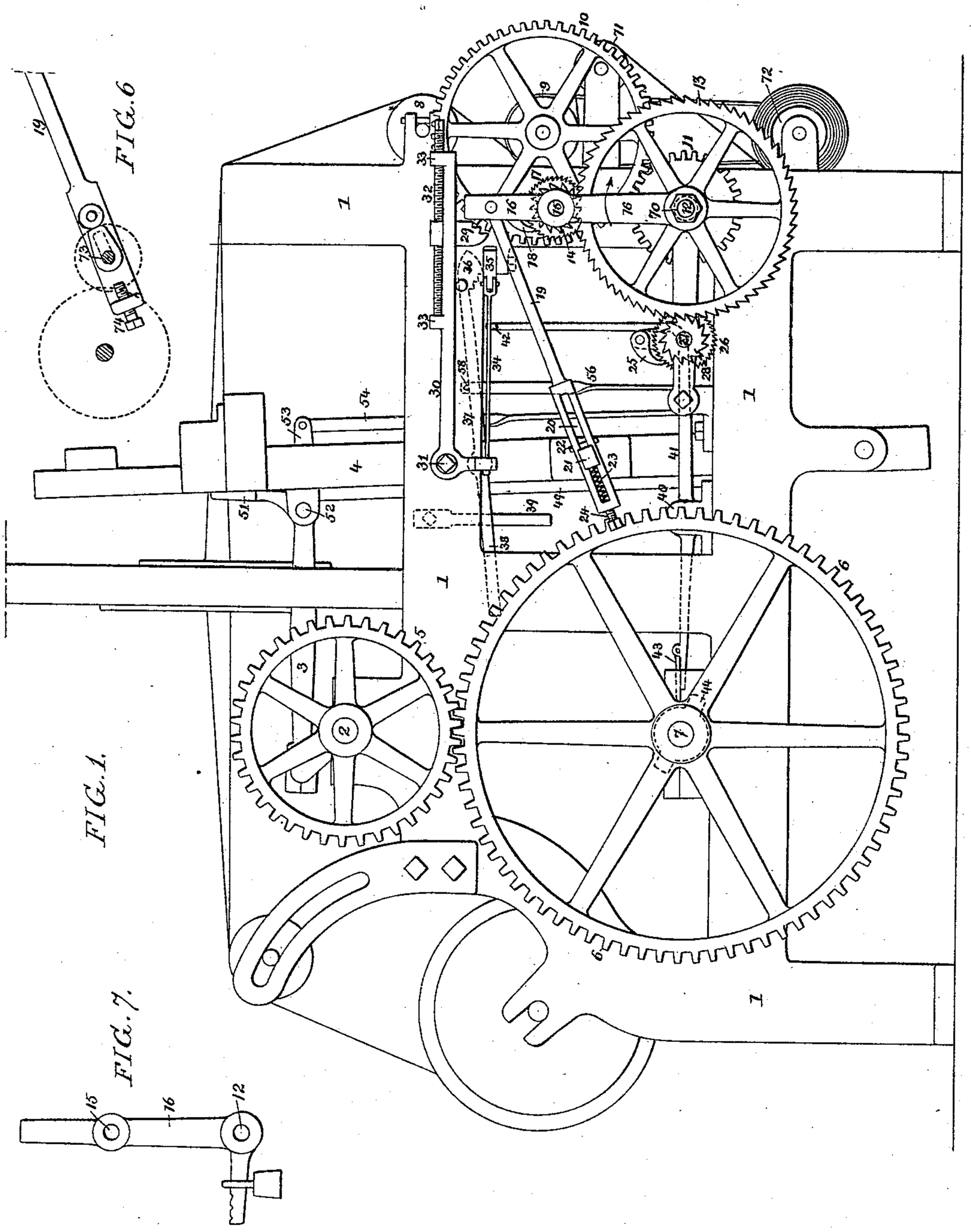
(No Model.) 3 Sheets—Sheet 1.

G. WALSH & J. BOOTHROYD.

TAKE UP MECHANISM FOR LOOMS.

No. 355,902. Patented Jan. 11, 1887.



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Hamilton O. Turner.

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FIG. 2.

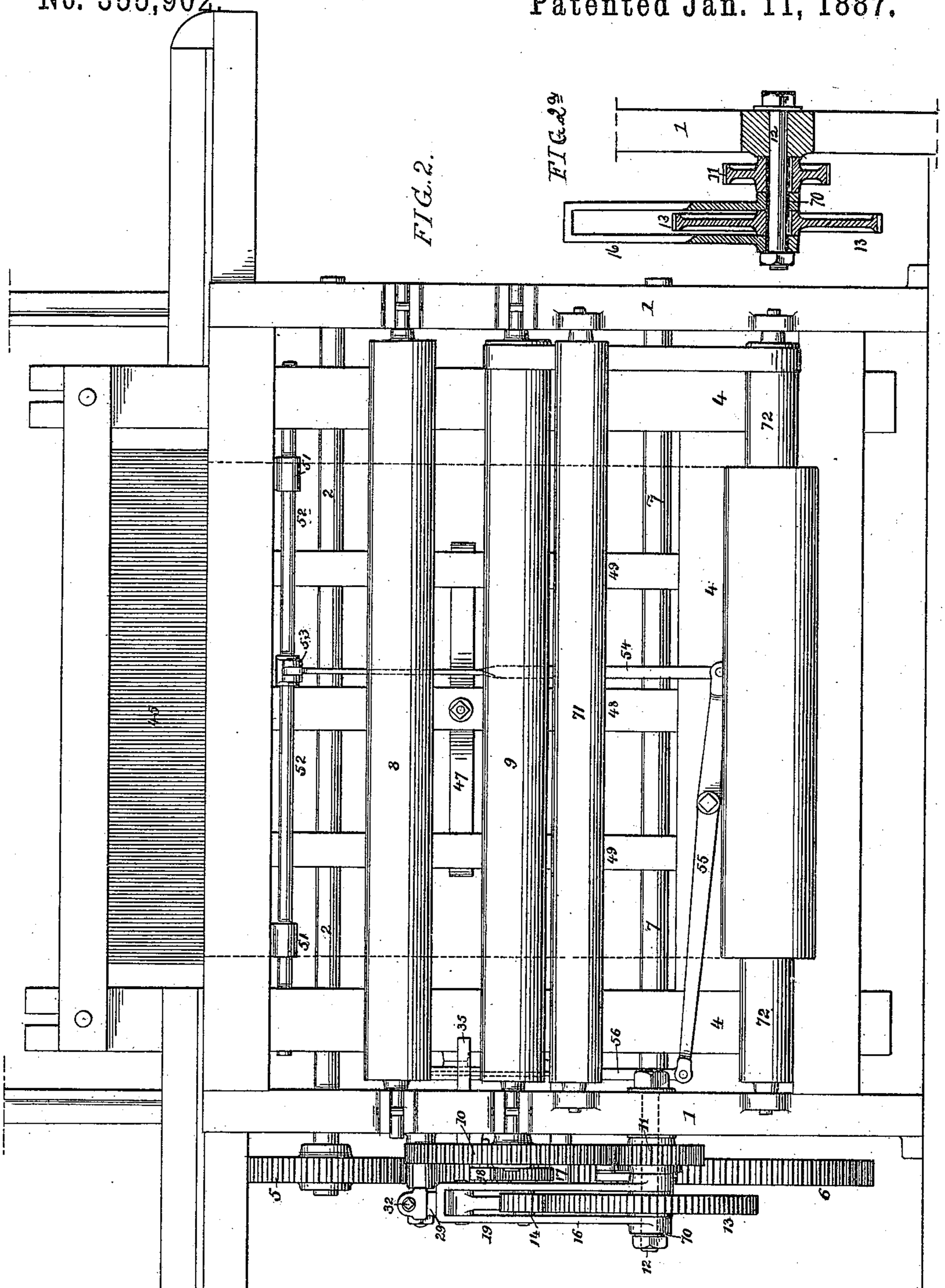

FIG. 2a.

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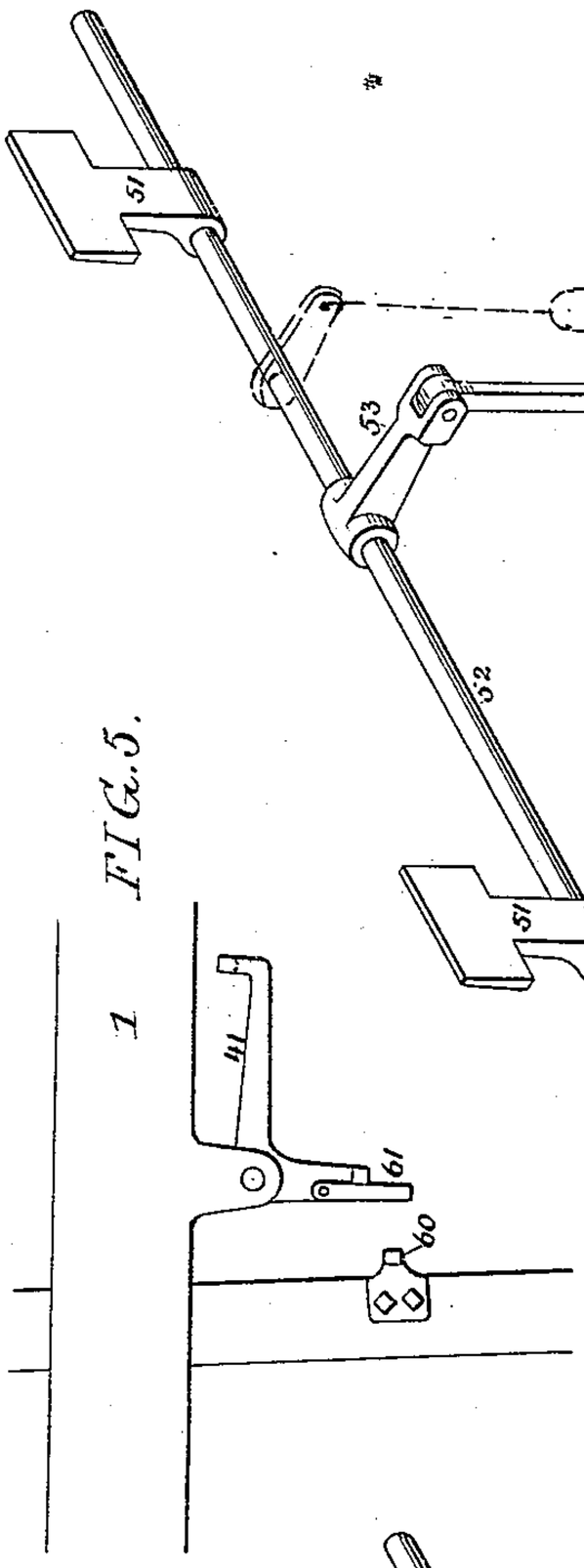

FIG. 1.

FIG. 3.

FIG. 8.

FIG. 5.

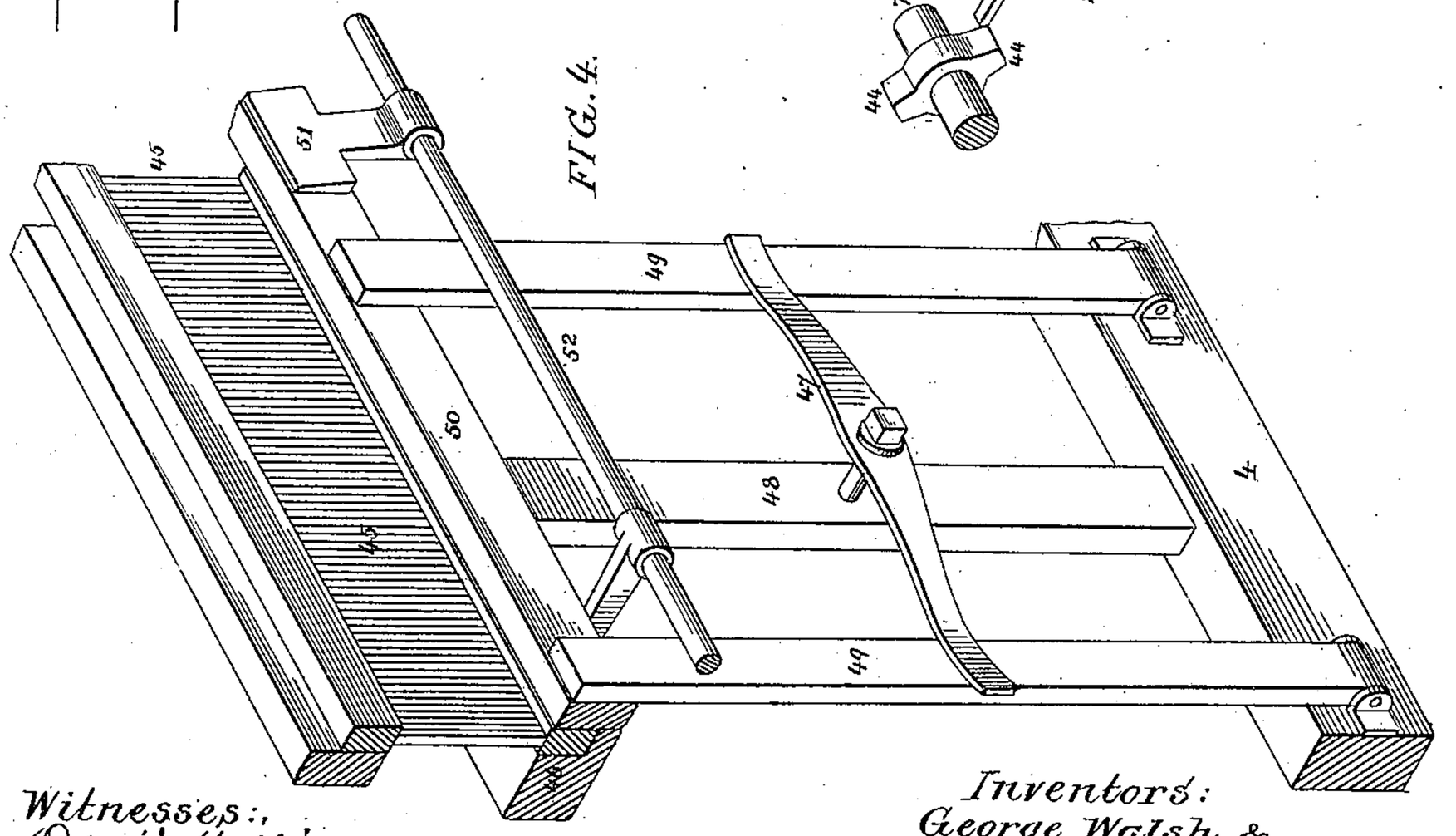

FIG. 4.

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UNITED STATES PATENT OFFICE.

GEORGE WALSH AND JOSEPH BOOTHROYD, OF PHILADELPHIA, PA.

TAKE-UP MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 355,902, dated January 11, 1887.

Application filed January 12, 1886. Serial No. 188,332. (No model.)

To all whom it may concern:

Be it known that we, GEORGE WALSH and JOSEPH BOOTHROYD, both citizens of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Take-Up Mechanism for Looms, of which the following is a specification.

One object of our invention is to so construct the take-up mechanism of a loom as to permit of slight variations in the number of picks to the inch, a further object being to accurately adapt the take-up to the size of the filling when the latter varies in size in different picks, as in the manufacture of rag carpet.

In the accompanying drawings, Figure 1 is a side view of sufficient of a loom to illustrate our improved take-up mechanism; Fig. 2, a front view of the loom; Fig. 2ª, a sectional view of part of the same; Fig. 3, a perspective view of parts of the take-up constituting our invention, these parts being detached from the loom; Fig. 4, a perspective view showing part of a reed and the hanger therefor, and Figs. 5, 6, 7, and 8 views illustrating modifications of parts of our invention.

1 represents part of the usual fixed frame of the loom; 2, the usual crank-shaft, which is connected by rods 3 to the pivoted lathe 4 of the loom, and is geared by a spur-pinion, 5, to a spur-wheel, 6, on the cam-shaft 7 of the loom in the ordinary manner.

The woven fabric passes from the breast-beam round the roller 8, and thence around the take-up roller 9, the shaft of which has a spur-wheel, 10, gearing into a spur-pinion, 11, on a sleeve, 70, which is free to turn on a spindle, 12, secured to and projecting from one of the side frames of the loom, said sleeve carrying a ratchet-wheel, 13. (See Fig. 2ª.) From the take-up roller 9 the fabric passes round a roller, 71, and thence to the cloth-roll 72, which is frictionally driven by means of a belt from the roller 9, as usual, or in any other suitable manner.

With the ratchet-wheel 13 engages a ratchet-pinion, 14, on a shaft, 15, carried by an arm, 16, which is hung to the sleeve 70. On the shaft 15 is a ratchet-wheel, 17, with which engages a pawl, 18, hung to the arm 16, and the upper end of said arm is connected to a rod, 19, the rear end of which has a slot, 20, for the reception of a projection, 21, on the lathe 4 of the loom, this projection on the forward movement of the lathe striking a pin, 22, and on the backward movement acting upon a spring, 23, the tension of which can be regulated by means of a set-screw, 24. While the forward movement of the rod 19 and the arm 16, therefore, is a positive one, due to the contact of the projection 21 and pin 22, the rearward movement of the rod and arm can be arrested at any desired point, owing to the fact that said rearward movement is imparted to the rod through the medium of the spring 23. On the forward movement of the arm—that is to say, the movement in the direction of the arrow, Fig. 1—the ratchet 17 is prevented from turning by the pawl 18, and the pinion 14 is consequently locked in position and compels the wheel 13 to move with it, thereby, through the medium of the gears 10 and 11, imparting movement to the take-up roller 9; but on the backward movement of the arm the wheel 13 is prevented from moving by reason of a pawl, 25, which engages with a ratchet-wheel, 26, on a shaft, 27, having a ratchet-pinion, 28, which engages with said wheel 13; hence, during this backward movement of the arm, the pinion 14 travels on the wheel 13 and is thereby caused to turn the shaft 15, the turning of the pinion and shaft 15 in this direction being permitted by the ratchet-wheel 17 and pawl 18. The amount of take-up on each movement of the lathe, therefore, will depend upon the extent to which the arm 16 is drawn back on each movement of the lathe; hence, by the use of an adjustable stop for limiting this backward movement of the arm, we are enabled to regulate the amount of take-up with great accuracy, and thus vary the number of picks per inch in the fabric, as may be desired. If, for instance, the ratchet-wheel 17 has six times the number of teeth that there are in the pinion 14, variations in the movement of the wheel 13 to the extent of but one-sixth of a tooth (equal to one tooth of the ratchet-wheel 17) will be permitted, this movement of the wheel 13 to the extent of but a fraction of a tooth being held, owing to the use, in connection with the retaining ratchet-pinion 28, of a ratchet-wheel and pawl, similar to the wheel 17 and pawl 18.

Our improved take-up device is distinct from the ordinary take-up device of a loom in which a vibrating lever carries a pawl acting directly on the primary wheel of the train of gearing. In ordinary take-up gear, for instance, the stud 15 would be fixed, and the arm 16, carrying the pawl 18, would be hung thereto. Supposing each movement of the lever to be to the extent of four teeth of the primary gear, an increase or decrease of throw to the extent of a tooth means a large percentage of increase or diminution of take-up, whereas, in our device, a throw of the arm 16 to the extent of, say, four teeth of the wheel 13 would, supposing the proportion of the wheel 17 and pinion 14 to be six to one, represent a movement of the said wheel 17 to the extent of twenty-four teeth, so that a much finer graduation of the movement of the arm is possible than when said arm carries a pawl acting directly upon the primary wheel of the gearing.

The adjustable stop shown in Figs. 1 to 3 of the drawings is in the form of a block, 29, which is guided in a slot in the long arm of a lever, 30, hung to a stud, 31, on the frame 1 of the loom, the upper portion of said block forming a nut for the reception of a screw-stem, 32, which is adapted to bearings 33 on the said lever 30, and is squared or otherwise formed at the outer end for the reception of a suitable wrench or handle, whereby it may be readily turned, in order to adjust the stop-block 29 to different positions. For ordinary weaving—that is to say, weaving in which the filling-threads are all of the same size—this combination of devices is sufficient; but where, as in the weaving of rag carpet, for instance, the filling varies in size in the different picks, it becomes necessary to provide for variations in the extent of take-up corresponding to said variations in the size of the filling. In order to effect this variation in the movement of the take-up, therefore, we recess the stop block 29, so as to form a series of steps thereon, as shown in Figs. 1 and 3, so that if said stop-block is lifted to different heights it will serve to arrest the rearward movement of the arm 16 in different positions. To effect this lifting of the stop-block, we connect the short arm of the lever 30 by means of a rod, 34, to the short arm of a trigger-lever, 35, which is pivoted to a stud on the frame 1, the long arm of said lever 35 projecting into the path of the stepped end 36 of the forward arm of a lever, 37, which is pivoted to the lathe 4 of the loom and swings backward and forward with the latter, the rear arm of the lever being slotted, so as to form two elastic wings, 38, which embrace and fit snugly to a bar, 39, secured to the frame 1 of the loom, this device thus forming a friction-brake, which serves to retain the lever 37 in any position to which it may be adjusted. Other forms of friction-brake for this purpose may, it will be evident, be used in place of that shown, the latter being merely adopted for the sake of convenience.

Hung to a bar, 40, on the frame of the loom is a lever, 41, the long arm of which is bent upward at the front end and terminates in a head, 42, beneath the lever 37, the short arm of the lever projecting rearward and being provided with a pivoted toe, 43, which is acted upon at intervals by cams 44 on the shaft 7, these cams being so timed that as the lathe moves forward the lever 37 will be lifted, and will be allowed to remain in this elevated position during the backward movement of the lathe, the head 36 of the lever in such case clearing the lever 35, so as to impart no movement thereto. If the lever 37, however, is pulled down from the position to which it has been raised by the lever 41, the stepped head 36 of said lever 37 will, upon the rearward movement of the lathe, catch upon the long arm of the lever 35 and move the same to an extent depending upon which of the steps of the head is in engagement therewith, and this is determined by the extent of depression of the lever. In order, therefore, that the movement of the lever 35, and hence of the lever 30 and stop-block 29, may be proportionate to the size of the filling which is being introduced, we make the reed 45 movable forward and backward on the lathe, said reed being, under ordinary circumstances, held up firmly against its front bearing, 46, by the pressure of a spring, 47, which is carried by one of the vertical bars 48 of the lathe and acts upon bars 49, pivoted at their lower ends to the bottom bar of the lathe and bearing at their upper ends against the rear retaining-bar, 50, for the reed. (See Fig. 4.) So long as the filling which is being inserted does not exceed a certain size, the reed will retain its normal position, as shown in Fig. 4, and the levers 35 and 30 will not be moved, the amount of take-up being uniform; but in the event of a thicker filling being introduced, the reed will be pressed backward and will impart movement to arms 51 on a rock-shaft, 52, which is adapted to suitable bearings on the lathe, and has an arm, 53, connected by a rod, 54, to one arm of a lever, 55, hung to the bottom bar of the lathe, the other arm of said lever having a rod, 56, the upper end of which passes through a slot, 57, in the lever 37, the rod above said lever being provided with a projecting pin, 58. It will be seen, therefore, that a depression of the lever 37 will be caused whenever there is an operation of the rock-shaft 52, due to the pressing back of the reed by a thick filling, the extent of depression of said lever 37 being directly proportionate to the extent of rearward movement of the reed, and this in turn being governed by the size of the filling, so that it will be apparent that the extra take-up will be directly proportionate to the extra size of the filling.

The arms 51 of the rock-shaft may be secured to the presser-bar 50, or the shaft may be subjected to tension—as, for instance, by

means of the weighted cord and arm (shown by dotted lines in Fig. 3)—so as to cause said arms to bear firmly against said bars 50 at all times.

If desired, a spur-wheel and pinions may take the place of the ratchet-wheel 13 and ratchet-pinions 14 and 28; but we prefer the construction shown, as it enables us to utilize the ratchet-wheel 13, which forms part of the take-up mechanism of almost every loom.

Various modifications in the minor details of our improved take-up mechanism may be made without departing from the essential features of our invention. For instance, in ordinary looms, the guide for the stop-block 29 may be secured to the fixed frame of the loom instead of forming part of a lever, 30; and where the stepped catch 37 is used, the same may be lifted to its elevated position by other means than the cam on the cam-shaft of the loom. For instance, in Fig. 5 we have shown a modification in which the lever is actuated by a stud, 60, on the lathe, this stud, on the forward movement of the lathe, striking a pendent toe, 61, hung to the lever 41, and imparting movement to said lever until the stud 60 passes beneath the toe, the lever then falling to its original position and the toe swinging backward when it is struck by the stud on the rearward movement of the lathe.

The rod 19 may, if desired, be operated from a cam-shaft, 73, instead of by the lathe, (see, for instance, the modification, Fig. 6;) and instead of using a stop for acting directly on the arm 16, the throw of the latter may be limited by employing a set-screw, 74, upon which the lug 21 of the lathe (or the cam when a cam-shaft is employed) acts in effecting the backward movement of the arm, the adjustment of this set-screw determining the amount of lost movement of the lathe or cam. (See Fig. 6.)

Instead of effecting the retraction of the rod 19 through the medium of a spring, as shown, the weight of the rod may be relied upon to carry it back on the rearward movement of the lathe; but in this case the arm 16 should preferably be inclined to the rear or be provided with a counter-weight, as in Fig. 7, to facilitate this movement.

A frame having lugs adapted to annular grooves 75 in the opposite sides of the wheel 13 may be used, in place of the arm 16, as a carrier for the pinion 14, ratchet-wheel 17, and pawl 18, as shown in Fig. 8, for instance.

In former take-up mechanism of a character similar to ours the movement of the pinion-carrier 16 has been controlled by a lever connected to a rod having a bearing on the roll of cloth on the cloth-beam, the throw of the carrier being gradually decreased as the diameter of the cloth-roll increased, the object being to preserve at all times a uniform take-up. In our device, on the other hand, the adjustable stop is independent of the amount of cloth on the beam, as the main object of our invention is to permit variation in the extent of take-up.

We therefore claim as our invention—

1. The combination, in loom take-up mechanism, of the following elements, namely: first, a take-up roll; second, gearing connected thereto and having as one of its elements a toothed wheel, 13; third, a carrier, 16, having a pinion gearing into said wheel 13, a wheel, 17, connected to but having a greater number of teeth than the pinion, and a retainer for said wheel 17; fourth, mechanism for operating the carrier; fifth, a device, substantially as described, for regulating the extent of movement of the carrier, and, sixth, means, substantially as specified, for adjusting said regulating device, said means being independent of the roll of cloth on the cloth-beam, all substantially as set forth.

2. The combination, in loom take-up mechanism, of the following elements, namely: first, the take-up roll; second, gearing connected thereto and having as one of its elements a toothed wheel, 13; third, a carrier having a driving-pinion gearing into the wheel 13, a wheel, 17, connected to but having a greater number of teeth than said pinion, and a retainer for said wheel 17; fourth, a locking-pinion with similar large wheel and retainer; fifth, mechanism for operating the carrier; sixth, a device, substantially as described, for regulating the extent of movement of the carrier, and, seventh, means, substantially as specified, for adjusting said regulating device, said means being independent of the roll of cloth on the cloth-beam, all substantially as set forth.

3. The combination, in loom take-up mechanism, of the following elements, namely: first, the take-up roll; second, gearing connected thereto and having as one of its elements a toothed wheel, 13; third, a carrier having a pinion gearing into said wheel 13, a wheel, 17, connected to but having a greater number of teeth than said pinion, and a retainer for said wheel 17; fourth, a stop for the carrier; fifth, a carrier-operating device, and, sixth, a spring combined with said carrier-operating device, substantially as described, whereby it serves as the medium through which power is applied to the carrier to move it toward the stop, all substantially as specified.

4. The combination, in loom take-up mechanism, of the following elements, namely: first, a take-up roll; second, gearing connected thereto and having as one of its elements a wheel, 13; third, a carrier having devices whereby it is locked to the wheel during one movement, but released during the reverse movement; fourth, mechanism for operating said carrier; fifth, a stepped stop serving to restrict the movement of the carrier; sixth, a stepped catch; seventh, a lathe having a yielding reed; eighth, a trigger for engaging with the stepped catch; ninth, means, substantially as specified, whereby said trigger is connected to the stepped stop; tenth,

mechanism, substantially as described, whereby the stepped catch is lifted clear of the trigger, and, eleventh, devices, substantially as set forth, whereby the movement of the yielding reed is transmitted to the stepped catch in order to cause its engagement with the trigger, as specified.

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

GEORGE WALSH.
JOSEPH BOOTHROYD.

Witnesses:
WILLIAM F. DAVIS,
HARRY SMITH.