

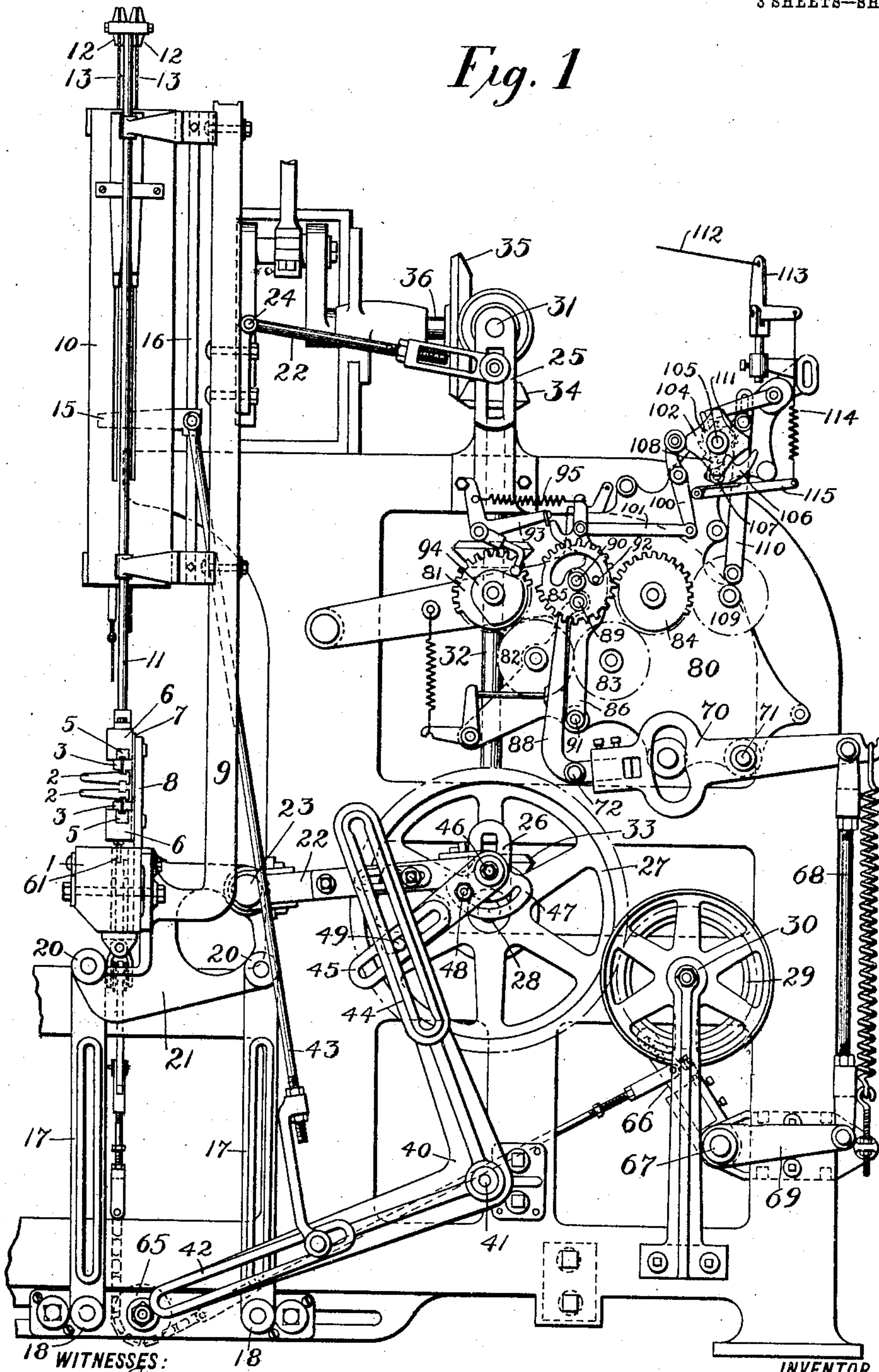
No. 786,237.

PATENTED MAR. 28, 1905.

O. W. SCHAUM.
NARROW WARE LOOM.
APPLICATION FILED OCT. 5, 1903.

3 SHEETS—SHEET 1.

Fig. 1

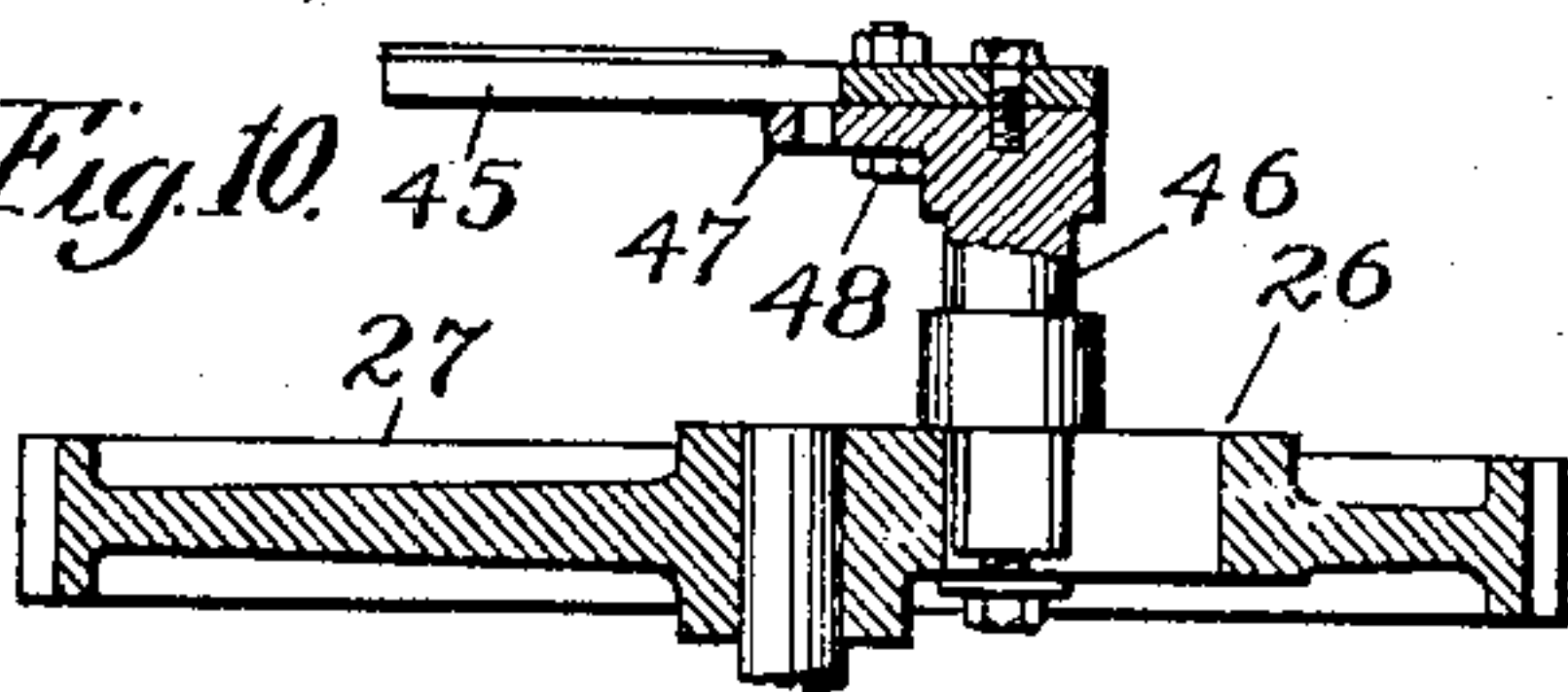


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Fig. 10.



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3 SHEETS—SHEET 2.

Fig. 3

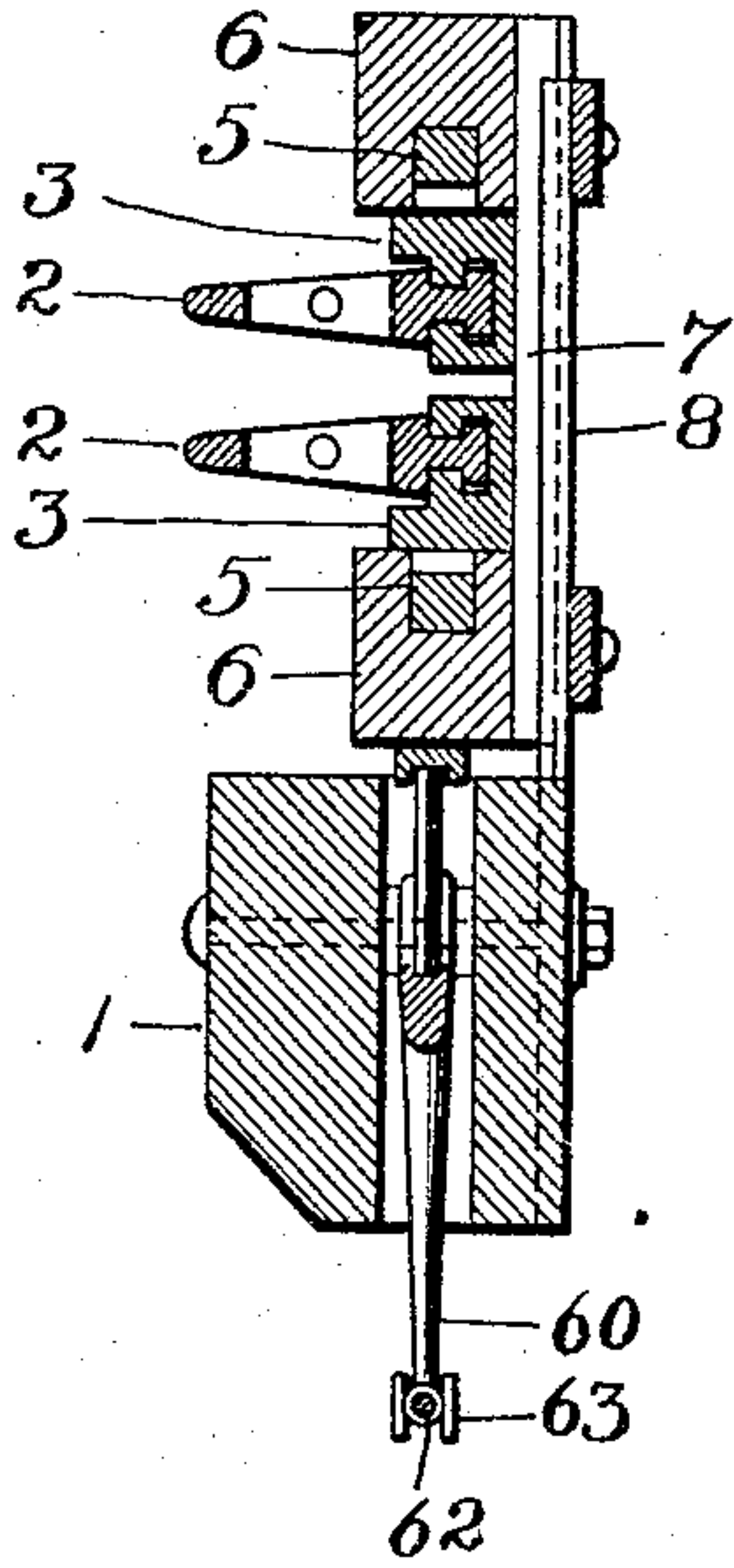


Fig. 2

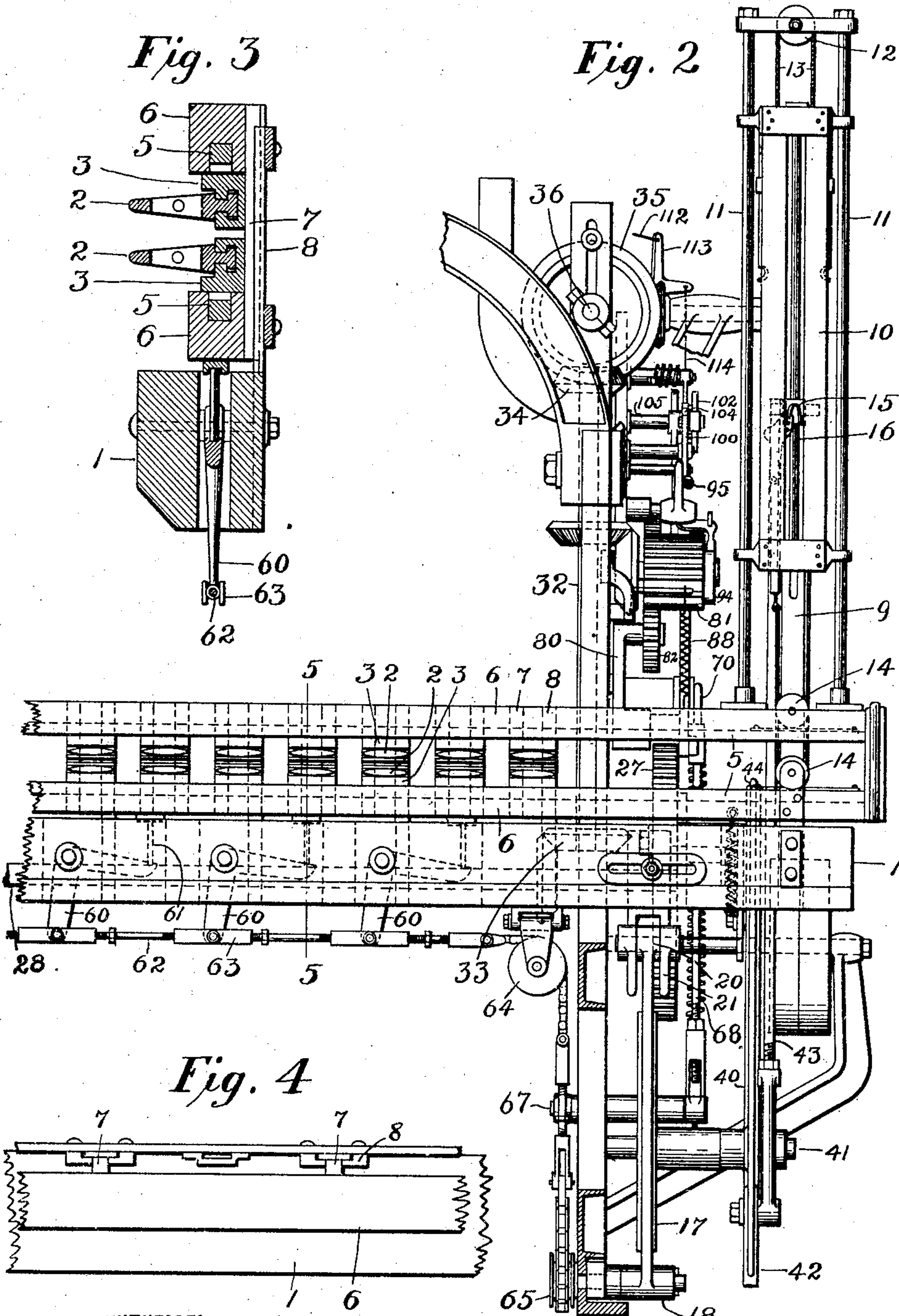
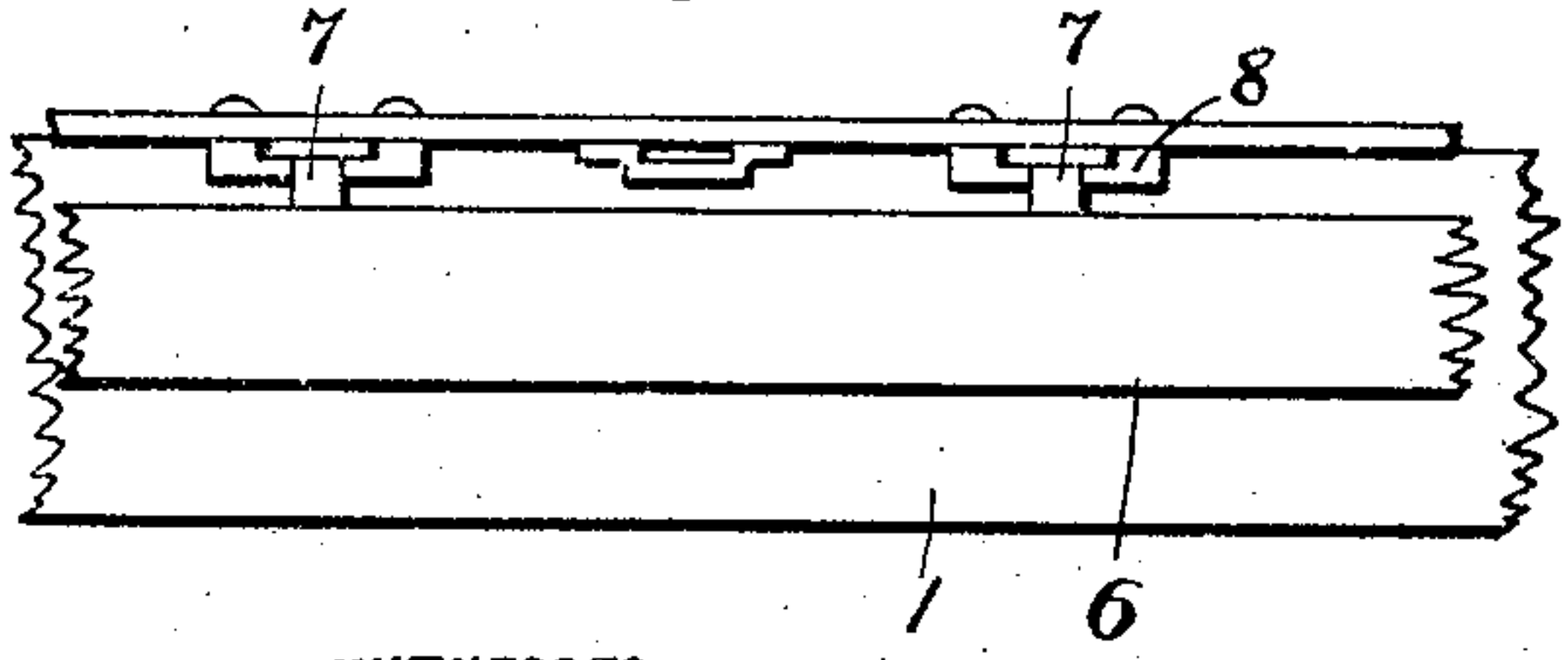


Fig. 4



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3 SHEETS—SHEET 3.

Fig. 5

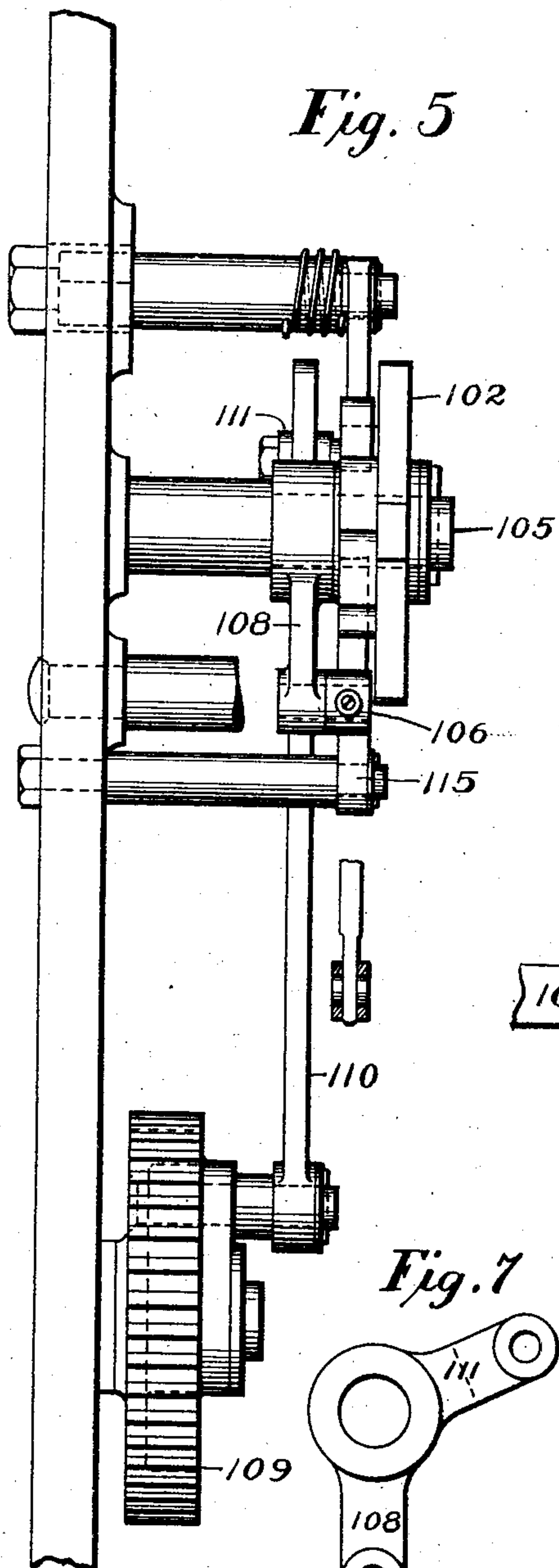


Fig. 6

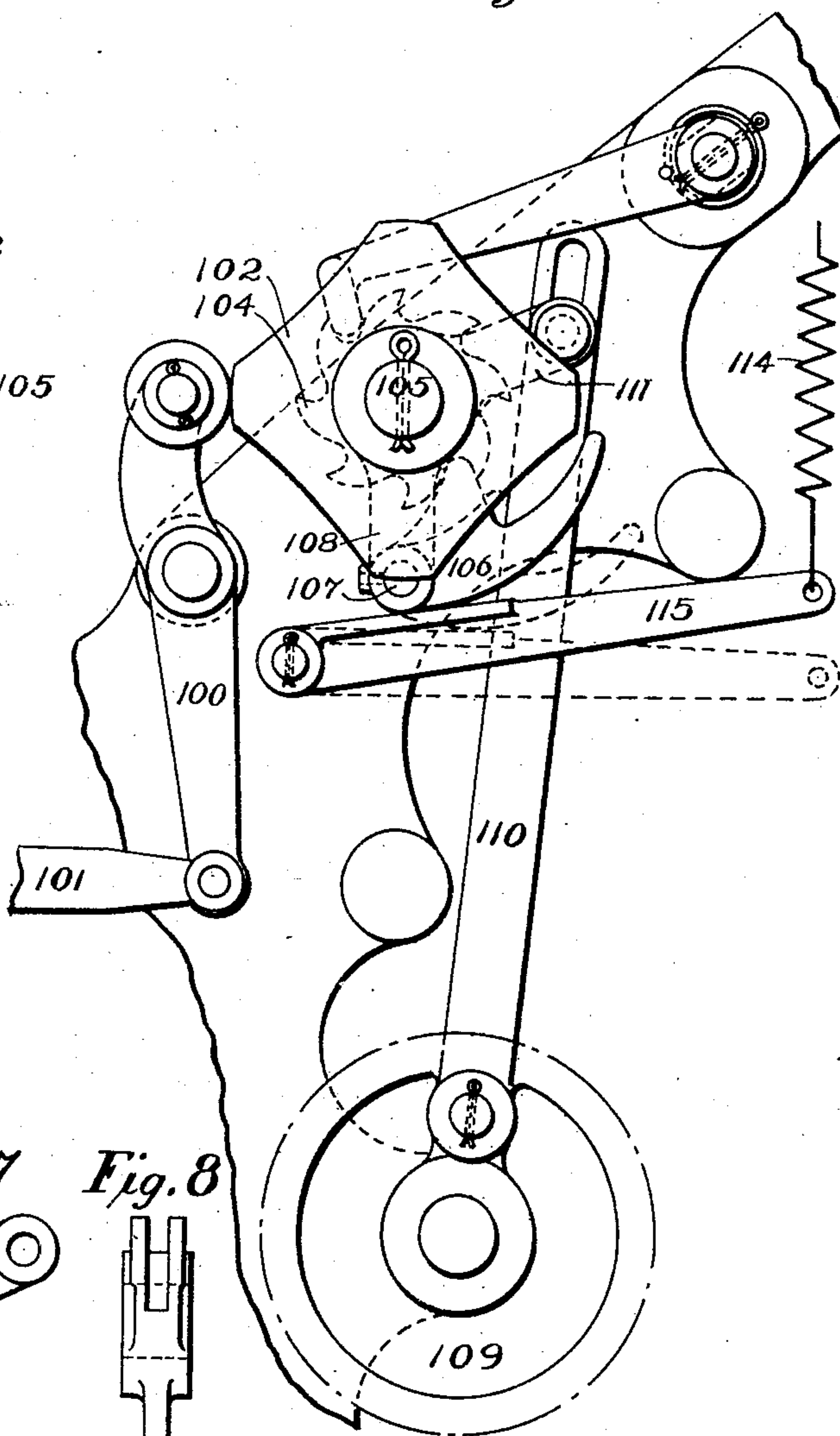


Fig. 7

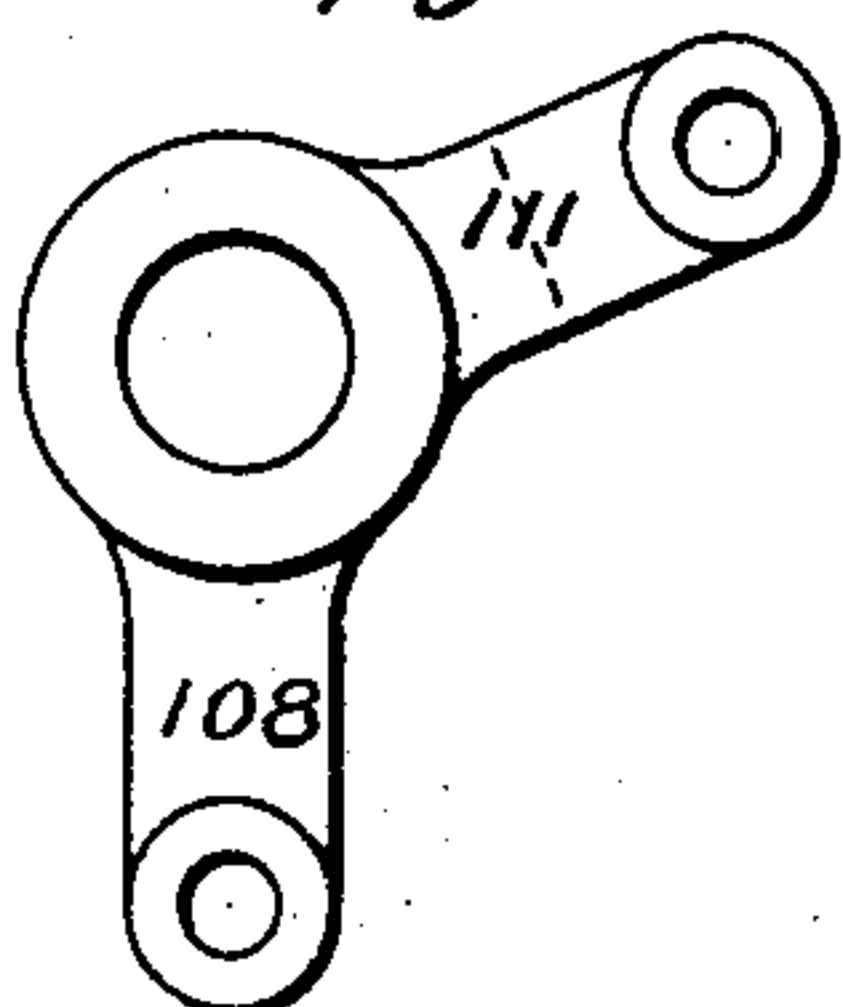
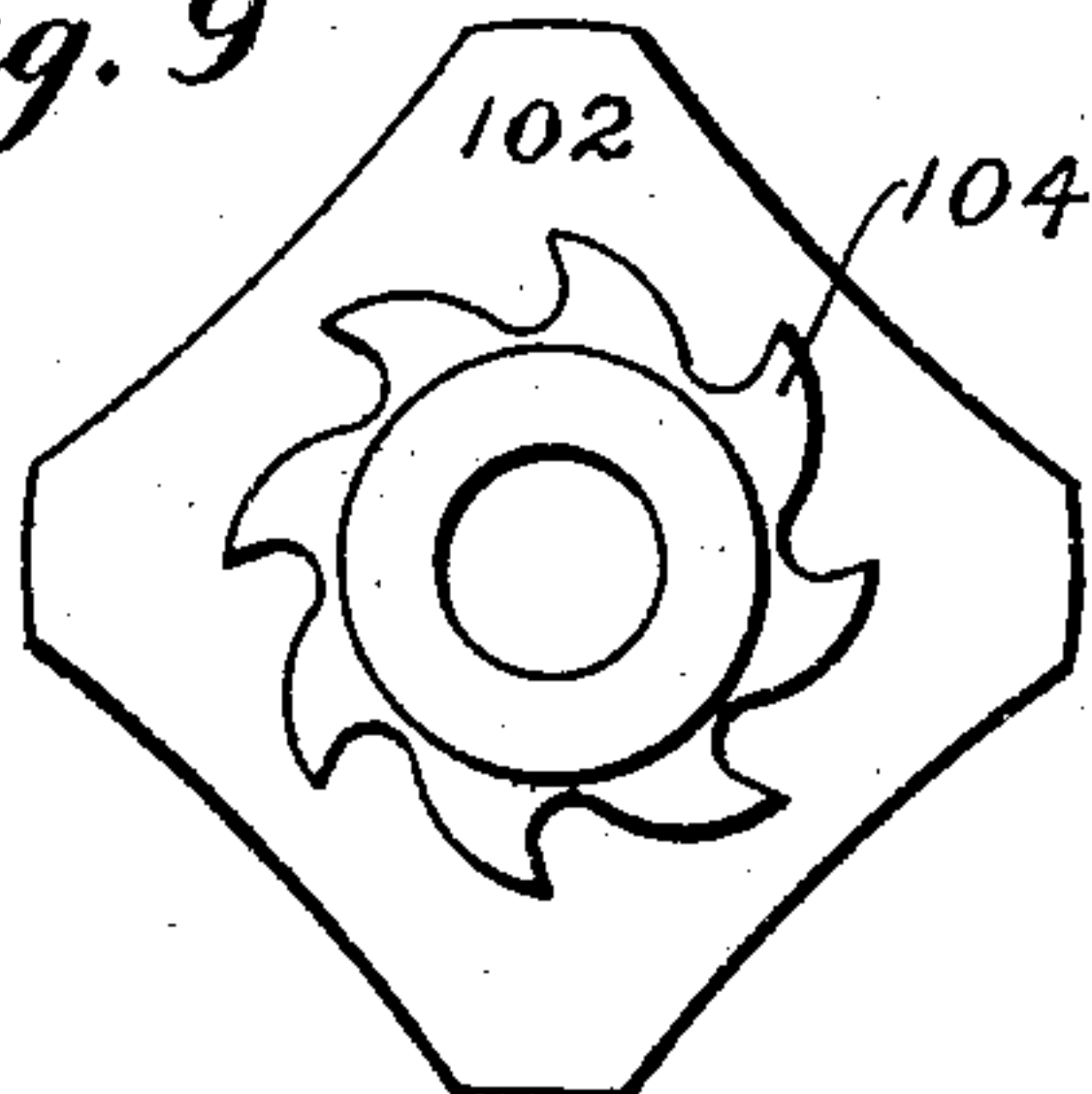


Fig. 8



Fig. 9



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UNITED STATES PATENT OFFICE.

OTTO W. SCHAUM, OF PHILADELPHIA, PENNSYLVANIA.

NARROW-WARE LOOM.

SPECIFICATION forming part of Letters Patent No. 786,237, dated March 28, 1905.

Application filed October 5, 1903. Serial No. 175,779.

To all whom it may concern:

Be it known that I, OTTO W. SCHAUM, a citizen of the United States of America, and a resident of the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Narrow-Ware Looms, of which the following is a specification.

My invention relates particularly to narrow-ware looms employing two or more banks of shuttles; and it consists in the improved mechanisms and their coöperative arrangement for effecting the several movements of the batten, the shuttle-races, and the respective banks of shuttles.

The invention is fully described in connection with the accompanying drawings, illustrating a preferred embodiment of the several mechanisms and their relative arrangement, and the novel features are specifically pointed out in the subjoined claims.

Figure 1 is a side elevation of a loom, showing the several mechanisms coöperatively arranged in connection with the horizontally-movable batten and its attached parts, including the vertically-movable shuttle-carrying beams, with their raceways and the usual marionette or shuttle-operating mechanism for the several banks of shuttles. Fig. 2 is a partial front elevation corresponding with Fig. 1, but drawn to a slightly-enlarged scale; and Fig. 3 is an enlarged cross-sectional view on the line 5 5 of Fig. 2; and Fig. 4 is a partial plan view of the batten and the shuttle-raceway beams thereon. Figs. 5 and 6 are enlarged views showing the indicator or reversing mechanism for controlling the vertical movement of the shuttle-raceways. Figs. 7, 8, 9, and 10 are detail views of several of the parts referred to.

Upon the lathe or batten beam 1 is carried, as shown, two banks of shuttles 2 2, guided, as usual, in properly-spaced ways or races formed by suitable shuttle-carrying blocks 3 3, which blocks are provided, as usual, with pinions engaging the shuttles. These pinions are also arranged in engagement with laterally-slidable racks 5 5, mounted in transverse beams 6 6, the properly-timed move-

ments of each of which racks effect the throwing of the engaging bank of shuttles across the warp-threads extending between the laterally-spaced series of carrying-blocks. These parts and their arrangement and operation may be such as are commonly employed in narrow-ware looms and will therefore be readily understood without more specific description or illustration.

The vertically-spaced transverse beams 6 6, together with the intervening shuttle-carrying blocks 3 3, are rigidly connected by vertical bars 7 7 and are movably secured to rigid upward extensions 8 on the batten-frame, so as to be capable of vertical movement relative to the latter sufficient to bring one or other of the several banks of shuttles into the plane of the sheds formed, as usual, in the warp-threads between the shuttle-carrying blocks.

The batten-beam 1 also carries a rigidly-secured vertically-extending bracket 9, to the upper end of which is fastened, as shown, the usual marionette-frame 10 and shuttle-operating mechanism therein acting upon the shuttle-engaging racks 5 5. Guide-standards 11 11, rising from the rigidly-united beams 6 6, carry at their upper ends, as shown, a pair of pulleys 12 12, over which pass the cords 13 13, by means of which the shuttle-operating racks 5 5 are moved in one direction or the other, said cords passing over lower pulleys 14 14 and being connected with said racks, as usual. These movements are controlled as desired by the vertical movement of the shuttle-carrying beams 6 6 in connection with a cross-head movable device 15, guided on a vertical rod 16 and arranged to engage the usual pivoted fingers on the slide-rods in the marionette-box, to which the cords 13 are attached, as determined by the operating mechanism for said cross-head, which latter mechanism, together with the several mechanisms provided for imparting a horizontal to-and-fro movement to the batten and its connected parts and for effecting the relative vertical movement of the shuttle-carrying beams 6 6, will be fully described. In order that the several move-

ments referred to may be coöperatively effected satisfactorily, I in the first place provide for maintaining the batten 1, together with the relatively movable shuttle-carrying mechanism and the marionette shuttle mechanism mounted thereon, in constant vertical position during the usual to-and-fro movement of the batten. To accomplish this, I mount the latter and the mechanism carried thereby, as shown, upon carrying-links 17 17, adjustably pivoted at their lower ends 18 to the frame of the machine and at their upper ends 20 to the batten-brackets 21, substantially as indicated in Patent No. 497,824, issued to me May 23, 1893, and I impart a parallel to-and-fro movement thereto through approximately horizontal links 22 22, pivoted, respectively, to said batten-brackets 21 at 23 and to the upper portion of the vertical marionette-carrying brackets 9 at 24. These horizontal batten-links 22 are adjustably pivoted at their rearward ends to operating-cranks 25 and 26, respectively, arranged to impart an equal movement to the pivoted forward ends, and thereby provide a steady parallel to-and-fro movement of the batten, with its attached shuttle and elevated marionette mechanisms. The crank 26, to which the lower of said horizontal links 22 is connected, is provided, as shown, in connection with the gear-wheel 27 on the main shaft 28 of the machine, which gear-wheel meshes with a driving-gear 29 on the pulley-shaft 30. The upper crank 25 is carried by a transverse horizontal shaft 31, which is driven by a vertical shaft 32 from the main shaft 28 through suitable bevel-gears 33 and 34 on said vertical shaft, said upper bevel-gear 34, as shown, driving said horizontal crank-shaft 31 through an intermediate bevel-gear 35, secured to a double-crank horizontal shaft 36, which is adapted to operate a suitable overhead jacquard mechanism, substantially as indicated in my prior patent, No. 667,458, issued February 5, 1901.

The automatic operating mechanism for the vertically-movable marionette device 15 comprises, as shown, a bell-crank 40, pivoted at a fixed point 41 and having one of its slotted arms, 42, adjustably connected, through a rod 43, to said device, and its other slotted arm, 44, adjustably connected to a slotted crank-arm 45, which latter is carried by the main-shaft wheel 27 in such manner as to be adjustable to any desired angle upon the crank-pin 46 of said wheel 27 and locked at such angle by means of the relatively fixed quadrant 47 and engaging clamping-bolt 48. This operating mechanism, it will be seen, provides for imparting to the marionette cross-head carried by the horizontally-movable marionette-frame an accurately-adjusted movement, as required, derived from the adjustably-fixed crank-arm 45, the connecting pivot-pin 49 of which is

readily set at any required point relative to the main shaft 28 and carried through the slotted bell-crank connections, as indicated.

The vertical movements of the shuttle-carrying beams 6 6 in my improved construction is effected by means of a bottom lift mechanism, as follows: At different points in the length of the transverse batten 1 I pivot a series of lifting devices in the form of bell-cranks 60, preferably, the approximately horizontal arms of which are connected by suitable links or struts 61 to the lower shuttle-carrying beam 6, so that the turning of said devices shall effect the raising or lowering of the shuttle-carrying beams and attached blocks forming the raceways. This turning movement of the lifting devices is effected uniformly, as shown, by means of a horizontal chain connection 62, preferably formed of suitable links 63, engaging successively the several lifting devices and which, as shown, is carried over a suitably-mounted pulley 64, beneath the batten-beam 1, and thence over a lower pulley 65 on the frame of the loom to a crank-arm 66, fixed to a shaft 67, mounted in said frame, the required rocking movement being transmitted to said shaft 67 from the change-motion above it, the horizontal lever 70 of which is connected by a rod 68 to another crank-arm, 69, fixed to said shaft 67.

The change-motion shown for vertically adjusting the shuttle-races through the bottom lift mechanism described is somewhat similar to mechanisms heretofore employed in loom construction, but is novel in the improved relative arrangement of the parts, as well as in certain details, which, with the co-operating indicator mechanism shown, constitutes, specifically, the subject-matter of a separate application. The motion is transmitted to the bell-cranks 60, mounted on the batten 1, through the horizontal lever 70, already referred to. This lever and the connected change-motion is adapted, as shown in the drawings, for two banks of shuttles, though capable of being modified without material change, so far as my invention is concerned, to operate a four-bank construction, as heretofore. The lever 70 is pivoted at 71 to the frame 80, which carries the change-motion, and its inner end is pivoted at 72 to a vertical crank-rod 88, the upper end of which is eccentrically connected at 89 to the vibrator crank-gear 85. This crank-gear is carried at 90 by a vertical vibrator-lever 86, the lower end of which is pivoted to the frame 80 at a point 91, located approximately in a vertical tangent to the arc in which the pivotal connection 72 of lever 70 swings and as near as convenient to this pivotal connection on which the crank-rod 88 turns, the effect of this arrangement being that this crank-rod and the carrying-arm 86 for the crank-gear are at all times approxi-

mately vertical and held practically in balance and that their crank-gear connections are swung equally by the shifting of the crank-gear, as heretofore described, thereby
 5 avoiding any movement of the lever 70 by such shifting of the crank-gear. The crank-gear 85 is, as usual, arranged to be rotated about a half-turn in opposite directions to effect the required movement of the horizontal lever 70, this being accomplished by
 10 means of a semicircular series of meshing gears 81, 82, 83, and 84, grouped around said crank-gear, which latter is arranged to be swung laterally into engagement with one or
 15 other of the end gears 81 or 84 of said semicircular series. These end gears, as well as the crank-gear 85, are properly mutilated, as usual, in their engaging parts, so as to insure proper meshing for the required semirotation of said crank-gear in opposite directions
 20 by the respective end gears, a stop 92 being provided on the carrying-arm 86 to positively limit such rotation and the gears 81 or 84 being freely rotatable during the interval between the lateral shifting of the swinging arm 86 and its attached crank-gear. A
 25 stop-lever 93 is swung by a spring 95 and by a cam 94 on gear 81 into or out of engagement with the carrying-lever 86 to retain the crank-gear 85 in proper engagement with gear 84 until it is desired to swing it laterally, as described. This shifting of the crank-gear 85 to effect the required vertical movement of the shuttle-races is in my improved construction effected by a novel indicator mechanism,
 30 the operation of which is regulated by the jacquard in harmony with the shedding mechanism and the shuttle movements described without throwing the actual work of shifting upon the jacquard-pattern and with a simplifying of the latter and of the general operation. This indicator mechanism comprises, as shown, a rocking lever 100, connected by
 35 a link 101 to the vibrator crank-gear lever 86, and a star-shaped cam 102, arranged to engage said lever and in connection with the spring 95, attached to said vibrator-lever, as shown, operate the latter. This cam, which is provided with a concentric ratchet-wheel
 40 104, is mounted on a shaft 105 and is intermittently rotated by means of a pawl 106, pivoted at 107 to one arm of a pawl-carrying lever 108, pivotally mounted on said shaft 105 and regularly oscillated thereon by means
 45 of a crank-gear 109, meshing, as shown, with the end gear 84 of the change-motion and adjustably connected by a crank-rod 110 to an arm 111 of said pawl-carrying lever. The engagement of the pawl 106 with the ratchet-wheel 104 of the cam will cause the latter to be turned one-eighth of a revolution, as shown, for each oscillation of the pawl-carrying lever, the ratchet-wheel being provided with eight teeth corresponding with the alternate projections and recesses on the periphery of the cam, while the disengagement of said pawl makes the oscillations of the lever inoperative. Thus the mere movement of the pawl into or out of engagement at proper times will control the movement of
 50 the cam and its connections to the carrying-arm 86 of the change-motion, the actual operation of which is, however, effected by the power mechanism of the loom through crank-gear 109. The jacquard mechanism is thus
 55 required only to operate the pawl 106, as required, and this is accomplished, as shown, by connecting the wire 112 therefrom to one arm of a bell-crank 113, the other arm of which had a yielding connection 114 to a
 60 pawl-engaging lever 115, upon which said pawl 106 is supported, so as to be moved into engagement with the cam ratchet-wheel 104 or lowered out of engagement therewith by the pull upon or release of the jacquard wire
 65 or spring 112.

It will be noticed that the pawl 106 when moved into or out of engagement with the ratchet-wheel 104 may be retained in either position during as many picks of the loom as
 70 desired, thus permitting an indicating weaving operation to continue until a change is required and dispensing with a great number of the perforations in the indicator movements heretofore made thereby.

In the operation of my improved loom the batten-beam, together with the shuttle-races and the marionette or shuttle operating mechanism carried thereby, are moved equally
 75 in a horizontal direction, so as to at all times maintain a vertical position, the shuttle-races being at the same time automatically adjusted by my improved bottom lift mechanism and the shuttles operated in the races at proper times during such parallel joint movement of the parts, as has been heretofore
 80 fully described.

Modifications of the preferred construction shown may be readily devised without departing from the spirit of my invention.

I claim—

1. In a narrow-ware loom having two or more banks of shuttles the combination with the batten and shuttle-races vertically movable thereon of a longitudinally-movable
 85 chain connection arranged parallel with the batten and operatively connected at intervals with said shuttle-races.

2. In a narrow-ware loom having two or more banks of shuttles the combination with the batten and shuttle-races vertically movable thereon of a bottom lift mechanism for said races comprising a series of lifting devices pivoted at intervals to the batten and connected to said races and a properly-timed
 90 operating mechanism for said lifting devices.

3. In a narrow-ware loom having two or more banks of shuttles the combination with the batten and shuttle-races vertically movable thereon, of a bottom lift mechanism for
 95

said races comprising a series of lifting devices pivoted at intervals to the batten and operatively connected to said races a chain connection arranged parallel with the batten
5 and engaging each of said devices, and a change-motion for operating said chain connection.

4. In a narrow-ware loom having two or more banks of shuttles the combination with
10 the batten, shuttle-races with shuttles therein adjustably mounted thereon, and a bracket secured thereto, and carrying a shuttle-operating mechanism, of a parallel-motion mechanism for reciprocating the batten and at-
15 tached parts.

5. In a narrow-ware loom having two or more banks of shuttles the combination with the batten, shuttle-races with shuttles therein adjustably mounted thereon, and a vertical
20 bracket secured thereto and carrying a shuttle-operating mechanism, of a parallel-motion mechanism for reciprocating the batten and attached parts comprising a supporting means for the batten, and top and
25 bottom crank connections to the latter co-operatively driven through a vertical shaft.

6. In a narrow-ware loom having two or more banks of shuttles the combination with

the batten, shuttle-races with shuttles therein adjustably mounted thereon, and a vertical bracket secured thereto, and carrying a shuttle-operating mechanism, and a movable
30 device engaging the same, of a parallel-motion mechanism for reciprocating the batten and attached parts, and an adjustable crank
35 mechanism comprising an intermediate bell-crank connected to said movable device.

7. In a narrow-ware loom having two or more banks of shuttles the combination with the batten, shuttle-races with shuttles therein
40 adjustably mounted thereon, and a vertical bracket secured thereto, and carrying a shuttle-operating mechanism, of a parallel-motion mechanism for reciprocating the batten and attached parts, a crank mechanism
45 arranged to operate said shuttle-operating mechanism and a change-motion for adjusting the shuttle-races, all coöperatively arranged.

Signed at Philadelphia this 30th day of
September, 1903.

OTTO W. SCHAUM.

Witnesses:

B. G. ELLIOTT,
L. M. LENTZ.