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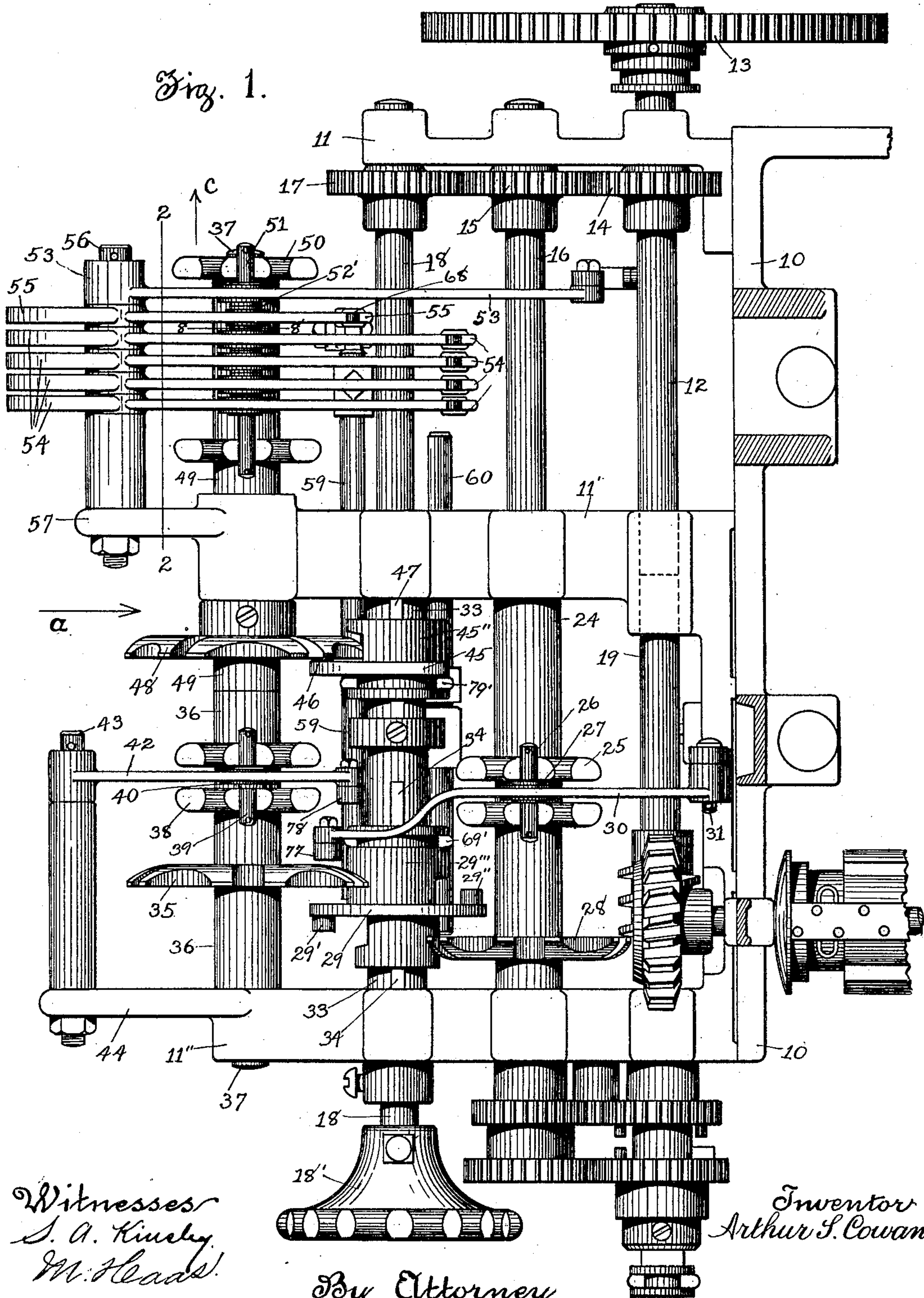
Patented Apr. 29, 1902.

A. S. COWAN.
PATTERN MECHANISM FOR LOOMS.

(Application filed Oct. 31, 1901.)

(No Model.)

4 Sheets—Sheet 1.



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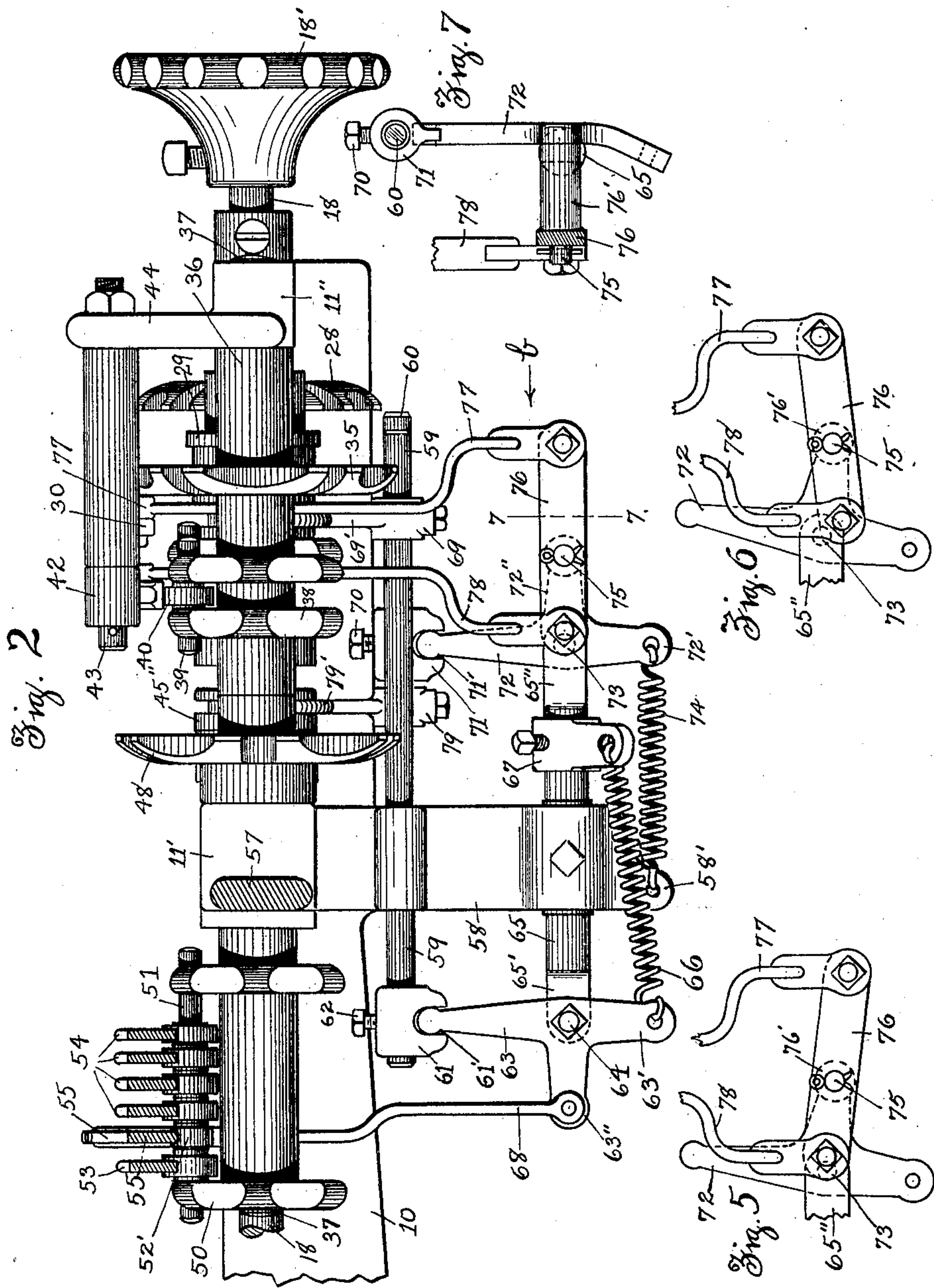
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Fig. 3

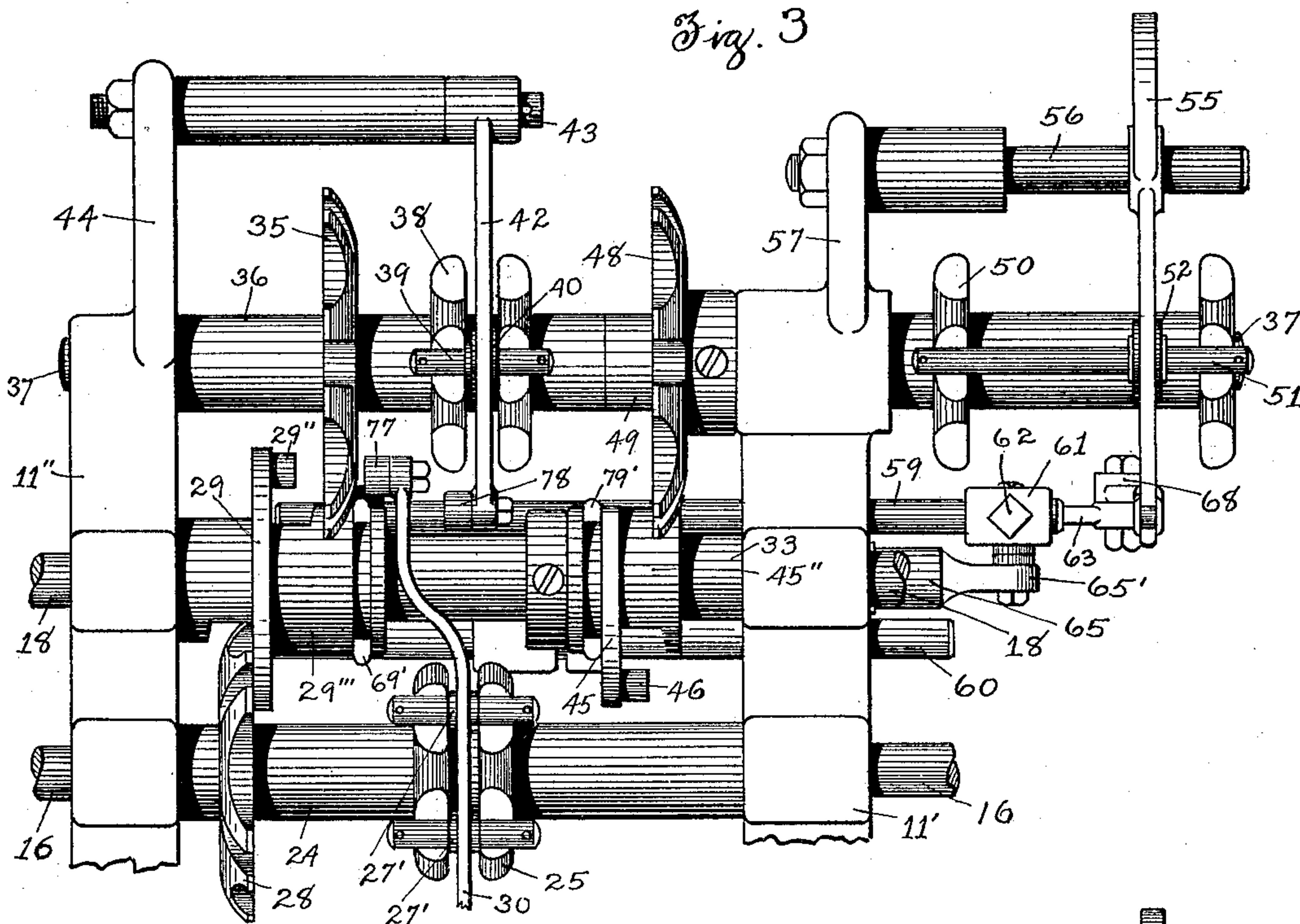
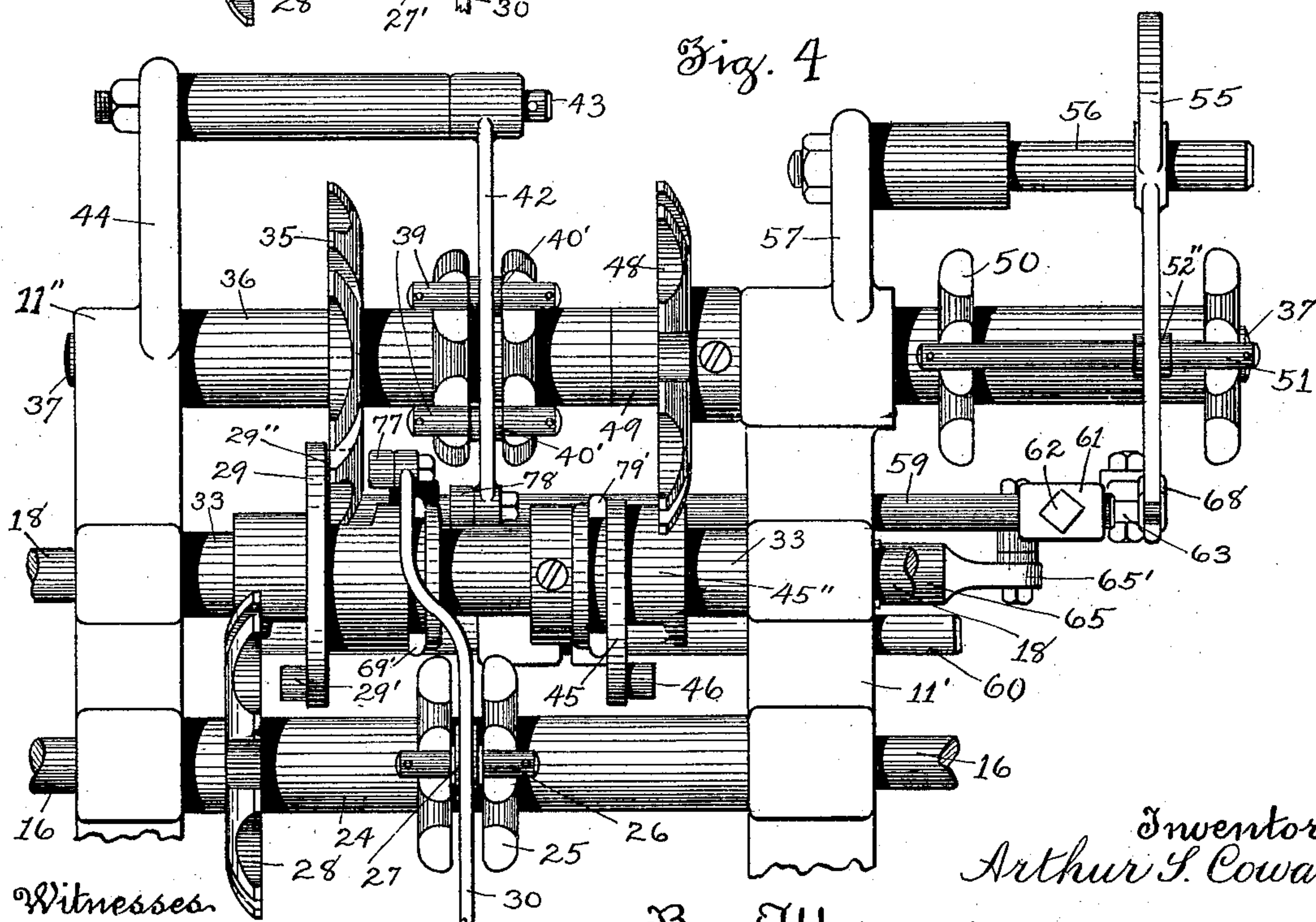


Fig. 4



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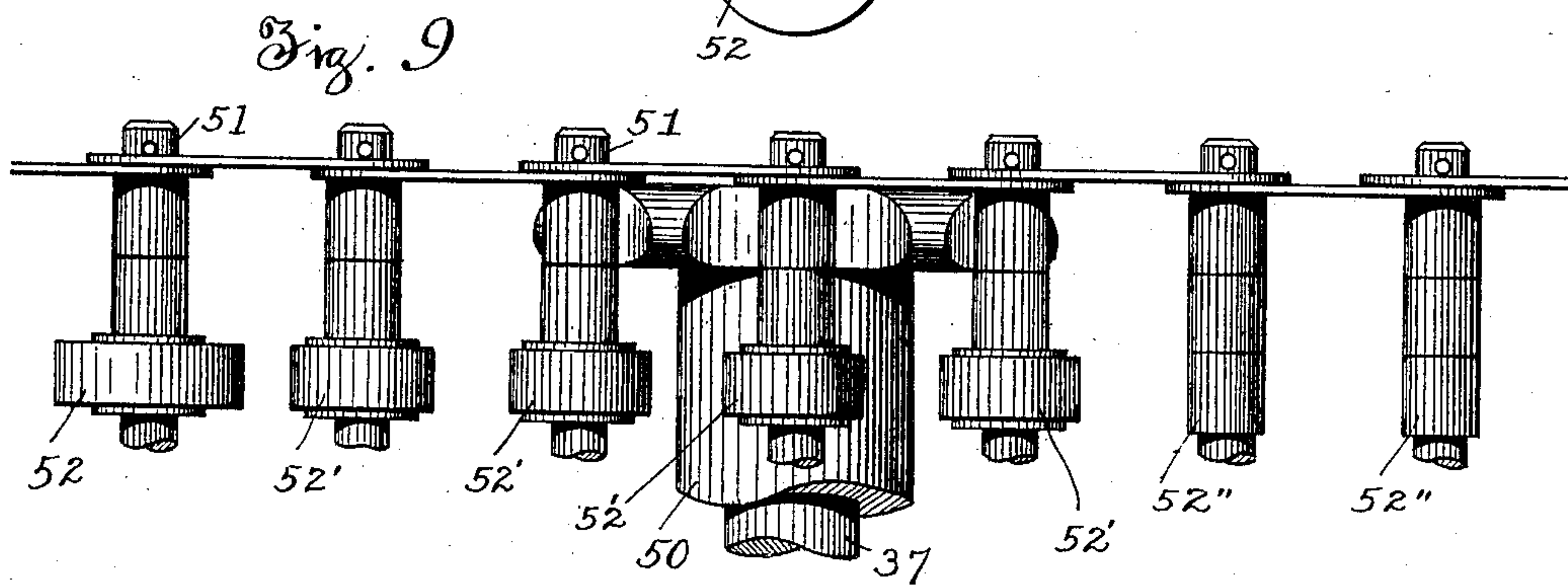
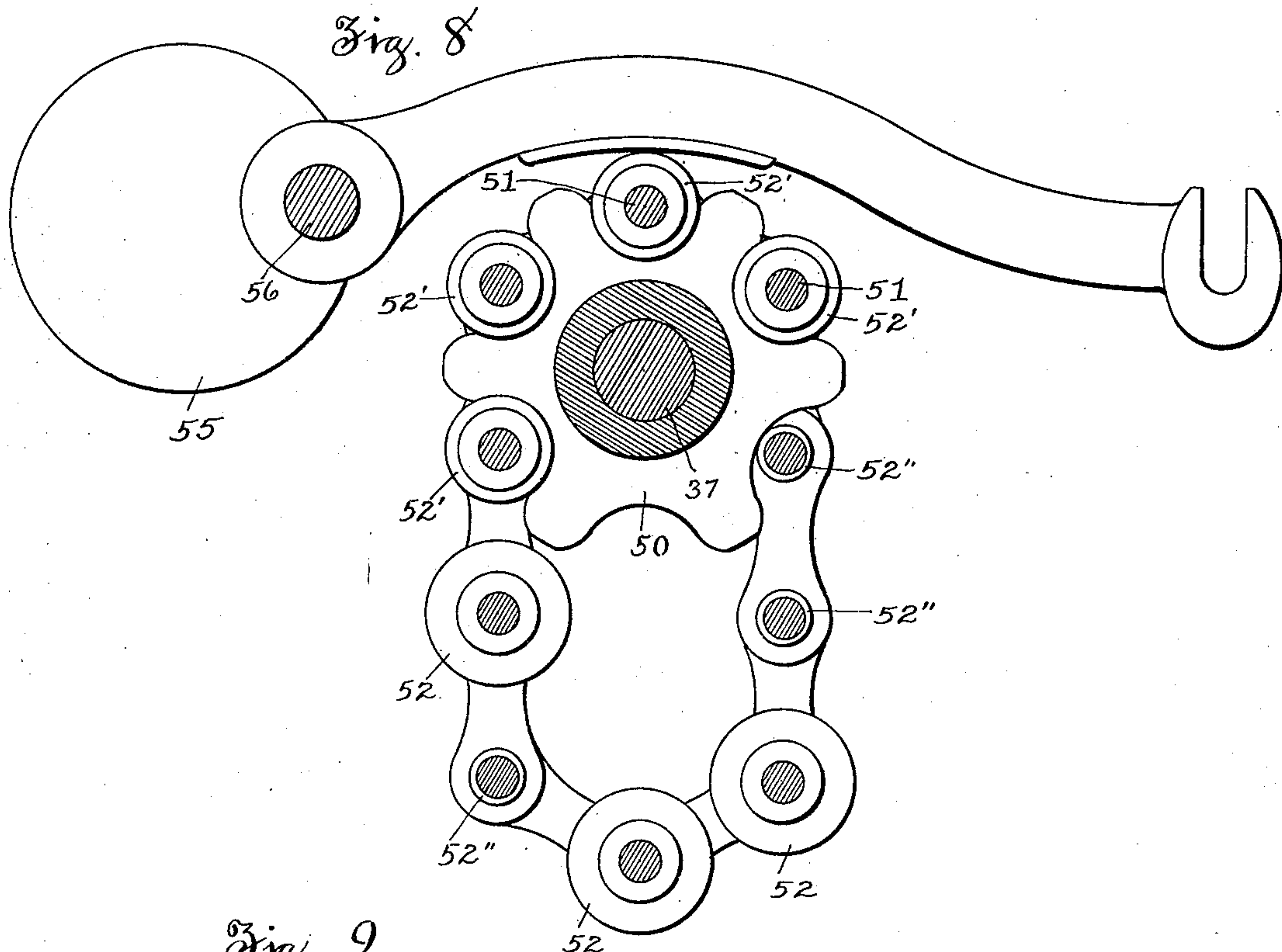
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UNITED STATES PATENT OFFICE.

ARTHUR S. COWAN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

PATTERN MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 699,104, dated April 29, 1902.

Application filed October 31, 1901. Serial No. 80,652. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR S. COWAN, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Pattern Mechanism for Looms, of which the following is a specification.

My invention relates to looms, and particularly to the pattern mechanism of that class of looms in which, in connection with the drop-box-pattern chain mechanism, an auxiliary or multiplier pattern chain mechanism is used, by means of which certain bars of the box-pattern chain are repeated, as desired. This class of looms is now well known, and I will particularly refer to United States Letters Patents No. 413,369, of October 22, 1889, No. 582,924, of May 18, 1897, and No. 620,861, of March 7, 1899, which show and describe the pattern mechanism referred to and with which my present improvements may be combined.

The object of my invention is to provide in this class of looms an additional multiplier-pattern chain mechanism, combined with the ordinary drop-box-pattern chain mechanism and the ordinary multiplier-pattern chain mechanism, by means of which a shorter box-pattern chain may be used than is the case when only one multiplier-pattern chain mechanism is used.

My invention consists in certain novel features of construction of my improvements, as will be hereinafter fully described.

I have shown in the drawings my improvements combined with the pattern mechanisms shown in the drawings of Patents No. 582,924 and No. 620,861, above referred to, and particularly shown in Fig. 1 of Patent No. 620,861.

Referring to the drawings, Figure 1 is a plan view of the pattern mechanisms and other parts corresponding to Fig. 1 of Patent No. 620,861 with my improvements applied thereto. Fig. 2 is a sectional side view of some of the parts shown in Fig. 1, taken at a point indicated by line 2 2, Fig. 1, looking in the direction of arrow *a*. Fig. 3 is a detached plan view of the drop-box-pattern chain mechanism and the two multiplier-pattern chain

mechanisms shown in Fig. 1 with some of the parts in a different position. Fig. 4 corresponds to Fig. 3, but shows some of the parts in a different position. Fig. 5 shows a detached view of the compound lever shown in Fig. 2, showing the lever in a different position. Fig. 6 corresponds to Fig. 5, but shows the compound lever in a different position. Fig. 7 is a section on line 7 7, Fig. 2, looking in the direction of arrow *b*, same figure, showing an edge view to illustrate the arrangement of the parts of the compound lever. Fig. 8 is a section through the drop-box-pattern chain and barrel, taken at a point indicated by line 8 8, Fig. 1, looking in the direction of arrow *c*, showing the complete chain made up of bars, connecting-links, and different-sized rolls and tubes, which are not shown in Fig. 1, and the indicator-lever extending over said chain; and Fig. 9 shows a plan view of the chain shown in Fig. 8 extended.

It is not necessary to describe the dobby-pattern chain mechanism (shown in Fig. 1) or the mechanism for operating the same from the drop-box-pattern chain, as the same form no part of my present invention and are fully shown and described in Patent No. 620,861, above referred to.

It is only necessary to describe herein my improvements above referred to.

In the accompanying drawings, 10 is a portion of the dobby-frame supported on the upper end of the loom side or frame. (Not shown.) To the dobby-frame 10 are secured the bracket 11 and the frame 11' 11'', which support the drop-box-pattern chain mechanism, and two multiplier-pattern chain mechanisms and the operating-shafts and other parts.

The driving-shaft 12 has a gear 13 loose thereon, but which may be clutched thereto by any ordinary clutch mechanism (not shown) to rotate said shaft. The gear 13 is driven by a system of gears (not shown) on some driven part of the loom. The shaft 12 also has a gear 14 thereon, which meshes with a gear 15, fast on a shaft 16. The gear 15 also meshes with a gear 17, fast on a shaft 18, which has at

its other end a hand-wheel 18'. A shaft 19 is in alinement with the shaft 12, and at the ends of the shafts 19 and 16 is a system of gears for moving in a forward or reverse direction the
5 dobby-pattern chain, as fully described in Patent No. 620,861, before referred to.

On the shaft 16, which is rotated when the driving-shaft 12 is in operation, is loosely mounted a sleeve 24, having fast thereon my
10 additional multiplier-pattern chain-cylinder 25, carrying a pattern-chain made up of bars carrying rolls and tubes and connected by links in the usual way.

In Figs. 1 and 4 only one bar 26, with a roll
15 27 thereon, is shown on the cylinder 25, and in Fig. 3 two bars, each with a tube 27' thereon, are shown on said cylinder 25. Also fast on the sleeve 24 is a star-wheel 28, which is operated to revolve the sleeve 24 and the mul-
20 tiplier-pattern chain-cylinder 25 by the pin-wheel 29, provided with oppositely-extending pins 29' and 29'', one of which 29' when the pin-wheel 29 is moved into the proper position engages the star-wheel 28, as shown in
25 Fig. 3, to operate the pattern chain-cylinder 25.

An indicator-lever 30, pivoted at one end on a stud 31, extends over the pattern-chain on the multiplier-pattern chain-cylinder 25, and the movement of said lever is governed
30 by the pattern-surfaces on said chain. To the outer free end of said indicator-lever 30 is attached a connector 77 to a lever, to be hereinafter described.

The shaft 18, which is revolved when the driving-shaft is in operation, has a sleeve 33
35 fast thereon, on which is a spline 34. On the sleeve 33 is mounted the hub 29''' of the pin-wheel 29, above referred to. Said pin-wheel 29 revolves with the shaft 18 and sleeve 33 through engagement with the spline 34 on
40 said sleeve 33, but may be moved in the direction of the length of the sleeve 33 and shaft 18 to cause the pin-wheel 29 to be moved into and out of engagement with the star-wheel
45 28 and also into and out of engagement with a second star-wheel 35, fast on a sleeve 36, loose on the shaft 37 of the drop-box-pattern chain mechanism. Also fast on the sleeve 36
50 is the ordinary multiplier-pattern chain-cylinder 38, carrying a pattern-chain made up of bars carrying rolls and tubes and connected by links in the usual way. Only one bar 39, with a roll 40 thereon, is shown in Figs. 1 and 3, and two bars 39, each with a tube 40'
55 thereon, are shown in Fig. 4.

The revolution of the star-wheel 35 through the engagement of the pin-wheel 29 therewith causes the multiplier-pattern chain-cylinder 38 to revolve.

60 Extending over the pattern-chain of the multiplier-pattern chain-cylinder 38 is an indicator-lever 42, pivoted at one end on a stud 43 in a support 44. To the free end of the indicator-lever 42 is attached a connector 78
65 to a lever, to be hereinafter described.

On the sleeve 33 on the shaft 18 is mounted a second pin-wheel 45, having one pin 46

thereon. The pin-wheel 45 is splined on the sleeve 33 by a spline 47 to revolve with said sleeve and to have a longitudinal motion in
70 the direction of the length of said sleeve to move the pin-wheel 45 into or out of engagement with a star-wheel 48, fast on a sleeve 49, loose on the shaft 37 of the drop-box-pattern
75 chain-cylinder. Also fast on the sleeve 49 is the pattern chain-cylinder 50, carrying a pattern-chain made up of bars carrying rolls and tubes and connected by links in the usual way. Only one bar 51 and one set of rolls
80 are shown in Fig. 1.

Extending over the pattern-chain on the cylinder 50 are a series of levers, one of which, 53, corresponds to lever 38, (shown and described in Patent No. 620,861, above referred
85 to,) and four of which, 54, are the indicator-levers for the drop-boxes, while the fifth, 55, forms a part of my improvements.

All of the levers 53, 54, and 55 are mounted on a stud 56, secured to a support 57.

I will now describe the mechanism for au-
90 tomatically moving the pin-wheels 29 and 45 to operate the two multiplier-pattern chain-cylinders 25 and 38 and the drop-box-pattern chain-cylinder 50.

In the downwardly-extending support 58 on
95 the frame 11' 11'' (see Fig. 2) are supported two parallel sliding rods 59 and 60. On one end of the rod 59 is a collar 61, secured by a set-screw 62 and recessed on its under side at
100 61' to receive the upper end of the angle-lever 63, pivoted on a stud 64 in the end 65' of the rod 65. A spring 66 is attached at one end to an extension 63' on an angle-lever 63, and the other end of said spring is attached
105 to a stationary collar 67 on the rod 65. To the arm 63'' of the angle-lever 63 is attached the lower end of a connector 68, the upper end of which is attached to the free end of the indicator-lever 55, extending over the box-
110 pattern chain-cylinder 50. On the opposite end of the rod 59 is secured the lower end of an arm 69, the upper end of which, 69', is forked to extend into and engage an annular groove in the hub 29''' of the pin-wheel 29.

The longitudinal movement of the pin-
115 wheel 29, splined on the sleeve 33 to move the same into engagement with the star-wheel 28, as shown in Fig. 3; or the star-wheel 35, as shown in Fig. 4, or into an intermediate position, as shown in Fig. 1, is controlled by
120 the movement of the indicator-lever 55 through connector 68, angle-lever 63, sliding rod 59, and forked arm 69, according to whether a large roll 52 or a smaller roll 52' or a tube 52'' (see Fig. 8) comes under the lever
125 55 as the pattern chain-cylinder revolves.

On the sliding rod 60 is secured by a set-screw 70 a collar 71, recessed at 71' to receive the upper end of the angle-lever 72, which is
130 pivoted on a stud 73 in the end 65'' of the rod 65. A spring 74 is attached at one end to an extension 72' on the lever 72, and the other end of said spring 74 is attached to a projection 58' on the support 58. The arm 72'' of

the angle-lever 72 has a stud 75 thereon, on which is mounted a boss or hub 76' of the centrally-pivoted lever 76.

To one end of the lever 76 is attached the lower end of a connector 77, the upper end of which is attached to the indicator-lever 30, extending over the multiplier-pattern chain-cylinder 25. To the opposite end of the lever 76 is attached the lower end of a connector 78, the upper end of which is attached to the indicator-lever 42, extending over the multiplier-pattern chain-cylinder 38.

On the sliding rod 60 is secured the lower end of an arm 79, the upper end of which, 79', is forked to extend into and engage an annular groove in the hub 45'' of the pin-wheel 45.

The longitudinal motion of the pin-wheel 45, splined on the sleeve 33, to move the same into engagement with the star-wheel 48 to revolve said star-wheel and the box-pattern chain-cylinder 50 or out of engagement with said star-wheel to leave the cylinder 50 at rest, is controlled by the movement of the indicator-lever 30, extending over the pattern-surface on the multiplier-pattern chain-cylinder 25, and the indicator-lever 42, extending over the pattern-surface on the multiplier-pattern chain-cylinder 38 through connectors 77 and 78, lever 76, angle-lever 72, sliding rod 60, and forked arm 79, according to whether a roll or a tube on the pattern-surface comes under the indicator-levers 30 and 42.

I will now briefly describe the operation of the drop-box-pattern chain mechanism and two multiplier-pattern chain mechanisms shown in the drawings and above described.

Supposing the parts to be in the position shown in Fig. 1, as shown in said figure there is a roll 27 under the indicator-lever 30. There is only one roll on the pattern-chain on the multiplier-pattern chain-cylinder 25. The rest of the chain (not shown) is made up of tubes only. There is a roll 40 under the indicator-lever 42. This is the only roll on the pattern-chain on the multiplier-pattern chain-cylinder 38. The rest of the chain (not shown) is made up of tubes only. There is a smaller roll 52' under the indicator-lever 55 on the box-pattern chain. The pattern-surfaces under the lever 55 consist of rolls of two sizes, 52 and 52', and tubes 52'', as shown in Fig. 8, making three different pattern-surfaces to act on the indicator-lever 55. The pin-wheel 45 is in engagement with the star-wheel 48. Through gears 14, 15, and 17 and the shaft 18, carrying sleeve 33, rotary motion is communicated to the pin-wheel 45, splined on the sleeve 33, to turn the star-wheel 48 and the drop-box-pattern chain-cylinder 50. The pin-wheel 29, also splined on the sleeve 33, is in its intermediate position, out of engagement with the star-wheel 28 and the star-wheel 35, so that the multiplier-pattern chains are stationary. In the rotation of the drop-box-pattern chain-cylinder

50 as long as a smaller roll 52' comes under the lever 55 the cylinder 50 will continue to rotate; but when a roll 52 of larger diameter comes under the indicator-lever 55 said lever will be raised, and through connector 68 the angle-lever 63 is moved to carry the sliding rod 59 to the right in Fig. 2, and through the forked arm 69 the pin-wheel 29 is moved into engagement with the star-wheel 28, as shown in Fig. 3, and through the revolution of the shaft 18 and the sleeve 33 the pin-wheel 29 will be revolved and communicate motion to the star-wheel 28 and the multiplier-pattern chain-cylinder 25. The rotation of the multiplier-pattern chain-cylinder 25 will move the roll 27 from under the indicator-lever 30 and allow the lever 30 to drop. The spring 74 will act to move the angle-lever 72 to the position shown in Fig. 5 and cause the sliding rod 60 to be moved to the right in Fig. 2 and the forked arm 79 on said rod to move the pin-wheel 45 out of engagement with the star-wheel 48, leaving the drop-box-pattern chain-cylinder 50 at rest. The multiplier-pattern chain-cylinder 25 will continue to revolve until the roll 27 is brought again under the indicator-lever 30. When this happens, the indicator-lever 30 will be raised and through connector 77 will move the angle-lever 72 to the position shown in Fig. 2, causing the sliding rod 60 to be moved to the left in Fig. 2 and through the forked arm 79 carry the pin-wheel 45 into engagement with the star-wheel 48 to rotate the drop-box-pattern chain-cylinder 50. If a large roll 52 is again brought under the indicator-lever 55, the operation above described is repeated; but if a smaller roll 52' is brought under the indicator-lever 55 the indicator-lever 55 is dropped and the spring 66 will move the angle-lever 63 to move the rod 59 to the left in Fig. 2 and through the forked arm 69' move the pin-wheel 29 into its intermediate position, as shown in Fig. 1, leaving both multiplier-pattern chains at rest. If a tube 52'' comes under the indicator-lever 55 in the revolution of the drop-box-pattern chain-cylinder 50, the lever 55 is dropped lower, and through the action of the spring 66 the angle-lever 63 is moved to the left, Fig. 2, to move the sliding rod 59 and forked arm 69 and carry the pin-wheel 29 into engagement with the star-wheel 35, as shown in Fig. 4. The revolution of the pin-wheel 29 will cause the star-wheel 35 and the multiplier-pattern chain-cylinder 38 to revolve and carry the roll 40 from under the indicator-lever 42 and allow said indicator-lever to drop and through connector 78 cause the lever 76 to move into the position shown in Fig. 6, allowing the spring 74 to act to move the angle-lever 72 into the position shown in Fig. 6 and cause the rod 60 to be moved to the right, Fig. 2, and through the forked arm 79 to move the pin-wheel 45 out of engagement with the star-wheel 48 and leave the drop-box-pattern chain-cylinder 50 at rest. When in the revolution of the mul-

multiplier-pattern chain-cylinder 38 the roll 40 is brought again under the indicator-lever 42, said lever is raised, and through connector 78 the lever 76 and the angle-lever 72 are moved into the position shown in Fig. 2 to move the rod 60 and cause the forked arm 79 to move the pin-wheel 45 into engagement with the star-wheel 48 and again put into operation the drop-box-pattern chain-cylinder 50. If a tube 52' again comes under the indicator-lever 55, the operation above described is repeated, and the multiplier-pattern chain-cylinder 38 is again revolved; but if a large roll 52 comes under said indicator-lever 55 then the multiplier-pattern chain-cylinder 25 is put into operation, as above described. It will be seen that by means of the lever 76, pivoted on the angle-lever 72, the removing of a roll from under either indicator-lever 30 or 42 will lower the pivot-point of said lever 76 (see Figs. 5 and 6) and allow the spring 74 to act to move the angle-lever 72 to the right and also the sliding rod 60 and forked arm 79 to move the pin-wheel 45 out of engagement with the star-wheel 48 and leave the box-pattern chain-cylinder 50 at rest.

It will be understood that the details of construction of my improvements may be varied, if desired.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In pattern mechanism for looms, the combination with the drop-box-pattern chain-cylinder, and a multiplier-pattern chain-cylinder, and intermediate connecting mechanism, and mechanism for operating said drop-box-pattern chain-cylinder, and multiplier-pattern chain-cylinder, of a second multiplier-pattern chain-cylinder, and intermediate mechanism connecting said second multiplier-pattern chain-cylinder with the drop-box-pattern chain-cylinder and the first-mentioned multiplier-pattern chain-cylinder, and mechanism for operating said second multiplier-pattern chain-cylinder, substantially as shown and described.

2. In pattern mechanism for looms, the combination with the drop-box-pattern chain-cylinder, a pin-wheel and star-wheel mechanism for operating the same, a multiplier-pattern chain-cylinder, a pin-wheel and star-wheel

mechanism for operating the same, and a second multiplier-pattern chain-cylinder, and a pin-wheel and star-wheel mechanism for operating the same, of an indicator-lever for the drop-box-pattern chain-cylinder, and an indicator-lever for each multiplier-pattern chain-cylinder, and connections intermediate the indicator-lever of the drop-box-pattern chain-cylinder, and each indicator-lever of the multiplier-pattern chain-cylinders, and pattern-surfaces on the drop-box-pattern chain-cylinder, by means of which either multiplier-pattern chain-cylinder is put into operation, or out of operation, from the drop-box-pattern chain-cylinder, and pattern-surfaces on each of the multiplier-pattern chain-cylinders, by means of which the drop-box-pattern chain-cylinder is put out of operation, when either multiplier-pattern chain-cylinder is put into operation, and is put into operation when either multiplier-pattern chain-cylinder is put out of operation, substantially as shown and described.

3. In the pattern mechanism of looms, a drop-box-pattern chain mechanism, a multiplier-pattern chain mechanism, and a second multiplier-pattern chain mechanism, each multiplier-pattern chain mechanism having an indicator-lever connected to a centrally-pivoted lever, the lowering of which at either end, will, through intermediate connections, put the drop-box-pattern chain mechanism out of operation, and the raising of which will put it into operation, substantially as shown and described.

4. In the pattern mechanism of looms, a drop-box-pattern chain mechanism, a multiplier-pattern chain mechanism, and a second multiplier-pattern chain mechanism, each multiplier-pattern chain mechanism having an indicator-lever connected to a centrally-pivoted lever, the movement of which in one direction will, through intermediate connections, put the drop-box-pattern chain mechanism out of operation, and the movement in the other direction will put the drop-box-pattern chain mechanism into operation, substantially as shown and described.

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