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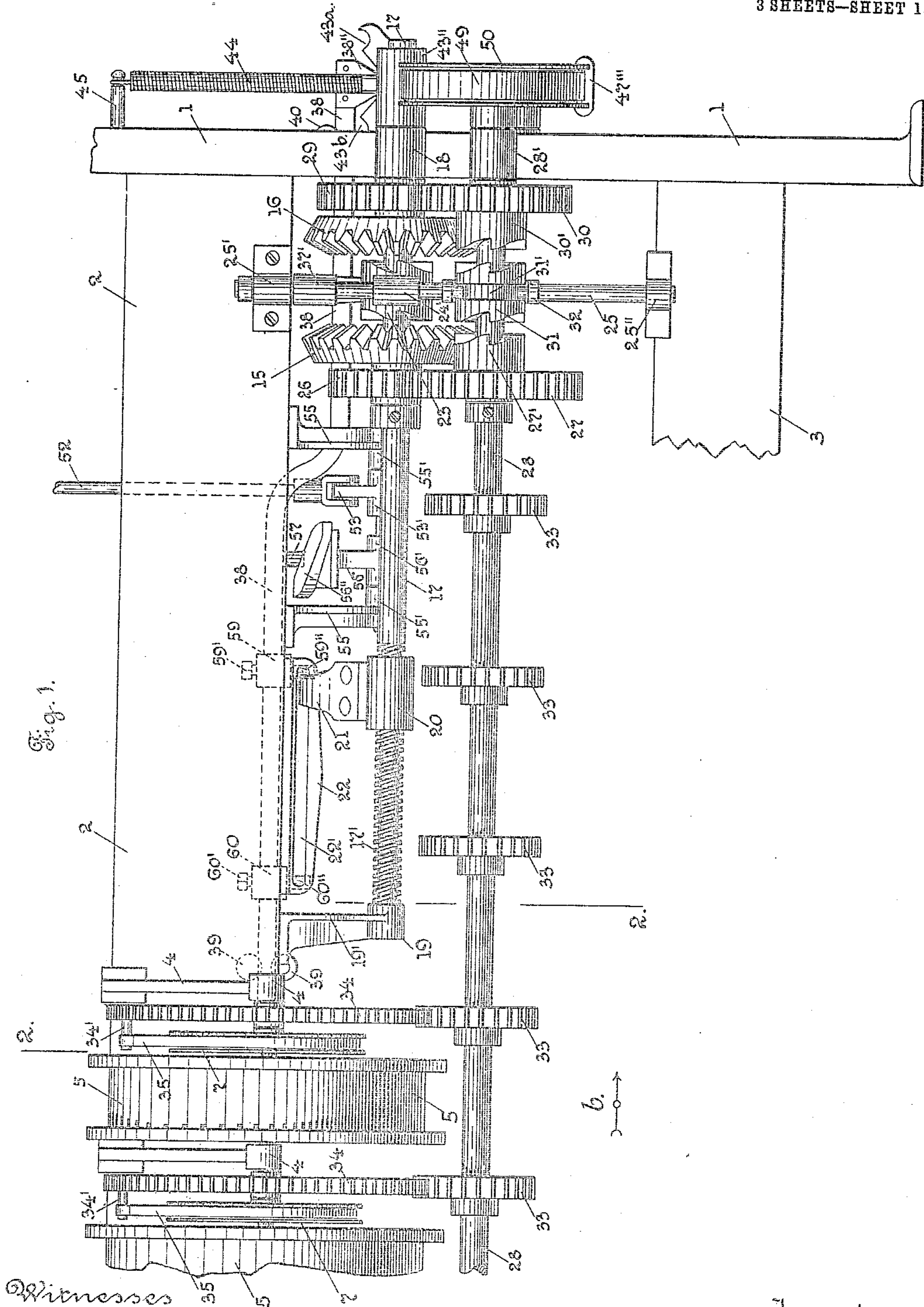
LET-OFF MECHANISM FOR LOOMS.

APPLICATION FILED MAY 18, 1909.

953,664.

Patented Mar. 29, 1910.

3 SHEETS—SHEET 1.



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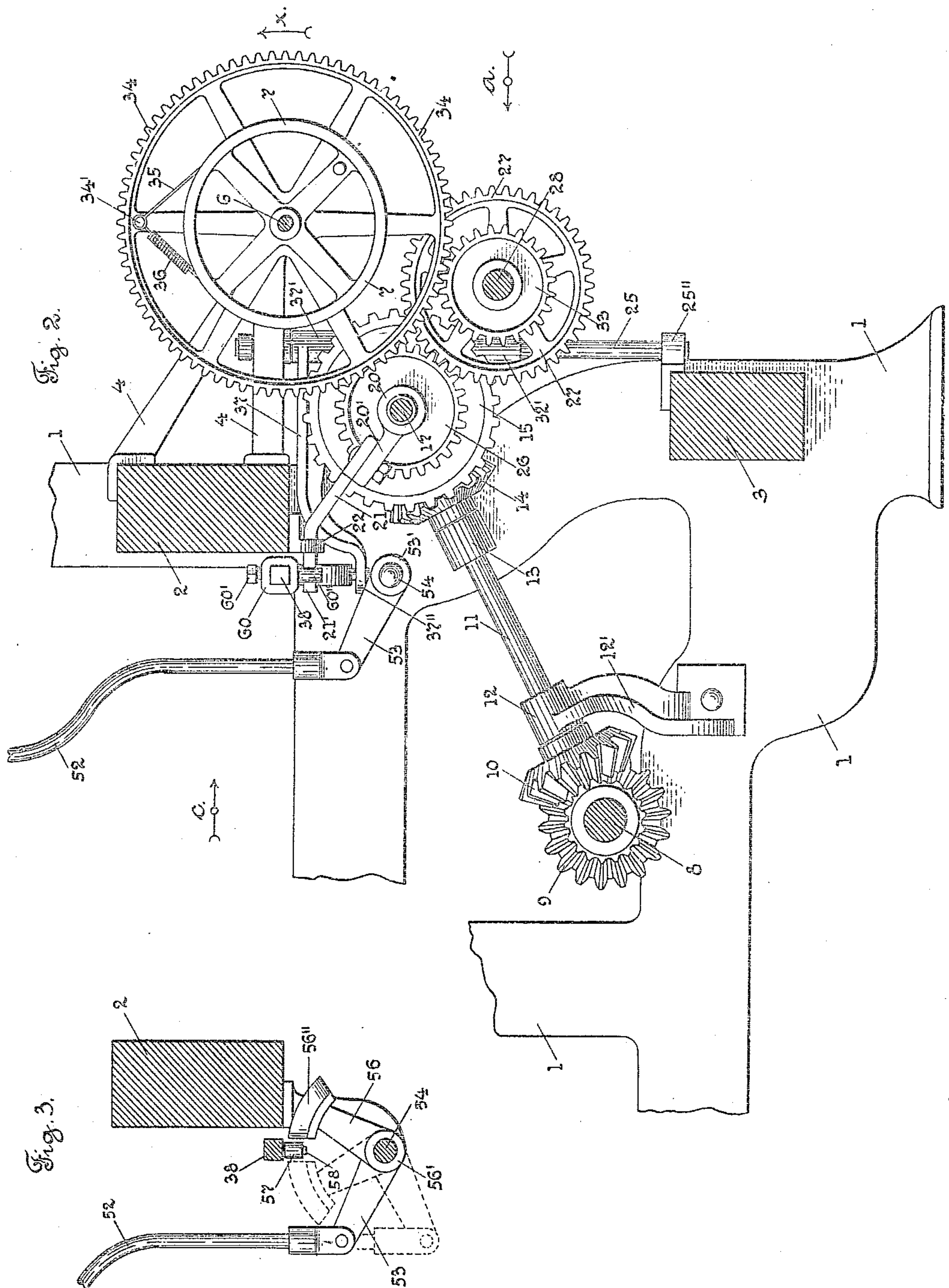
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3 SHEETS—SHEET 2.



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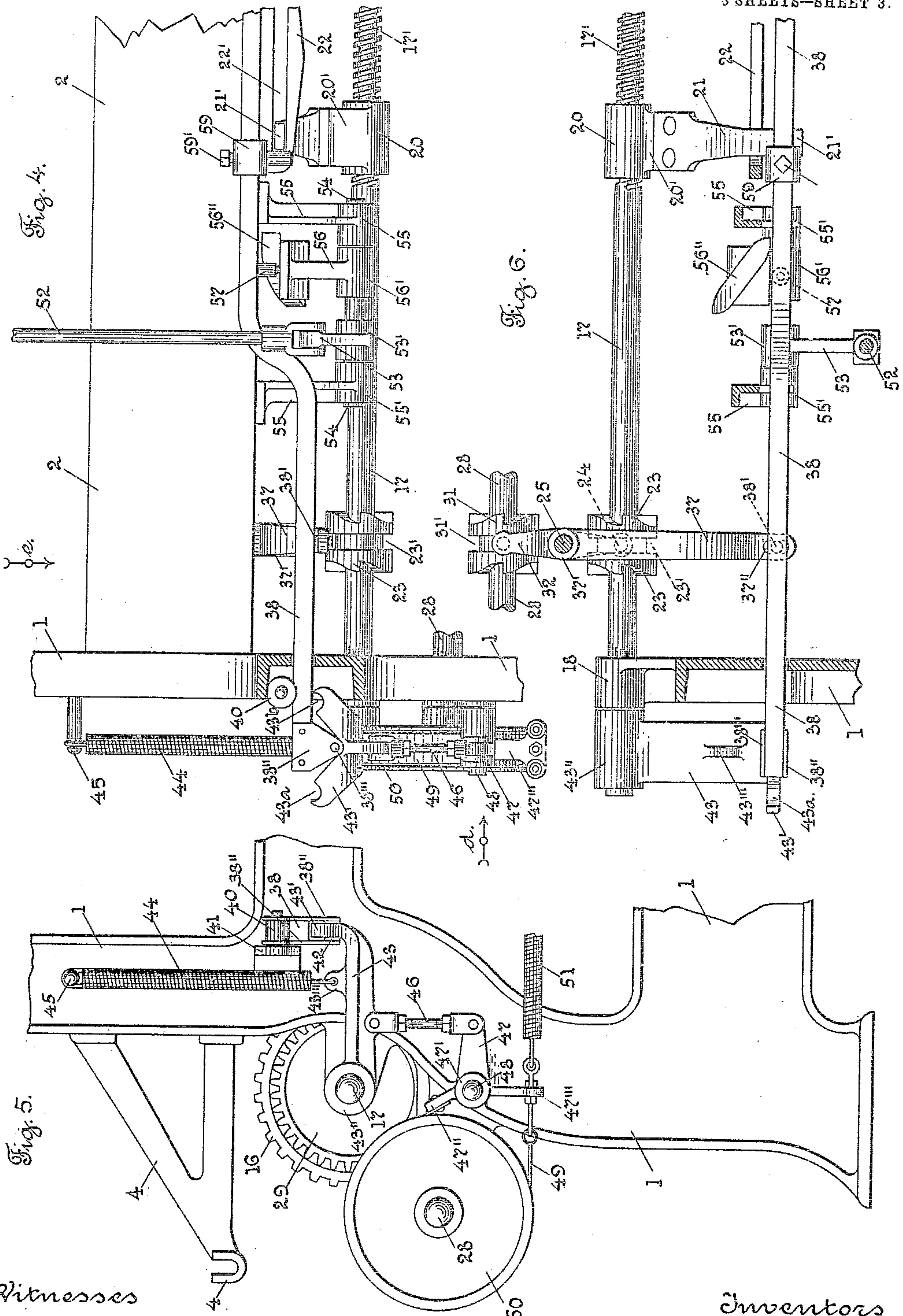
LET-OFF MECHANISM FOR LOOMS.

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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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LET-OFF MECHANISM FOR LOOMS.

953,664.

Specification of Letters Patent. Patented Mar. 29, 1910.

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To all whom it may concern:

Be it known that we, ELBRIDGE R. HOLMES and RALPH E. VALENTINE, citizens of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have jointly invented certain new and useful Improvements in Let-Off Mechanism for Looms, of which the following is a specification.

Our invention relates to let-off mechanism for looms, and particularly to narrow ware or ribbon looms for weaving elastic or rubber fabric, and the object of our invention is to provide a let-off mechanism for looms of the class referred to, by means of which the rubber warp is slackened for a certain number of picks, as required, to make the non-elastic portion of the fabric, and then stretched for a certain number of picks to make the elastic portion of the fabric.

Our invention consists in certain novel features of construction of our improvements as will be hereinafter fully described.

For narrow-ware looms for weaving fabric for suspenders, etc., which require a non-elastic portion, and an elastic portion, we provide means connected with the let-off mechanism, which means are preferably put into operation by a pattern surface, and are adapted to slacken the rubber warps in the non-elastic portion of the fabric, and then to stretch the rubber warps in the elastic portion.

We have shown in the drawings a detached portion of a narrow-ware loom, and let-off mechanism, with our improvements applied thereto, sufficient to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawings:—Figure 1 is a rear view of one end of a narrow-ware loom, and our improvements applied thereto, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is a vertical transverse section, on line 2, 2, Fig. 1, looking in the direction of arrow *b*, same figure; some parts which are shown in Fig. 1 are not shown in this figure. Fig. 3 is a detached view of operating levers which are not shown in Fig. 2; broken lines show the different positions of the levers. Fig. 4 shows some of the parts shown in Fig. 2, detached, looking in the direction of arrow *c*, same figure. Fig. 5 is a side elevation of the rear of the loom, looking in the direction of arrow *d*, Fig. 4, and, Fig. 6 is

a plan view of some of the parts shown in Fig. 4, looking in the direction of arrow *e*, same figure.

In the accompanying drawings, 1 is a portion of the loom side or end frame, 2 is the upper girt, and 3 the lower girt, 4 are brackets or bearings for the warp beams or spools 5, on which, in this instance the rubber warps, not shown, are wound. Each of the warp beams or spools 5 is carried on a shaft 6, and provided with a band brake wheel 7, of the usual construction. The rubber warps, not shown, are adapted to be drawn from the warp beams or spools 5 in the direction indicated by arrow *x*, in Fig. 2.

8 is the bottom shaft of the loom.

All of the above mentioned parts may be of any usual and well known construction.

We will now describe our improvements in let-off mechanism for the rubber warps.

On the bottom shaft 8 is mounted in this instance a bevel gear 9, see Fig. 2, which meshes with and drives a bevel gear 10 fast on a shaft 11. The shaft 11 is loosely mounted in a bearing 12 secured on a stand 12' attached to the loom side 1, and in a bearing 13 secured to the loom side 1. The upper end of the shaft 11 has secured thereon a bevel pinion 14, see Fig. 2, which meshes with and continuously drives two bevel gears 15 and 16, see Fig. 1, which are loosely mounted on a horizontally extending shaft 17. The shaft 17 is loosely mounted in a bearing 18 on the loom side 1, and in a bearing 19 on a bracket 19' secured to the upper cross girt 2. The shaft 17 is provided at its inner end with a worm portion 17'. A worm threaded sleeve 20 is loosely mounted on the worm portion 17' of the shaft 17, and has an extension 20', to which is secured in this instance a stop lever 21, see Figs. 1, 4, and 6, which extends upwardly toward the front of the loom, and has its upper end 21' offset and extending in an elongated slot 22' in a plate 22 secured to the cross girt 2.

The shaft 17, see Figs. 1, 4, and 6, has splined thereon a clutch member 23, which has an annular groove 23' therein, into which extends the forked end of a clutch lever 24, having its hub 24' fast on a vertically extending shaft 25, which shaft is mounted in bearings 25' and 25'' on the upper and lower cross girts 2 and 3, see Fig. 1. The clutch member 23 is adapted

to be moved into engagement with the teeth of either one of the bevel gears 15, and 16, to cause the shaft 17 to be rotated in one or the other direction.

5 The bevel gear 15 has rigidly connected therewith a pinion 26, which meshes with and continuously drives a pinion 27, loosely mounted on the horizontally extending shaft 28. The shaft 28 has a bearing 28' at one
10 end, on the loom side, see Fig. 1. There is also a bearing for the other end of the shaft 28 at the opposite end of the loom, not shown. The other bevel gear 16 has rigidly connected thereto a pinion 29, which meshes
15 with and continuously drives a pinion 30 also loosely mounted on the shaft 28. Each of the pinions 27 and 30 has a clutch portion 27' and 30' respectively, see Fig. 1, which are adapted to be engaged by a clutch member 31, which is splined on the shaft 28,
20 and has an annular groove 31' therein to receive the forked end of a clutch lever 32, which has its hub 32', see Fig. 2, secured upon the upright shaft 25. Through the engagement of the clutch 31 with the clutch
25 portion 27' on the pinion 27, or with the clutch portion 30' on the pinion 30, the horizontally extending shaft 28 is rotated in one or the other direction.

30 Mounted on the horizontally extending shaft 28 are a series of driving pinions 33, to mesh with and drive the gears 34, which are mounted on the shaft 6. There is a gear 34 for each rubber warp beam 5, and each
35 gear 34 has a pin 34' fast thereon, to which is connected one end of a band 35, which passes around the band wheel 7 connected with the warp beam or spool 5, and the other end of said band is connected to a
40 helically coiled contraction spring 36, which also is secured to the pin 34', see Fig. 2. Through the rotation of the gears 34 the warp beams 5 are rotated.

The vertically extending shaft 25 has fast
45 thereon, near its upper end, the hub 37' of an arm or lever 37, which extends toward the front of the loom, see Fig. 2, and has its front end slotted at 37'', see Fig. 6, to loosely receive a pin or stud 38' on a hori-
50 zontally extending square-shaped rod 38. One end of the rod 38, at the left in Fig. 1, is loosely held between two guide rolls 39; the other end of the rod 38 extends through the loom side, see Figs. 4, 5, and 6, and has
55 its upper edge guidingly held by a guide roll 40 mounted on a stand 41 on the loom side, see Fig. 5. To the end of the rod 38 is secured two plates 38'', carrying a stud 38''', on which is mounted a roll 42, which
60 is adapted to travel on the upper edge of a cam-shaped portion 43' on the upturned end of a horizontally extending lever 43, see Figs. 4, and 5. The lever 43 has its hub 43'' loosely mounted on the end of the shaft 17.

65 A helically coiled contraction spring 44 has

one end connected with an extension 43''' on the lever 43, and its other end connected to a pin 45 on the loom side, see Figs. 4 and 5. The spring 44 acts to yieldingly hold the
70 upwardly extending end of the lever 43 against the roll 40 on the square-shaped rod 38. To the lever 43 is pivotally attached the upper end of a rod 46. The lower end of said rod 46 is pivotally attached to an arm
75 47, which has its hub 47' loosely mounted on a stud 48, see Fig. 5. Extending out from the hub 47' is an arm 47'', to which is attached one end of a brake band 49, which passes around a peripherally grooved wheel
80 50, see Figs. 1, and 5, which wheel is secured to the shaft 28. The other end of the brake band 49 is attached to a second arm 47''', and to said arm 47''' is attached one
85 end of a helically coiled contraction spring 51. The other end of said spring is attached to a pin on the loom side, not shown. The downward movement of the lever 43 causes the brake band 49 on the brake wheel 50 to be loosened.

The lower end of a rod 52, which rod
90 leads to a pattern mechanism, not shown, is pivotally connected to the end of an arm 53, which has its hub 53' secured on a rocking shaft 54, which is mounted in bear-
95 ings 55' on stands 55 secured to the upper cross girt 2, see Fig. 1. Also secured on the shaft 54 is the hub 56' of a lever 56. The upper enlarged end of the lever 56 has the inclined or cam-shaped portion or block
100 56'', which is adapted to be moved into the path of and to engage a roll 57 on a pin 58 on the square-shaped rod 38. When the lever 56, having the cam-shaped block 56'',
105 is moved from one position to its other position, shown by broken lines in Fig. 3, the roll 57 travels along the cam-shaped or inclined edge of the block 56'' and moves the rod 38 longitudinally in one or the other di-
rection.

On the square-shaped rod 38 are adjust-
110 ably secured collars 59 and 60, by set screws 59' and 60', respectively. The collars 59 and 60 carry a pin 59'' and 60'', respectively, which are adapted to extend into the path
115 of and be engaged by the offset end 21' on the arm 21 secured to the worm sleeve 20, when said sleeve is moved in one direction or the other, by the rotation of the worm
portion 17' on the shaft 17.

From the above description in connection
120 with the drawings, the operation of our improvements will be readily understood by those skilled in the art. When the loom is in operation, the rubber warps, not shown,
125 are drawn from the warp beams or spools 5, in the direction indicated by arrow *a*, Fig. 2, under the tension caused by the brake bands 35 passing around the brake wheel 7 at-
tached to the gears 34. The gears 34 are in mesh with the pinions 33 on the shaft 28, 130

and said gears, remaining stationary, are held by the friction on the brake wheel 50 on the shaft 28. The pattern mechanism, not shown, indicates the slackening of the rubber warps, to weave the non-elastic portion of the fabric, and through the connector rod 52, the arm 53 is moved, in this instance from the position shown by full lines to the position shown by broken lines in Fig. 3. The lever 56 with the cam-shaped portion 56'' thereon, engages the roll 57 on the square-shaped rod 38, to cause said rod to move longitudinally, and in this instance toward the left in Figs. 4 and 6, and to the right in Fig. 1. The roll 42, which is carried on the plates 38'' on the end of the square-shaped rod 38, travels along the inclined edge on the upturned end of the lever 43, until said roll 42 enters the notch 43^a in said end. The lever 43 is pressed downwardly, and through the rod 46, and arms 47, 47'', releases the friction on the brake band 49 on the brake wheel 50 secured on the shaft 28, to allow the turning of said shaft. Through the pin or stud 38' on the square-shaped rod 38, the end of the lever 37 is moved to the left in Fig. 6, and the vertically extending shaft 25 is rocked, and through the movement of the clutch lever 32 thereon, the clutch member 31 is moved into engagement with the clutch portion 27' on the gear 27, see Fig. 1, to rotate the shaft 28 and the pinions 33 thereon, which are in mesh with the gears 34, causing said gears 34 to revolve in the direction of arrow *a*, Fig. 2, and through the band 35 on the wheel 7, to rotate the spools or beams 5, and let off the rubber warps, or slacken the warps, for weaving the non-elastic portion of the fabric. At the same time, through the rotation of the vertically extending shaft 25, the bevel gear 16 will revolve the shaft 17 and the worm 17' thereon, in a direction to cause the arm 21 to move toward the left in Fig. 1, until the end 21' engages the pin 60'' on the rod 38, to move said rod back again to the left in Fig. 1, and bring the roll 42 into the central part of the depression in the upturned end of the lever 43, to allow the spring 44 to act to return said lever to its raised position, and apply the band 49 on the brake wheel 50 on the shaft 28, to stop the rotation of said shaft. Through the movement of the square-shaped rod 38, the lever 37 is moved to rock the vertically ex-

tending shaft 25, and to move the clutch members 23 and 31 back into their inoperative position, and stop the operation of the slackening mechanism. To stretch or tighten up the rubber warps again for weaving the elastic portion of the fabric, the next indication of the pattern surface, not shown, through the connector rod 52 and intermediate connections, will move the lever 56, from the position shown by broken lines to the position shown by full lines in Fig. 3, the square-shaped rod 38 is moved to its opposite position, and to the right in Fig. 4, and the friction on the brake wheel 50 is again released, through the roll 42 on the rod 38 entering into the notch 43^b in the lever 43. The clutch members 23 and 31 are moved in the opposite direction to that above described, to cause the gears 33 to be rotated in the opposite direction, and turn the gears 34 also in the opposite direction, and through the band 35 on the wheel 7, to retard, or rotate in an opposite direction the warp beams or spools 5, to stretch or tighten up the rubber warps, until the sliding arm 21 on the worm portion 17' has been moved to its right position, as shown in Fig. 1, to engage the pin 59'', and move the rod 38 to the right, to move the clutch members and stop the operation of the let-off mechanism.

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

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. In a let-off mechanism for looms, a warp beam or spool having a friction mechanism, and means, under the control of pattern mechanism, for automatically rotating said warp beam or spool in either direction, to tighten, or slacken the warp.

2. In a let-off mechanism for looms, a warp beam or spool having friction mechanism, and positive means, under the control of pattern mechanism, said means including gearing and clutch mechanism, for automatically rotating the warp beam or spool in either direction to tighten, or slacken the warp.

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