

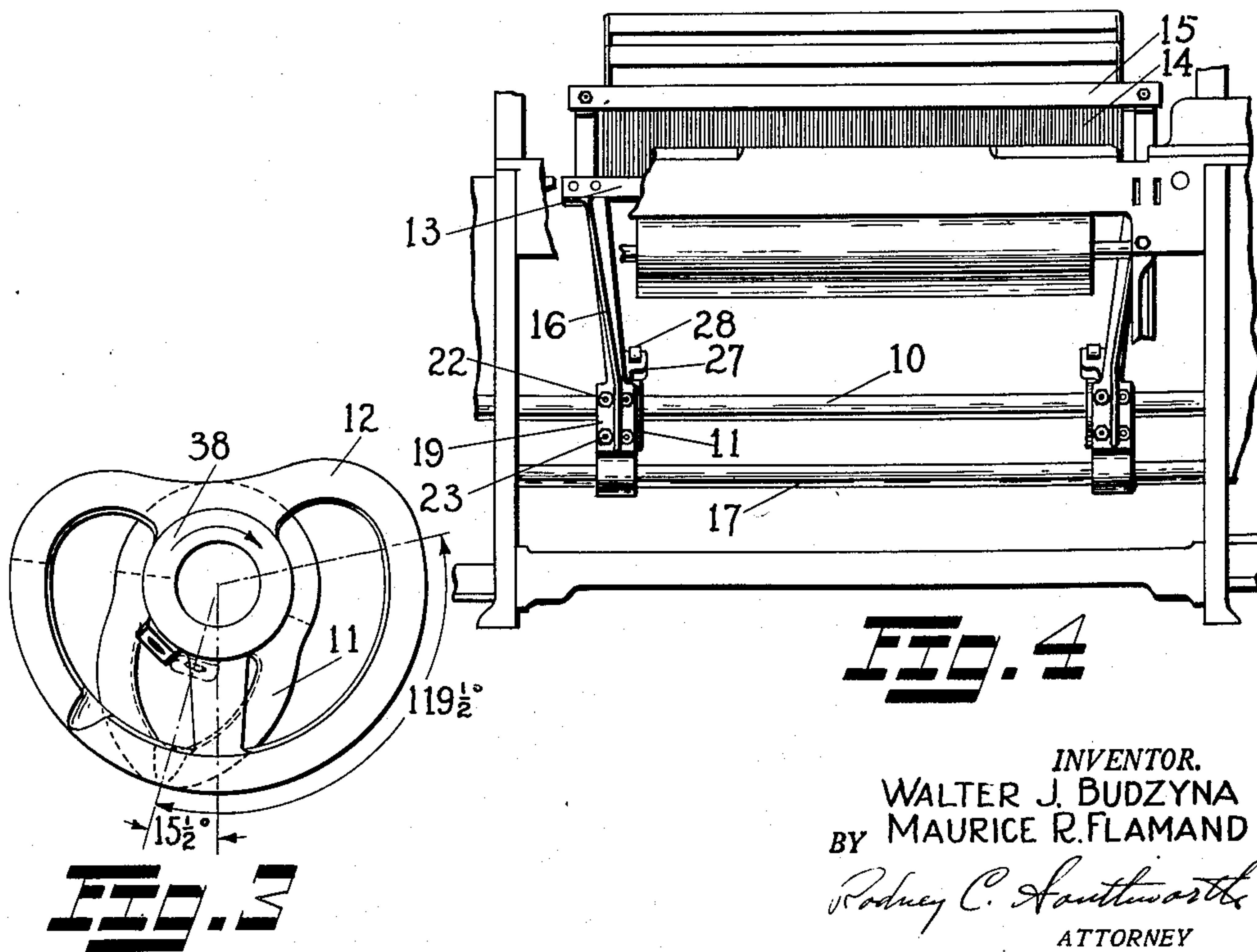
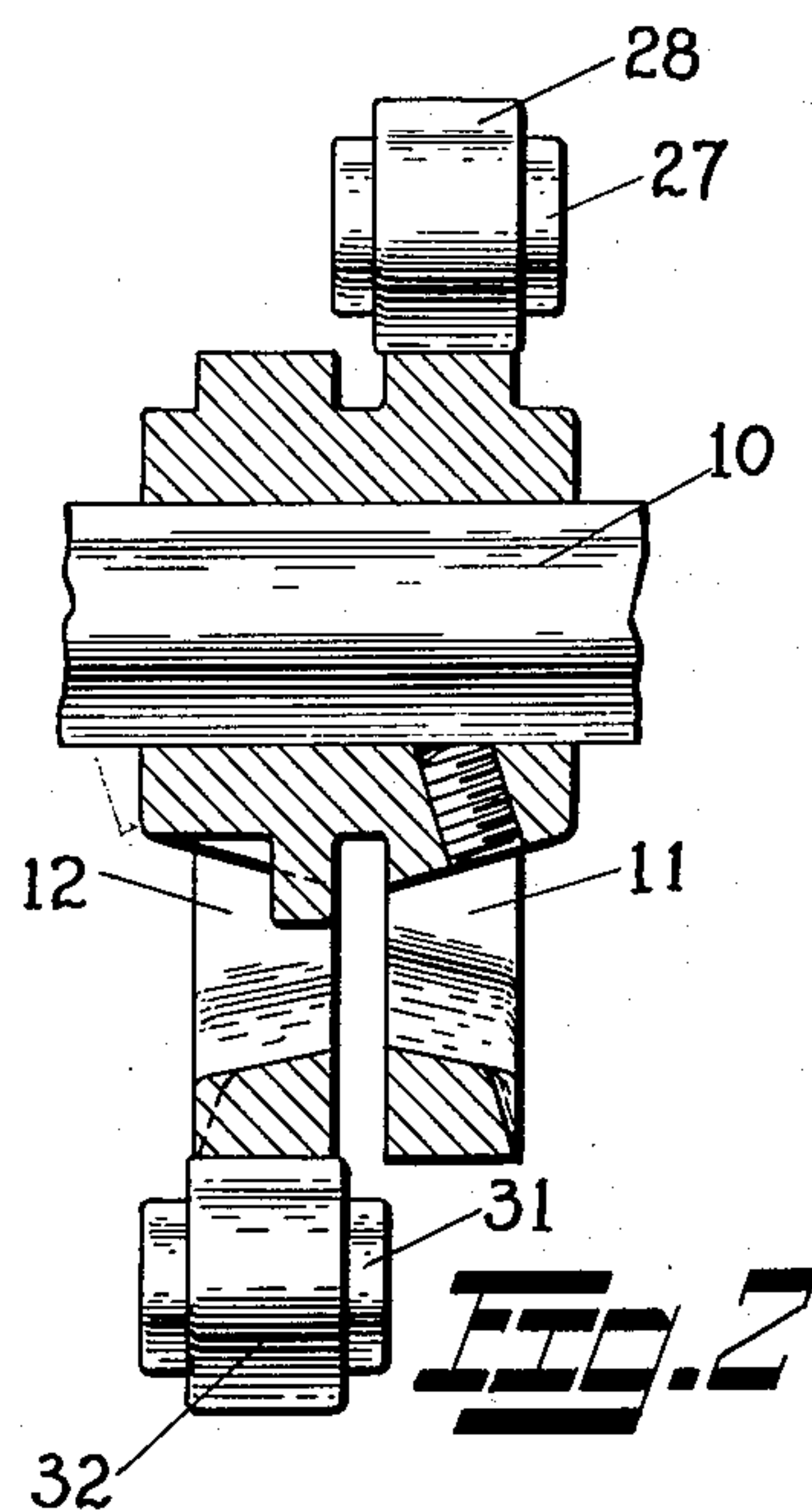
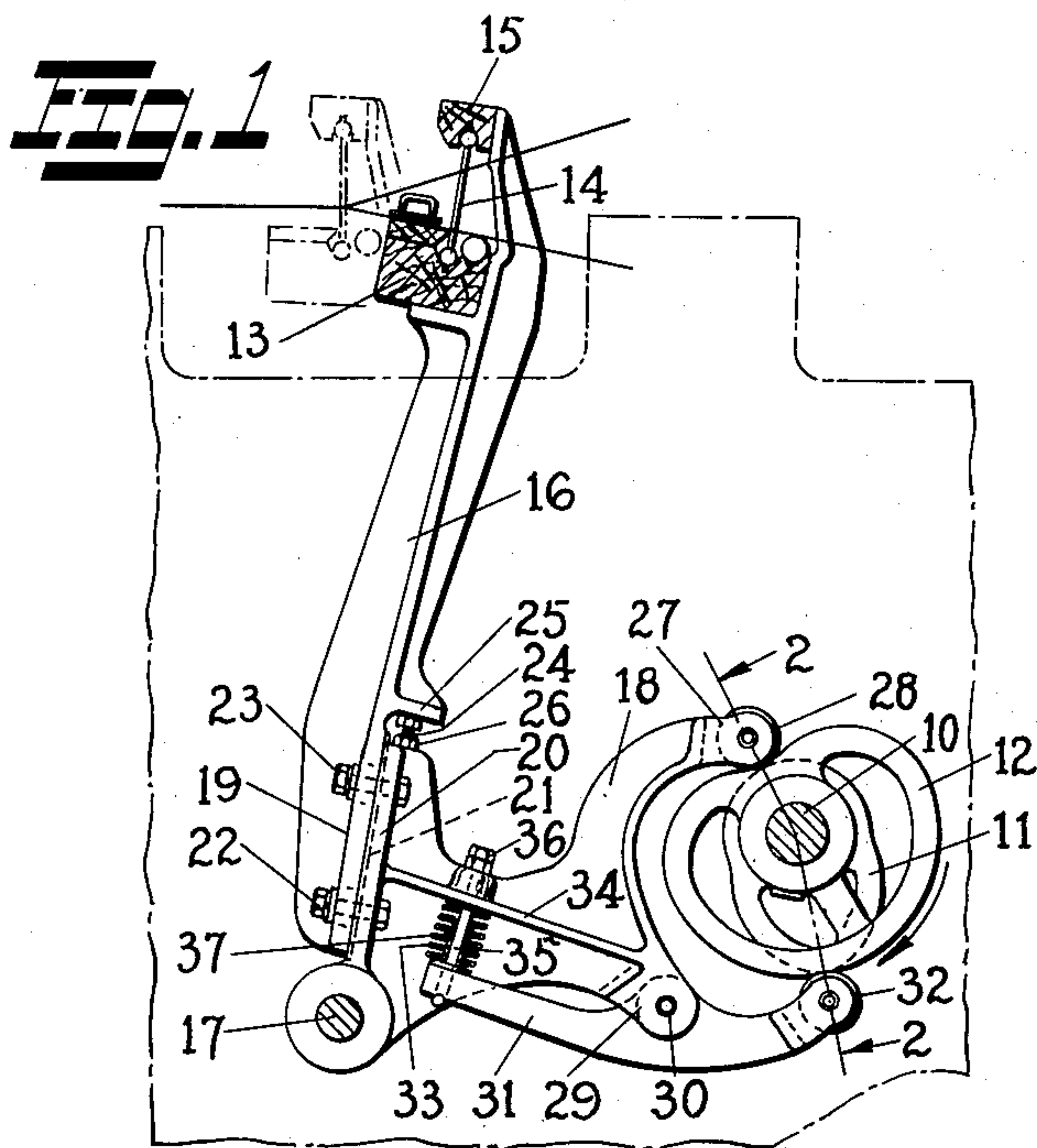
Jan. 6, 1953

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2,624,372

LAY MOTION FOR LOOMS

Filed June 29, 1950



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2,624,372

LAY MOTION FOR LOOMS

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Application June 29, 1950, Serial No. 171,207
In Brazil April 18, 1949

9 Claims. (Cl. 139—190)

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This invention pertains to lay motions for looms, and more particularly, to such motions adapted for use with shuttleless looms and to provide a period of dwell at that part of the cycle during which the filling is inserted. This application is a division of our application Serial No. 71,622, filed January 19, 1949.

It is an object of the invention to improve the lay motion for a loom and to provide for effectively beating up the fabric during a portion of the cycle while permitting the lay to remain stationary, or nearly so, throughout a sufficient period of time during the rest of the cycle, for the filling to be inserted and for the filling inserting mechanism to be withdrawn from the shed.

Other objects of the invention will become apparent from the following disclosure.

In high speed looms and especially shuttleless looms it is desirable to lighten the lay structure to reduce the mass which is to be swung to and fro for performing the beat-up function, and to provide actuating means for the lay which shall effect its movement to the beat-up position smoothly and in as brief an interval of time as practicable. It is also a requirement that the lay be permitted to dwell in its rearmost position for a period of time as great as is practicable to afford a maximum of time for the introduction of the filling from its outside source.

In carrying the invention into effect, as illustrated by the particular embodiment herein shown and described, a positively rotated cam mechanism is provided and is caused to function in cooperation with novel follower means forming a part of the oscillating lay structure to move the lay in a predetermined timed relationship to the movement of other parts of the loom for the purpose of beating the filling into the shed. This cam means also provides for a dwell of approximately one half the period of time consumed for a complete cycle incidental to the insertion of a single pick. The invention will be described hereinafter in greater detail by reference to one specific embodiment thereof as evident in the accompanying figures of drawing wherein like parts are indicated by like reference characters, and wherein:

Fig. 1 is a section transversely through part of a loom showing the lay, rock shaft and details of the lay swords, the rocker arms and the cam and cam follower means by which the lay is swung to and fro.

Fig. 2 is a section taken at line 2—2, Fig. 1, and showing the details of the cams and cam follower means.

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Fig. 3 is a layout of the cams themselves.

Fig. 4 is a front elevation of a loom framework, rock shaft, cam shaft, lay swords and attendant mechanism.

Now referring to the figures, a cam shaft 10 is supported in suitable bearings in loomsides (not shown) and carries adjacent the inner face of each loomside a pair of cams designated by numerals 11 and 12. These cams are fixed to the cam shaft to rotate therewith and serve to impart movement to the lay, reed, etc. The cam shaft itself is driven through a clutch and gearing from a motor or other source of power, or in any other convenient manner.

A lay beam 13, reed 14 and hand rail 15 are carried by lay swords 16 which are adapted to rock on a rock shaft 17. The actual construction of the lay swords is such that in cooperation with the supporting means therefor which forms a part of the rocking levers 18, the lay itself may be vertically adjusted, each end thereof being capable of independent movement.

The swords are machined to have flat surfaces somewhat vertically disposed, each of which forms the face of a pad 19 which is slidably mounted upon a corresponding pad 20 on its respective lever 18. A key and key slot designated by numeral 21 maintain the parts in proper vertical alignment and a pair of adjusting studs having nuts 22 and 23 pass through elongated slots in the pad 19 and are held within the cooperating pad 20 to maintain the parts in any desired adjusted position.

The actual vertical positioning of the swords and parts carried thereby is effected by lifting screws 24 threaded downwardly into the top portion of the pads 20 and having their heads bearing against a shoulder or ledge 25 cast as an integral part of the swords themselves. A locking nut 26 maintains the parts adjusted in properly elevated position in addition to the clamping studs and their nuts 22 and 23.

The levers 18 of which there are two, one at each lay sword and thus one adjacent each end of the machine, are forked having one fork portion 27 offset slightly toward the outer end of the loom so as to align with the cam 11 which is at the outer end of the cam shaft as compared to the cam 12. This forked and offset end 27 carries a follower in the form of a roller 28 for engagement with the cam 11.

The other end of the fork designated by numeral 29 has a pivot 30 on which is freely oscillatable a two-armed lever 31 to the outer end of which is pivoted a follower roller 32 similar to the roller 28. This lever 31 aligns with the main

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portion of the arm 18 and thus the roller 32 is in alignment with and contacts cam 12 all as illustrated in the sectional view in Fig. 2 taken at line 2—2 of Fig. 1. The arm 31 is pivoted at point 30, but is always urged by a spring 33 or other resilient means, so that the roller 32 is pressed toward its cam or, to state it in another way, the two followers 28 and 32 are always pressed together with a definite amount of resilient force so that they always contact their cams one of which is a positive cam for moving the lay and the reed to beat up position while the other is merely a return cam functioning through the resilient spring 33.

Spring 33 is compressed between the end of the lever 31 and a pad on a rib 34 on the arm 18, axial positioning of the parts being assured by a T-headed bolt 35 passing through the end of the arm 31 and through a boss on the rib 34 to be locked in position by nuts 36. The followers 28 and 32 are preferably of fibrous material such as one of the well known phenolic resins or other similar compounds adapted to be molded under extreme pressure and each of these rollers is mounted on its pivot or spindle upon needle bearings or other antifriction means. The adjustment of the bolt 35 and of the spring 33 is such that there will never be any appreciable play between the followers and their cams and the construction provides further for easier setting of the parts initially or for adjustment after an extended period during which there will have been a certain amount of wear.

A bushing 37 surrounding the bolt and enclosed by the spring serves to limit movement of the lever 31 relatively to arm 18 in case the spring should fail. In that event the rollers 28 and 32 may move away from their cams about $\frac{1}{16}$ " to $\frac{1}{8}$ " according to the clearance provided at the end of bushing 37, but that can lead to no particular difficulty except for noisy operation until the loom is stopped and the spring replaced. Otherwise the timing of the lay relative to the tape movement might be so adversely affected that a serious smash would result.

Now referring more specifically to Fig. 3, the cams 11 and 12 are preferably formed integrally by casting, but may be fabricated in any other manner and need not be integral since each may be separately and rigidly fixed to a single hub or to the shaft itself. The preferred construction is, however, that which is illustrated here. A hub 38 is provided with bosses through which set screws are threaded for the purpose of tightening the cams on the cam shaft when their position has once been established. Since the other parts working from the cam shaft are all separately adjustable, it is not necessary to change the position of these once their correct position has been established. The cams are divided into two portions, one of which is an active portion providing for the movement of the lay while the other opposite part thereof is concentrically disposed about the shaft and provides for dwell of the lay while the filling is being inserted. It has been found that a dwell of from 180° to 210° serves quite satisfactorily, although it is to be understood that deviations from those figures are possible and for certain purposes or under certain circumstances, the dwell may vary slightly above or below those figures.

Since the followers 28 and 32 are angularly disposed with respect to radial lines through their centers and through the pivot 17, a corresponding offset has to be provided between the points

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of the cams themselves. As here shown, that offset amounts to 15½°, although for other angular separation of the follower rolls and variations in other factors, corresponding changes must necessarily be effected. The point of the active or beat up cam 11 is actually positioned 119½° ahead of the next following active portion of the return cam. That figure has been adopted for a cam having a 200° dwell, and of course, is subject to change as circumstances require.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways. This application is, therefore, not to be limited to the precise details described, but is intended to cover all variations and modifications thereof falling within the spirit of the invention and the scope of the claims.

We claim:

1. In a lay motion for a loom, a rock shaft, a cam follower arm on said rock shaft, lay swords movable with said arm as it is rocked on said rock shaft, a lay carried by said swords, a cam shaft, a pair of cams on said cam shaft and followers on said cam follower arm, one of which is engageable with one of said cams for moving the lay to beat the filling into the shed and the other of which is engageable with the other follower to return the lay to a filling laying position.

2. In a lay motion for a loom, a rock shaft, a cam follower arm on said rock shaft, lay swords movable with said arm as it is rocked on said rock shaft, a lay carried by said swords, a cam shaft, and a pair of cams on said shaft for moving the lay to and from a position of rest during which the filling is laid and a position in which a reed carried by said lay is effective for beating the filling into the shed of the fabric, a cam follower on said arm on the rock shaft engageable with one of said cams effective for moving the lay to the said filling beat up position, a second arm pivoted to the arm just above mentioned and a follower on that arm engageable with the other of said cams for returning the lay to its position of rest, and resilient means for moving the said second mentioned arm to a position in which the follower carried thereby is pressed tightly against the cam with which it engages.

3. In a lay motion for a loom, a rock shaft, a cam follower arm on said rock shaft, lay swords one of which is movable with said arm and adjustably attached to said arm for movement radially of the rock shaft thereby to adjust the position of a lay carried by said swords, a cam shaft, a pair of cams on said cam shaft and followers on said cam follower arm, one of which is engageable with one of said cams for moving the lay to beat up the filling into the shed of the fabric, and the other of which is engageable with the other follower on said arm to return the lay to a filling inserting position.

4. In a lay motion for a loom, a rock shaft, a cam follower arm on said rock shaft said arm comprising a forked, articulated portion, a cam shaft, a pair of cams on said shaft rotatable therewith, and followers, one carried at each extremity of the forked portion of said cam follower arm, one said follower being engageable with one cam for moving the lay to beat up position and the other follower being engageable with the other of said cams for returning the lay to a filling inserting position, and spring means effective upon said articulated forked portion of the arm for urging said followers into pressure engagement with their respective cams.

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5. In a lay motion for a loom, a rock shaft, cam follower arms on said rock shaft, said arms each having an extended portion forming a bearing for a lay sword upon which the lay and reed are carried, each lay sword having slidable engagement with the bearing portion of its respective rock shaft arm, adjustable means for moving the sword radially toward the rock shaft and locking means for retaining it in an adjusted position.

6. In a lay motion for a loom, a rock shaft, a cam follower arm adjacent each end of said rock shaft, each said arm having a somewhat vertically extending portion forming a slidable bearing for a similar, complementary slidable portion of a lay sword upon the opposite end of which is carried a lay and a reed, and means for adjusting and locking each said sword in position which comprises threaded bolt means passing through slots in one member and effective to clamp that member against the other, and a threaded adjusting means extending along the lay sword and vertically extending portion of the cam follower arm, said means being threaded into one of said members and bearing at its other end against an abutment on the other member.

7. In a lay motion for a loom, a rock shaft, cam follower arms on said rock shaft, lay swords and a lay carried by said rock shaft and movable with said arms, a cam shaft, a pair of cams on said shaft and rotatable therewith, said follower arms further comprising forked extensions, a follower on one said extension engageable with one of the cams for moving the lay to one extreme position, a two-armed lever pivoted at the other fork extension and a follower at one end of said lever engageable with the other cam, and spring means between the other end of said lever and the follower arm for resiliently biasing the followers toward their cams, and adjusting means for limiting the movement of said follower toward their cams.

8. In a lay motion for a loom, a rock shaft, a cam follower arm on said rock shaft, lay swords movable with said arm as it is rocked on said rock shaft, a lay carried by said swords, a cam shaft and cams on said cam shaft, a cam follower on said arm on the rock shaft engageable with one of said cams effective to move the lay in one direction, a second arm pivoted to the first arm and a follower on that arm engageable with the other of said cams for moving the lay in the

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other direction, resilient means for moving the said pivoted arm to a position in which the follower carried thereby is pressed toward its cam and means operative upon failure of said resilient means for limiting the movement of the pivoted arm to an extent such that the motion imparted to the lay shall not be substantially diminished.

9. In a lay motion for a loom, a rock shaft, a cam follower arm on said rock shaft, lay swords movable with said arm as it is rocked on said rock shaft, a lay carried by said swords, a cam shaft, and a pair of cams on said shaft for moving the lay to and from a position of rest during which the filling is laid and a position in which a reed carried by said lay is effective for beating the filling into the shed of the fabric, a cam follower on said arm on the rock shaft engageable with one of said cams effective for moving the lay to the said filling beat up position, a second arm pivoted to the arm above mentioned and a follower on that arm engageable with the other of said cams for returning the lay to its position of rest, and resilient means for moving the said second mentioned arm to a position in which the follower carried thereby is pressed tightly against the cam with which it engages, and a bushing cooperatively associated with said resilient means and of slightly less extent than that said means when in its operatively adjusted state, for limiting relative movement between the first and second arms upon failure of the resilient means to maintain the followers in contact with their cams.

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