E. H. RYON.

LOOKING DEVICE FOR FILLING DETECTORS OF WEFT REPLENISHING LOOMS.

APPLICATION FILED APR. 19, 1911.

1,040,985.

Patented Oct. 8, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

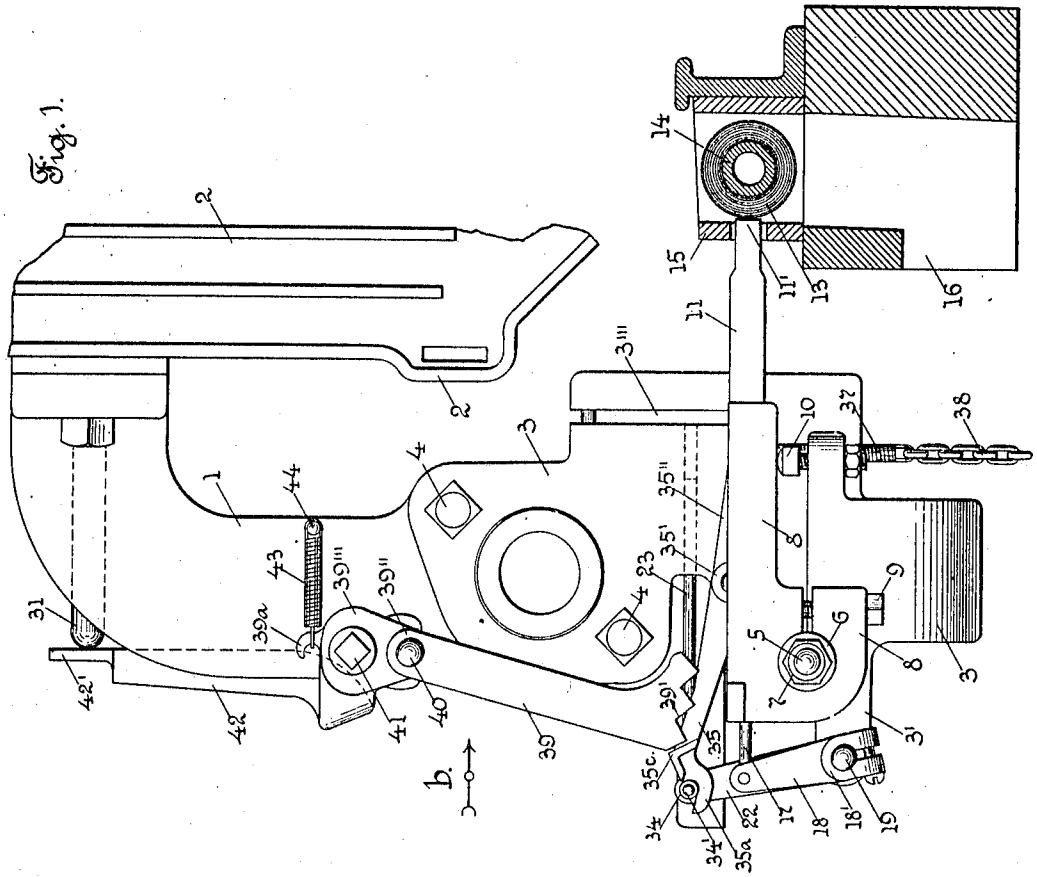

Fig. 2.

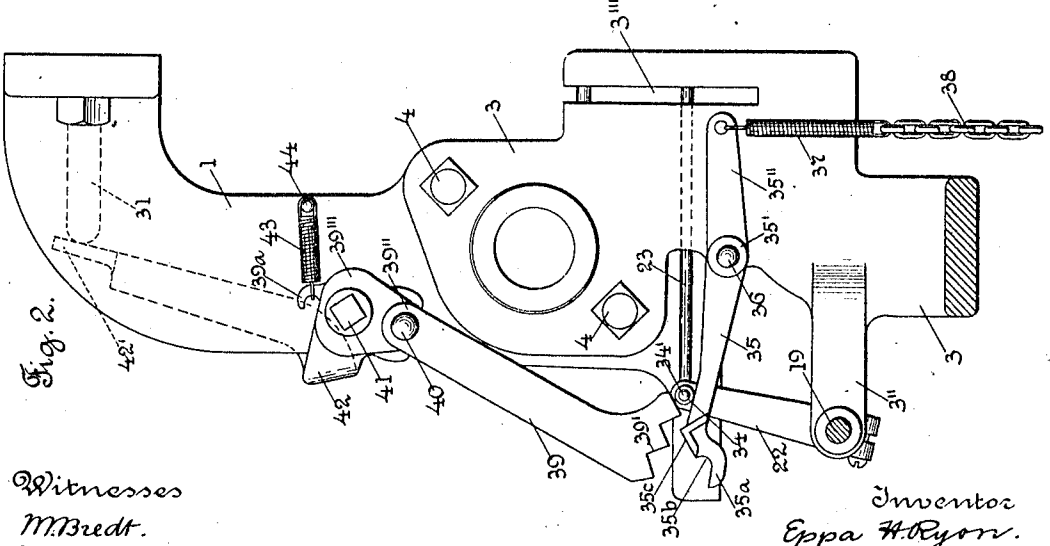

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Fig. 3.

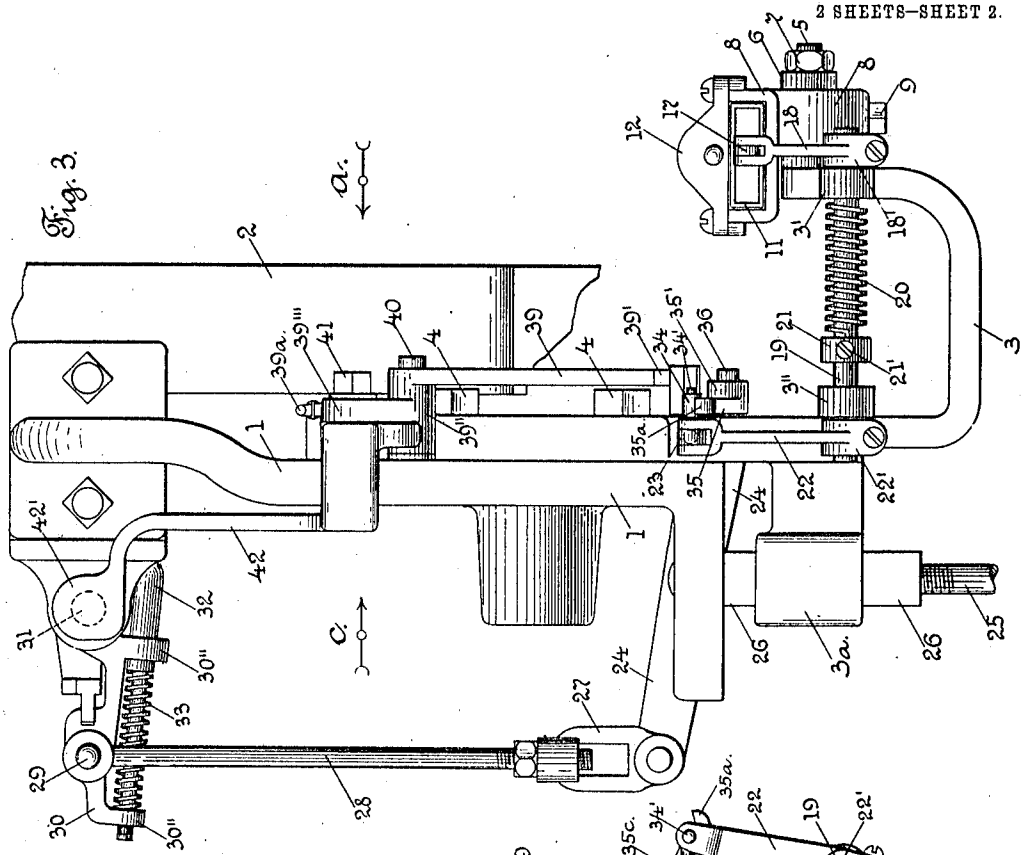
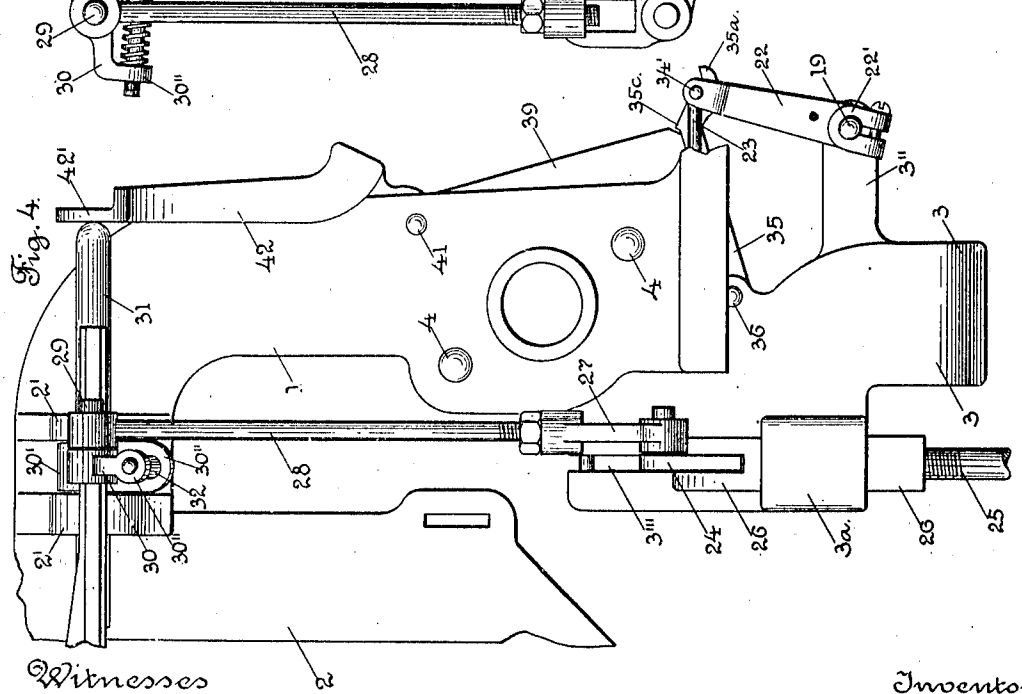


Fig. 4.



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UNITED STATES PATENT OFFICE.

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LOCKING DEVICE FOR FILLING-DETECTORS OF WEFT-REPLENISHING LOOMS.

1,040,985. Specification of Letters Patent. Patented Oct. 8, 1912.

Application filed April 19, 1911. Serial No. 622,051.

To all whom it may concern:

Be it known that I, EPPA H. RYON, a citizen of the United States, residing at Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Locking Devices for Filling-Detectors of Weft-Replenishing Looms, of which the following is a specification.

My invention relates to a locking device for a mechanical filling detector or feeler of weft replenishing looms, and more particularly to a filling detector or feeler of the type shown and described in U. S. Letters Patent, No. 972,722, in which a filling detector or feeler feels through an opening in the front wall of the shuttle to engage with the filling on the bobbin in the active shuttle on every other forward movement of the lay, and on the substantial exhaustion of filling operates mechanism to cause the weft replenishing mechanism to supply a fresh bobbin in the usual and well known way. Said filling detector or feeler comprises a slide, which on every second forward movement of the lay is yieldingly held against the filling on the bobbin, and moves therewith toward the front of the loom as the lay beats up, to cause the pivot point of an operating lever to be withdrawn, as long as there is a sufficient amount of filling on the bobbin. Upon the substantial exhaustion of filling on the bobbin, a rocking lever will remain in its inoperative position and cause a pivot point to remain underneath an operating lever of the weft replenishing mechanism, and a bobbin will be dropped from its compartment to the discharging end of the magazine, all in the usual and well known way, and as fully described in the Letters Patent, No. 972,722, above referred to.

The object of my invention is to improve upon the construction of the filling detector or feeler, and more particularly to provide and to combine therewith, supplemental mechanism or means, which on the engagement of the feeler with a full size bobbin, or a substantially full size bobbin, will lock and hold the feeler out of engagement with the filling on the bobbin, and thus prevent the feeler from engaging the filling every other pick, as the loom operates. The filling detector or feeler remains locked and held in its inoperative position, as the loom operates, until upon the change of the shuttle boxes, through intermediate connections therefrom to a sliding rod, said rod causes the filling detector or feeler to be unlocked, and enables it to feel for another bobbin in the active shuttle from another box cell. If the filling on this bobbin has been drawn off sufficiently, and the size of the bobbin, where the feeler engages the filling, has become substantially diminished, the feeler remains unlocked and engages with the filling in the usual way, to detect the substantial or practical exhaustion of the filling on the bobbin. But if the bobbin in the active shuttle from another box cell is full size, or substantially full size, it will cause the filling detector or feeler to be again locked, and held inoperative until the next change of drop shuttle boxes takes place.

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

I have only shown in the drawings a filling detector of the type above referred to, and a detached portion of a stationary magazine, with my improvements combined therewith, sufficient to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawings:—Figure 1 is an end view of a detached portion of a weft replenishing loom, with my improvements combined therewith, looking in the direction of arrow *a*, Fig. 3; the lay beam and shuttle are shown in section. Fig. 2 shows some of the parts shown in Fig. 1, in a different position; some of the parts shown in Fig. 1 are not shown in this figure. Fig. 3 is a front view of the parts shown in Fig. 1, looking in the direction of arrow *b*, same figure; also shows a portion of the selecting mechanism, not shown, in Fig. 1; some of the parts in Fig. 1 are not shown in this figure, and, Fig. 4 is an inner end view of the parts shown in Fig. 3, looking in the direction of arrow *c*, same figure.

In the accompanying drawings, 1 is a stand secured to the breast beam, not shown; said stand 1 has rigidly connected thereto the inner end 2 of a stationary magazine. The stand 3 is secured to the stand 1 by bolts 4, and has a stud 5, carrying a bushing 6, secured thereon by a nut 7, see Fig. 3, to adjustably receive the feeler bed or stand 8, which is clamped on the bushing 6 by a bolt 9, and rests at its front end on an adjusting

bolt 10. The feeler bed 8 is preferably grooved on its upper part to loosely receive the feeler slide 11, which is held thereon by a cap 12, see Fig. 3. The feeler slide 11 has the engaging end 11′ to engage the filling 13 on the bobbin 14 in the active shuttle 15 on the lay 16.

The feeler slide 11 is yieldingly pressed against the filling by an expansion spring, not shown. A connector rod 17 is attached at one end to the feeler slide 11 and at its other end is pivotally connected to the upper end of an upright lever 18, which has its hub 18′ fast on one end of a shaft 19, loosely mounted in bearings 3′ and 3″ on the stand 3, see Fig. 3. A helically coiled torsion spring 20 encircles the shaft 19, and has one end connected to the bearing 3′, and its other end to a collar 21 secured on the shaft 19 by a screw 21′. The torsion spring 20 acts to cause the shaft 19 to rock, and the lever 18 to move with said shaft in the direction of the lay. On the opposite end of the shaft 19 is secured the hub 22′ of an upright lever 22, see Fig. 3. The upper end of the lever 22 is pivotally connected to the outer end of the horizontally extending rod 23, see Fig. 2; the inner end of the rod 23 is loosely guided in the stand 3, and the forward end of said rod extends into an opening or slotted portion 3‴, and is adapted to form the pivot point for the end of the operating lever 24, see Fig. 3, of the selecting mechanism of the magazine.

A rocking movement is communicated to the lever 24 by a cam and lever on the loom, not shown, through a vertically extending connector 25, which has a rod head 26 thereon, guided in a boss 3^a on the stand 3, see Fig. 3. The upper end of the rod head 26 is yoke shaped, and pivotally connected to the center portion of the lever 24. The outer end of the lever 24 has pivotally connected thereto the rod head 27 on an upwardly extending rod or connector 28, see Fig. 3. The upper end of the connector 28 is pivotally connected to a stud 29 on a lever 30, which has its hub 30′ loosely mounted on a rod 31, see Fig. 4, and is prevented from having a longitudinal movement on said rod by two lugs or bearings 2′ on the magazine 2. The rod 31 is connected at its opposite end, through intermediate connections not shown, with the drop shuttle boxes on the opposite end of the loom. The raising and lowering of the drop shuttle boxes will impart a reciprocating movement to the rod 31, to cause it to be moved longitudinally, according to the number of the shuttle boxes, and in this instance to cause said rod to have four different positions longitudinally.

The lever 30 has lugs 30′ thereon, see Fig. 3, to loosely receive the spring actuated bolt 32, which, through the action of a helically coiled expansion spring 33, mounted on the reduced portion of said bolt, bears against the stand 1 when the lever 13 is in a horizontal position, to prevent said lever from moving downwardly, unless through the action of the lever 24.

All of the above mentioned parts may be of the usual and well known construction, as fully shown and described in Letters Patent, No. 972,722, above referred to, and also in Letters Patent, No. 1,030,748.

I will now describe my improvements in locking mechanism for the filling detector or feeler.

The upright lever 22 is provided at its upper end, in this instance on one side thereof, with a roll 34 on a stud 34′; said roll 34 is adapted to travel along the upper edge of a horizontally extending lever 35, see Fig. 1. The lever 35 has its hub 35′ pivotally mounted on a stud 36 on the stand 3, and has the inwardly extending arm 35″, which has connected thereto the upper end of a helically coiled contraction spring 37, see Fig. 2. The lower end of the spring 37 has a chain or flexible connection 38 connected thereto, which leads to a cam lever on the loom, not shown; the movement of said cam lever, through the connection 38, acts to increase or diminish the action of the spring 37 on the lever 35, at the desired time, that is when the roll 34, through the action of a full bobbin, is carried beyond the center of the cam projection 35^c, at which time the action of the cam, not shown, causes a tension on the connection 38 and spring 37, to move the outer end of the lever 35, and through the cam projection 35^c cause an additional outward movement of the roll 34, to cause it to enter the recess or notch 35^b, hereinafter described, and cause the feeler device to move away from the bobbin. The outer end of the lever 35 has an extension 35^a thereon, which forms a recess or notch 35^b, see Fig. 2, adapted to receive the roll 34, if the lever 22 has been moved to its extreme outward position (see Fig. 1), through the rocking of the shaft 19 on the backward movement of the lever 18, by the engagement of the feeler slide 11 with the filling 13 on a full size, or substantially full size bobbin 14. The spring 37, through the arm 35″, moves upwardly the arm 35, and causes the lever 22 to be locked and held in the position shown in Fig. 1, and the feeler slide 11 and feeler 11′ are locked and held in their outer position.

The lever 35 has a cam projection 35^c thereon, of angular shape, which, on the upward movement of the lever 35, is adapted to engage one of the outer inclined surfaces, or enter one of the notches 39′ in the lower end of an upright arm or lever 39, see Fig. 1. The lever 39 has its hub 39″ loosely

mounted on a stud 40 on the stand 1. A lug or extension 39''' on the hub 39' is adapted to adjustably hold, by a screw 41, the lower portion of an upwardly extending arm 42. The arm 42 has the upper engaging end 42' thereon, extending in the path of and engaged by the reciprocating sliding rod 31, see Figs. 1 and 2. A helically coiled contraction spring 43, which has one end connected to a lug 39^a on the lever 39, and its other end connected to a stud 44 on the stand 1, acts to hold the end 42' on the lever 42 in engagement with the sliding rod 31. Through the movement of the drop shuttle boxes and the reciprocating movement of the rod 31, a rocking movement is imparted to the levers 42 and 39, which causes, through the notches 39' on the lower end of the lever 39 engaging the triangular cam extension 35^c on the locking lever 35, said lever 35 to be depressed, to unlock and release the lever 22, the rock shaft 19, and lever 18, and the feeler slide 11 and feeler 11', until another bobbin of full size, or of substantially full size, locks said feeler and feeler slide 11, as above described.

The operation of my improvements in locking mechanism for the filling detector or feeler will be readily understood from the drawings in connection with the above description, and briefly is as follows:—In case of a full size, or a substantially full size bobbin in the active shuttle, as shown in Fig. 1, when the lay advances, the filling on the bobbin engages with the end 11' of the feeler slide 11 and moves backwardly said feeler slide and the lever 18, and rocks the shaft 19, and moves outwardly the lever 22, until the roll 34 on said lever 22, is in position to enter the notch 35^b in the lever 35. The lever 35, through the action of the cam lever, not shown, and the connection 38, spring 37, and arm 35'', raises the lever 35 and causes the roll 34 to move outwardly, and engage with the notch 35^b, and holds the lever 22, the lever 18, and the feeler slide 11 in their outward position. On a change of the shuttle boxes, the movement of the rod 31 to the left in Fig. 2, will move the lever 39 at its lower end, against the action of the spring 43, from the position shown in Fig. 2 to the position shown in Fig. 1, or to an intermediate position. The movement of the rod 31 in the opposite direction will allow the spring 43 to act to move the lever 39 in an opposite direction, that is from the position shown in Fig. 1 to the position shown in Fig. 2. The movement of the lever 39 will cause, through the engagement of the lower end of the lever 39' with the cam extension 35^c on the lever 35, said lever 35 to be depressed, against the action of the spring 37, to release the roll 34 from the notch 35^b in said lever, and allow the torsion spring 20 to act to cause the rocking of the shaft 19, and the movement of the lever 22, and the lever 18, and the feeler slide 11, toward the lay, so that the feeler slide or detector will be in operative position to engage the bobbin on the forward movement of the lay. If there is a sufficient amount of filling on the bobbin to move the feeler slide back far enough to rock the shaft 19, and move the lever 22 far enough to allow the roll 34 on the lever 22 to engage the notch 35^b in the lever 35, then said lever 22 and the lever 18, and the feeler slide 11, will be again locked in their outward position, but if there is not enough filling on the bobbin to move said parts to the position stated, then the feeler slide 11 will be moved into operative position, to enter the active shuttle on every other forward movement of the lay, to detect the substantial exhaustion of filling on the bobbin therein, in the usual way. After the feeler slide has detected the substantial exhaustion of filling on the bobbin, it is retracted or moved backwardly preparatory to the insertion of a full bobbin in the shuttle in any suitable manner, preferably by means of an arm connected with the transferrer arm, which, on the downward movement of the transferrer arm to transfer a full bobbin from the magazine into the active shuttle, engages a projection on the feeler slide, and moves it backwardly to cause the feeler to be moved away from the shuttle, such a mechanism is shown in the drawings of the U. S. Letters Patent, No. 972,722, above referred to.

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 a weft replenishing loom, a feeler or detector to contact with the filling on the filling carrier in the active shuttle, to determine the amount of filling thereon, means to lock said feeler in its inoperative position, and means, operative through connections to the drop shuttle box mechanism, to unlock said feeler.

2. In a weft replenishing loom, a feeler or detector to contact with the filling on the filling carrier in the active shuttle, to determine the amount of filling thereon, means, coöperating with said carrier, to cause said feeler to be moved out of a position to contact with the filling, means to lock said feeler in its inoperative position, and means, operative through connections to the drop shuttle box mechanism, to unlock said feeler.

3. In a weft replenishing loom, a filling feeler, means to cause the same to contact with the filling on the filling carrier at predetermined periods, means, coöperating with the filling on the filling carrier, to move said feeler out of a position to contact with the

filling, means to lock said feeler in its inoperative position, and means, operative through connections to the drop shuttle box mechanism, to unlock said feeler and to allow it to return to its normal operative position.

4. In a weft replenishing loom, a feeler or detector to contact with the filling on the filling carrier, to determine the amount of filling thereon, means, including a movable cam surface, and connections thereto, to cooperate with the filling on the carrier to move said feeler out of a position to contact with the filling, means to lock said feeler in its inoperative position, and means, operative through connections to the drop shuttle mechanism, to unlock said feeler.

5. In a weft replenishing loom, a feeler or detector to contact with the filling on the filling carrier, a rock shaft having an arm thereon, connections from said arm to said feeler, a second arm on said rock shaft, an oscillating lever having a cam surface thereon at one end, means at the same end of said oscillating lever to coöperate with and lock said second mentioned arm, connections from the other end of said oscillating lever to a cam, to operate said lever in one direction, and means coöperating with said cam surface on said lever, to operate said oscillating lever in the opposite direction.

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