

No. 842,117.

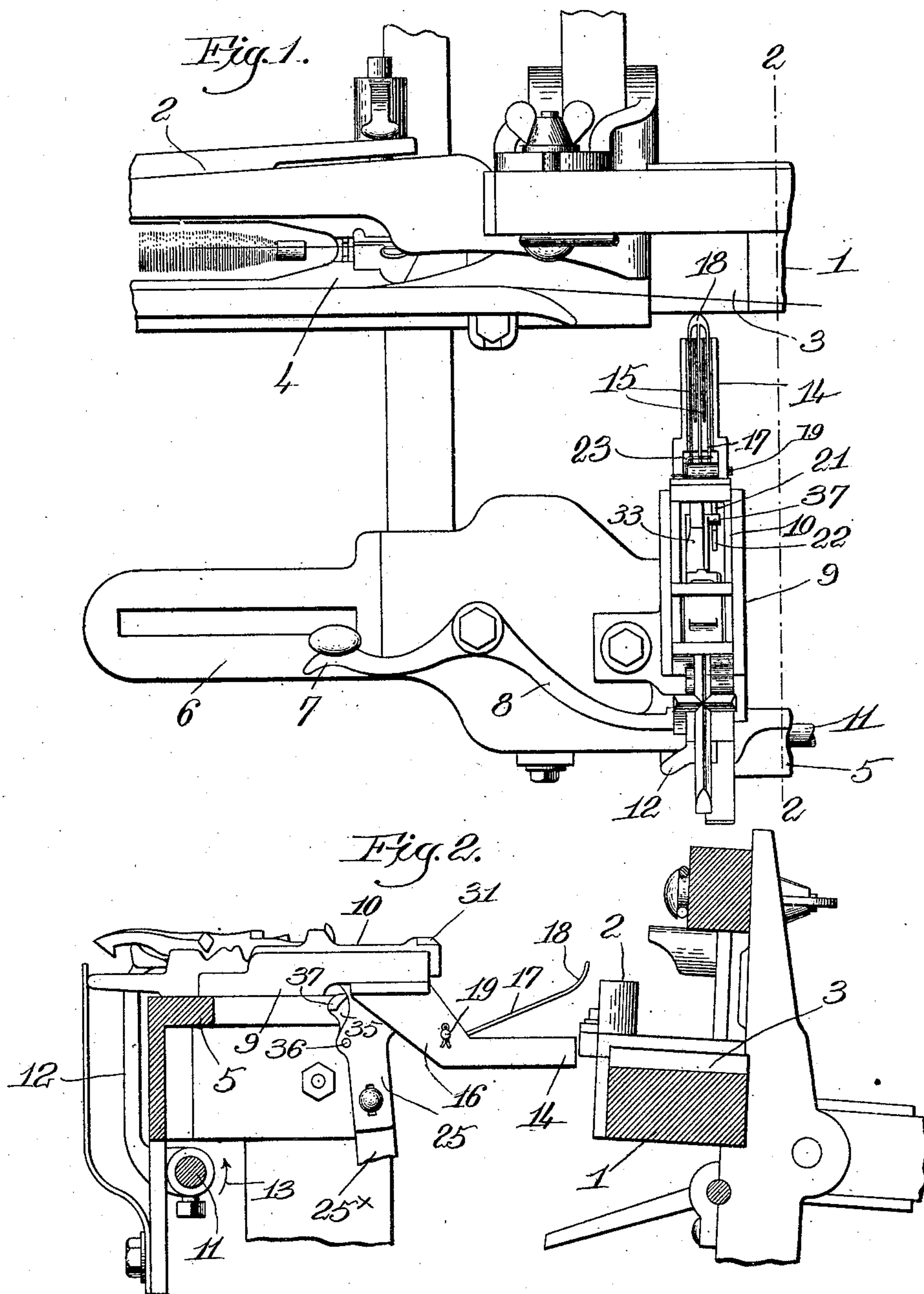
PATENTED JAN. 22, 1907.

C. F. ROPER.

FILLING DETECTING MECHANISM FOR LOOMS.

APPLICATION FILED JUNE 18, 1906.

2 SHEETS—SHEET 1.



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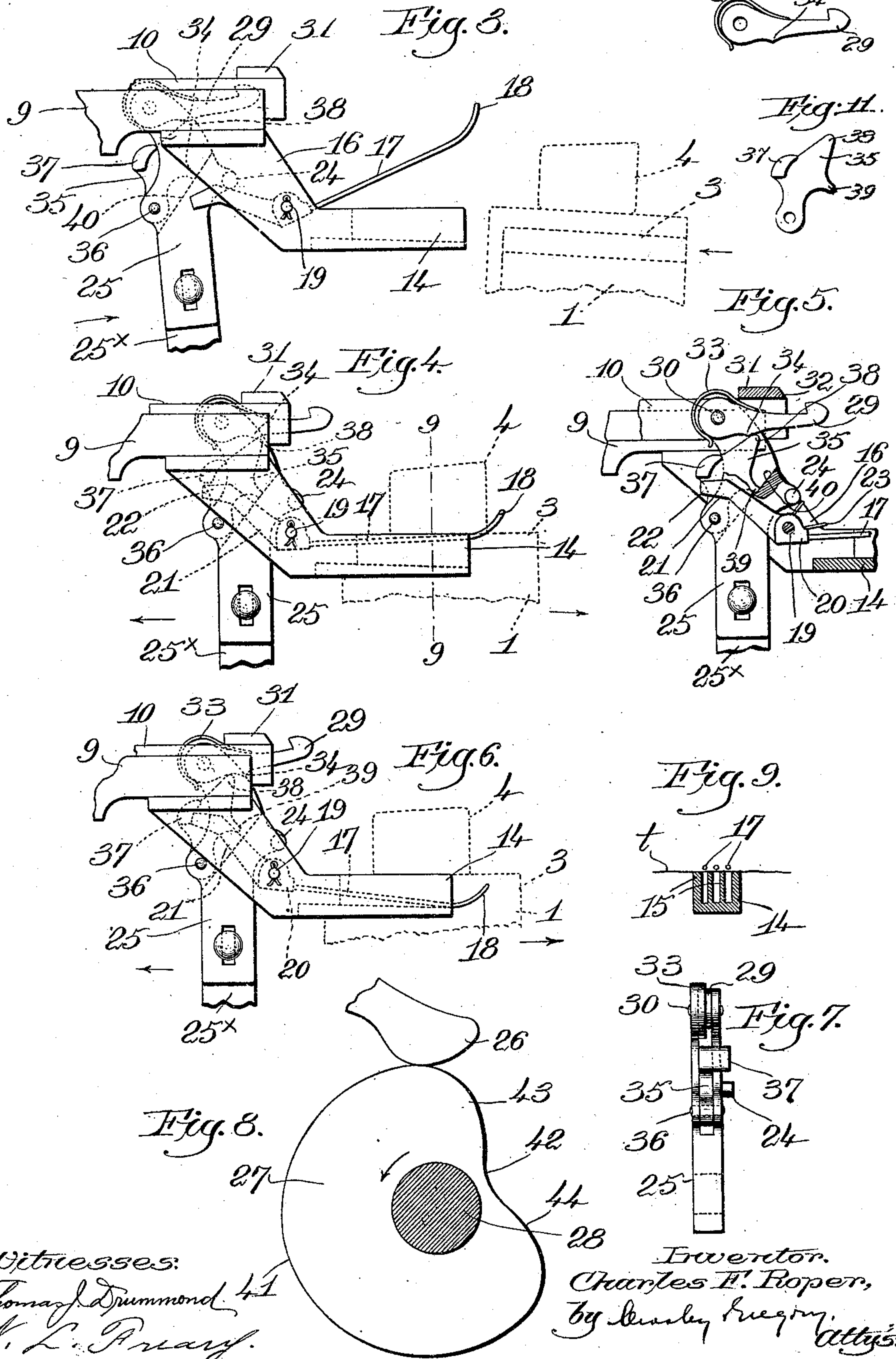
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UNITED STATES PATENT OFFICE.

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FILLING-DETECTING MECHANISM FOR LOOMS.

No. 842,117.

Specification of Letters Patent.

Patented Jan. 22, 1907.

Application filed June 18, 1906. Serial No. 322,133.

To all whom it may concern:

Be it known that I, CHARLES F. ROPER, a citizen of the United States, and a resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Filling-Detecting Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like figures on the drawings representing like parts.

This invention has for its object the production of novel mechanism to detect the presence or absence of filling laid by the shuttle in a loom.

In the present embodiment of my invention I have provided means to intermittently pass beneath and sustain intact filling during detecting action, the filling-detector and said means both being independent of the lay. The movement of the detector is so controlled that after it has detected presence of filling the latter is relieved of undue pressure from the detector, thereby obviating any tendency to strain or crimp the filling, particularly when the latter is soft or fine. When filling absence is detected, I have arranged mechanism to effect automatically a change in the operation of the loom—such, for instance, as a change or replenishment of the running filling or a stoppage of the loom—such change in operation being effected by or through the detector, but without subjecting the latter to any material strain.

The various novel features of construction, arrangement, and operation residing in my present invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a partial top plan view of a loom, showing enough thereof to be understood in connection with my present invention, one practical embodiment of which is applied thereto. Fig. 2 is a transverse sectional detail on the line 2 2, Fig. 1, looking toward the left, the lay being substantially at back center. Fig. 3 is an enlarged detail of the filling-detecting mechanism, showing the various details thereof more clearly. Fig. 4 is a view similar to Fig. 3, but showing the lay forward and the detector in detecting position, the filling being supposed to be present. Fig. 5 is a partly-sectional detail, the nearer side of the bifurcated portion of

the filling support or grid being omitted to show the parts behind it and the vibrator being partly broken out for the same purpose. Fig. 6 is a view similar to Fig. 4, but showing the position of the detector when it has detected filling absence and illustrating the manner in which the mechanism operates to effect a change in the operation of the loom. Fig. 7 is a front elevation of the upper end or head of the vibrator or actuator to be referred to. Fig. 8 is a side elevation of the cam which controls the movement of said vibrator and the coöperating follower. Fig. 9 is a transverse section through the grid and detector on the line 9 9, Fig. 4, just before the detector has detected presence of filling. Figs. 10 and 11 are side elevations, detached, of the vibrator-hook and the hook-positioning device, respectively.

Referring to Figs. 1 and 2, the lay 1, one of the shuttle-boxes 2 thereon, the transverse recess 3, crossing the raceway or path traversed by the shuttle 4, (which latter may be and is herein shown of the automatically self-threading type,) the breast-beam 5, notched holding-plate 6 for the shipper 7, Fig. 1, the knock-off lever 8, and a fixed guide or stand 9 for the slide 10 may be and are all substantially of well-known construction, save that herein the grid or grating on the lay is omitted, and the slide differs from the usual slide in certain particulars to be described. The rock-shaft 11, having an attached upturned arm 12 in the path of the outer end of the slide 10, is substantially as in the Northrop type of loom, such as shown in Northrop's United States Patent No. 529,940, rotation of said rock-shaft in the direction of arrow 13, Fig. 2, effecting the actuation of mechanism to replenish automatically the filling in the running shuttle, as provided for in said patent.

Herein I have provided a stationary grid or grating 14, longitudinally grooved to present a series of adjacent elongated supports 15, Fig. 9, to sustain the filling when intact on detecting picks, the front end of the grid being bifurcated to form upturned cheeks or sides 16, which are rigidly attached to the inner end of the stand 9. This filling-support or grid is so located that it extends rearward opposite the recess 3 in the lay and projects into such recess as the lay beats up, Figs. 4

and 6, the grid being substantially horizontal, and when the filling is present the grid passes beneath it, the filling being indicated at *t*, Fig. 9.

5 A filling detector or fork 17, shown as having its tines curved upward and connected at their tips at 18, is fulcrumed at 19 on and between the cheeks 16 to rock toward and from the grid, the divisions or supports 15 of the latter being so spaced that the fork-tines can drop between them when filling is absent. Extending forwardly from the body 20 of the fork is an extension or tail 21 up-
10 turned with relation thereto, the extremity of the tail having a flat face 22 on its upper edge substantially in parallelism with the fork-tines for a purpose to be described. Ordinarily the balance of the fork is such that when free to move it will drop into the position shown in Fig. 6; but descending movement of the fork may be assisted, if desired, by a light spring 23, attached to one of the cheeks 16 and bearing at its free end on the fork back of its fulcrum 19. The pivotal
20 movement of the fork is controlled by a lateral pin or stud 24 on the side of the up-turned and bifurcated end or head 25 of a vibrator or actuator 25^x, technically designated the "weft-hammer," usual in loom filling-detecting mechanisms, the vibrator in practice having a fixed fulcrum, as usual, and being provided with a foot or follower 26, Fig. 8, to cooperate with an operating-cam 27 on the usual cam-shaft 28 of the loom.
30 This cam will be referred to hereinafter, as it is of peculiar contour. A hook 29 is fulcrumed at 30 on the bifurcated head of the vibrator, the head moving back and forth between the cheeks 16 and in the open slide, the latter herein having a transverse bridge 31, provided with a beveled edge 32 to at times be engaged by the hook 29. When the hook is brought into engagement with the bridge, the slide 10 is moved outward on the outward
40 stroke of the vibrator or actuator, and through the usual means a change in the operation of the loom is effected. This may be a replenishment of filling through the agency of the rock-shaft 11, or the shipper may be released through the knock-off lever 8, Fig. 50 1, to stop the loom, both operations being common in the art. Normally the hook is depressed to pass below the bridge by a suitable spring 33, (shown plainly in Fig. 5,) and on its under edge the hook has a blunt shoulder 34. A hook positioning or governing device or member is mounted between the sides of its bifurcated head, said member being herein shown as a plate 35, fulcrumed at 36 and
60 having a lateral projection or abutment 37 above its fulcrum, the upper end of said member at 38 cooperating with the under edge of the hook 29. A projection 39 on the plate 35 engages the stop-surface 40 of the
65 vibrator-head to retain said positioning

member in normal position, Figs. 3, 4, and 5, the upper end 38 thereof then engaging the hook just back of the shoulder 34. The hook then passes under the bridge as the vibrator swings back and forth, the movement of the latter acting through the controller 24 to govern the action and position of the detector. 70

Referring to Fig. 8, the actuating-cam 27 is shown as substantially heart-shaped, with a long dwell portion 41, also forming the high part of the cam, a low portion 42, and relatively rapid change portions 43 44. 75 When the follower 26 is on the long high or dwell portion 41, the vibrator is in its extreme outward position, Figs. 2 and 3, and at such time the controller 24 depresses the tail or extension 39, lifting the fork well above the grid, and the fork is not permitted to descend until the lay has moved forward and the grid has passed under the filling, if properly laid, on the detecting pick, the backward stroke of the vibrator permitting the detecting movement of the fork to be effected—that is, as the follower 26 travels along the
80 change portion 43 of the cam the head of the vibrator moves back and the controller 24 permits the fork-tail to gradually rise, the fork descending to feel for the filling, and on such stroke of the vibrator the member 35 moves with it as a unit. Just before the abutment 37 is thereby moved into the position shown in Fig. 4 the detecting action takes place, and if the filling is present the fork is held stationary, so that the abutment moves back to a point just over the face 22 on the fork-tail and close thereto. The clearance between the two parts is then so slight that any further downward movement of the fork-tines is prevented by engagement of the
85 abutment with the face 22, and the weight of the fork is thereby taken from the filling, relieving the latter from any strain and preventing the formation of crimps or crinkles. When, however, the fork detects absence of filling, it drops into the position shown in Fig. 6, elevating the front end of the tail 21 into the path of the abutment 37 before the rearward stroke of the vibrator is completed, and as the stroke is completed the hook-positioning member is swung on its pivot 36 into the relative position shown in Fig. 6. Thereby the end 39 of the said member 35 is moved under the shoulder 34 and in front of it, nearer the pivot of the hook 29, so that the latter is raised into position to engage the bridge 31 and move the slide 10 outward as the follower 26 rises from the low point 42 of the cam along the rise 44 to the high part 41. As the engagement between the hook and bridge is completed the beveled edge 32 acts to slightly lift the hook, disengaging it from the member 35, and the latter thereupon returns by gravity to its normal position relative to the vibrator, the projection 39 com- 130

ing to a stop against the surface 40. As soon thereafter as the return or rearward stroke of the vibrator frees the hook from the bridge the spring 33 returns said hook to normal position, Figs. 3, 4, and 5, ready for the next detecting action of the fork. As the cam 27 rotates once for every two picks, the detecting action takes place only on alternate picks, the vibrator being held in its forward position on the intervening picks, and the fork is held raised on such picks by the controller 24 acting upon the fork-tail.

It will be seen that the fork can be made very light in weight, as it is absolutely independent of any pull or strain necessary to move the slide outward, the hook of the vibrator transmitting such strain directly to the vibrator. The change in the relative position of the hook-positioning member 35 to operatively position the hook is of course effected by or through the described cooperation of the end of the fork-tail with the abutment 37. But very little power is required for the purpose. Said abutment is thus effective in changing the position of the member 35 when the filling is absent, and it also acts upon the fork to relieve the filling when present from any strain due to the weight of the fork. When the follower 26 is on the low point 42 of the cam, the parts will be in the relative positions shown in Fig. 4 or 6, according to whether the filling is present or absent, as will be manifest from the foregoing.

My invention is not restricted to the precise construction and arrangement herein shown and described, as the same may be varied or modified in different particulars by those skilled in the art without departing from the spirit and scope of my invention.

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

1. In filling-detecting means for looms, a stationary member to intermittently project beneath the path of and temporarily support intact filling, a detector to detect presence or absence of the filling at such time, and means governed by the detector to effect a change in the operation of the loom upon detection of filling absence.

2. In a loom, a lay having a transverse recess in the shuttle-raceway, a stationary grid to enter the recess below and temporarily support intact filling, a detector to detect presence or absence of filling when the grid is so positioned, and means governed by the detector to effect a change in the operation of the loom upon detection of filling absence.

3. In a loom, a lay, a shuttle to lay the filling across it, a stationary member to intermittently pass under and temporarily support intact filling on the beat-up of the lay, a detector having a stationary fulcrum, to detect presence or absence of filling when said mem-

ber is in operative position, and means actuated upon detection of filling absence by the detector to effect a change in the operation of the loom.

4. In a loom, a lay having a transverse recess in the shuttle-raceway, a stationary grid to enter the recess below and temporarily support intact filling, a detector fulcrumed on the grid and adapted to detect presence or absence of the filling when the grid is operatively positioned, and means to effect a change in the operation of the loom upon detection of filling absence.

5. In a loom, a lay, stationary means to intermittently pass under and support intact filling at a plurality of adjacent points as the lay beats up, a detector fulcrumed on said means and adapted to detect presence or absence of filling when said means is operatively positioned, and means to effect a change in the operation of the loom upon detection of filling absence.

6. In a loom, a lay having a transverse recess in the shuttle-raceway, a substantially horizontal grid to enter the recess as the lay beats up and support intact filling when laid across the raceway, a detector fulcrumed on the grid and adapted to detect presence or absence of filling when the grid is operatively positioned, and means to effect a change in the operation of the loom upon detection of filling absence.

7. In a loom, a lay, a detector having a movement to detect presence or absence of filling, a stationary device to sustain intact filling at a plurality of adjacent points during detecting action, both the detector and said device being independent of the lay, and means independent of said stationary device to control the movement of said detector.

8. In a loom, a filling-detector, a stationary device to intermittently extend beneath and sustain intact filling, means to control movement of the detector to detect presence or absence of filling, and a device to relieve the filling from pressure of the detector when the latter has detected presence of filling.

9. In a loom, a lay, a pivotally-mounted filling-detector, a device independent of the lay to intermittently sustain intact filling, and means to automatically engage and hold the detector up after detection of filling presence, to relieve such filling from pressure by the detector.

10. In a loom, a lay, a fixed grid to intermittently pass beneath and sustain intact filling, a pivoted filling-fork, a controller to govern movement thereof to detect presence or absence of filling, a device to immediately sustain the fork after detection of filling presence, and means, operated by or through the fork when the filling is absent, to effect a change in the operation of the loom.

11. In a loom, means to change the operation thereof, including a slide, a vibrating ac-

tuator provided with a hook to at times engage and move the slide, a filling-fork and a grid, both independent of the lay and the slide, means to control movement of the fork
5 by or through said actuator, and a device to operatively position the hook relatively to the slide when the fork detects filling absence.

12. In a loom, a lay, a grid independent
10 thereof to intermittingly sustain intact filling, a pivotally-mounted filling-fork, a vibrating controller to govern movement of the fork to detect presence or absence of filling, and an operating-cam for the vibrating controller.
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13. In a loom, a pivoted filling-fork having a tail, a vibrator having a hook, a slide engaged and moved thereby upon filling failure, a hook-controller, and means to control
20 movement of the fork, both mounted on the vibrator, movement thereof in one direction causing said means to permit detecting movement of the fork, the fork-tail engaging the hook-controller on such movement if filling
25 is absent and acting therethrough to effect coöperation of the hook and slide on return movement of the vibrator.

14. In a loom, a pivoted filling-fork having a tail, a vibrator having a hook, a slide engaged and moved thereby upon filling failure, a hook-controller having an abutment, and means to control movement of the fork, both mounted on the vibrator, movement of the latter in one direction causing said means
35 to permit detecting movement of the fork, the tail thereof engaging the abutment on such movement if filling is absent and acting therethrough to cause the controller to effect engagement of the hook and slide upon return movement of the vibrator, said abutment acting through the tail to prevent undue pressure of the fork upon the filling when
40 presence thereof is detected.

15. In a loom, a pivotally-mounted filling-fork, a vibrator, means thereon to control
45 movement of the fork to detect presence or

absence of filling, and a device on said vibrator to prevent undue pressure of the fork upon the filling when presence thereof is detected and to cause the vibrator to effect a
50 change in the operation of the loom when the fork detects absence of filling.

16. In a loom having a lay, in combination, a detector, a grid to sustain the filling during detecting action of the detector, said
55 detector and grid being independent of the lay, a vibrator, and a device thereon to prevent undue pressure of the detector on the filling when presence thereof is detected, and to cause the vibrator to effect a change in the
60 operation of the loom when absence of filling is detected.

17. In a loom, in combination, a stationary grid, a filling-fork pivotally mounted thereon, a vibrator, means thereon to control
65 movement of the fork to detect presence or absence of filling, and a member movable with and also relatively to the vibrator to prevent undue pressure of the fork on the filling when sustained by the grid, and to
70 cause the vibrator to effect a change in the operation of the loom when the fork detects absence of filling.

18. In a loom, in combination, a lay, a grid to pass under the shuttle-path on the
75 lay on alternate picks and sustain intact filling, a filling-fork fulcrumed on the grid, a vibrator, means thereon to control detecting movement of the fork, and a rocking member on said vibrator to coöperate with the
80 fork and prevent undue pressure thereof upon the filling when sustained by the grid, and to be moved by or through the fork when the filling is absent to cause the vibrator to effect a change in the operation of the loom.
85

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES F. ROPER.

Witnesses:

E. D. BANCROFT,
O. H. LANE.