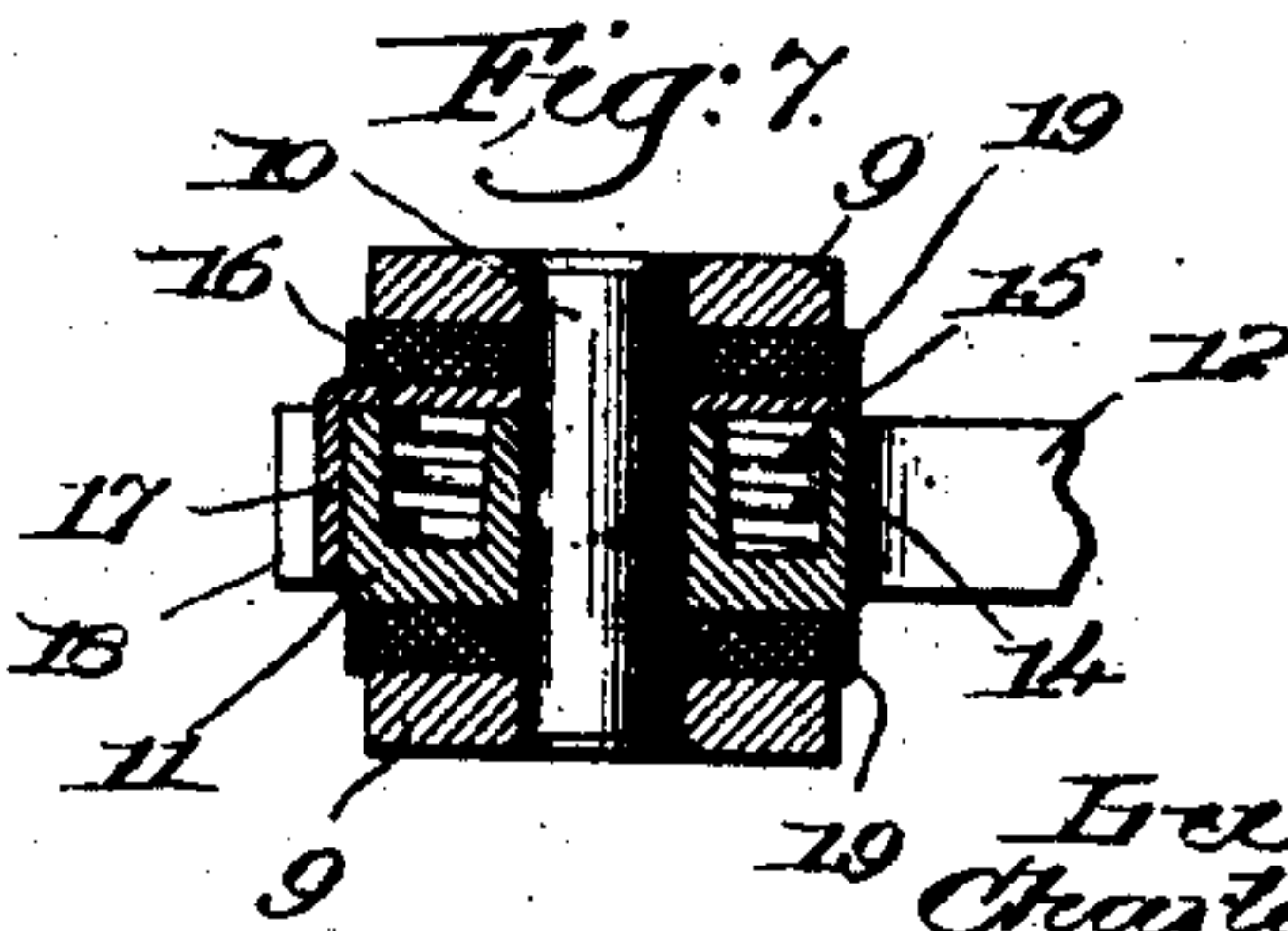
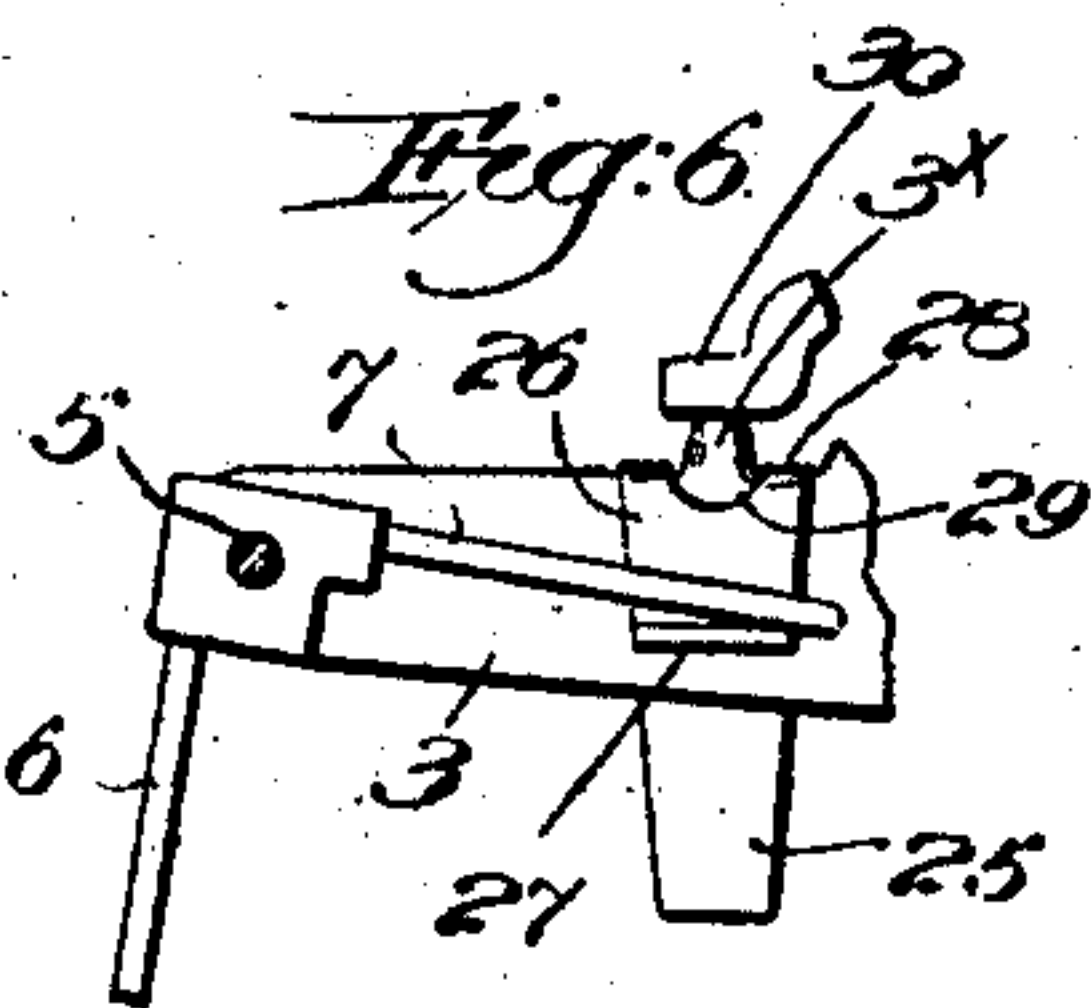
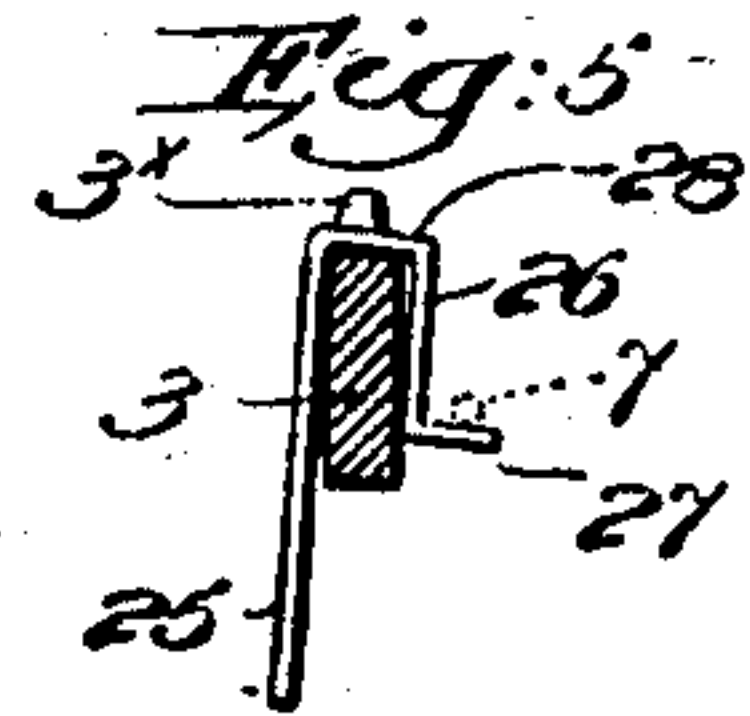
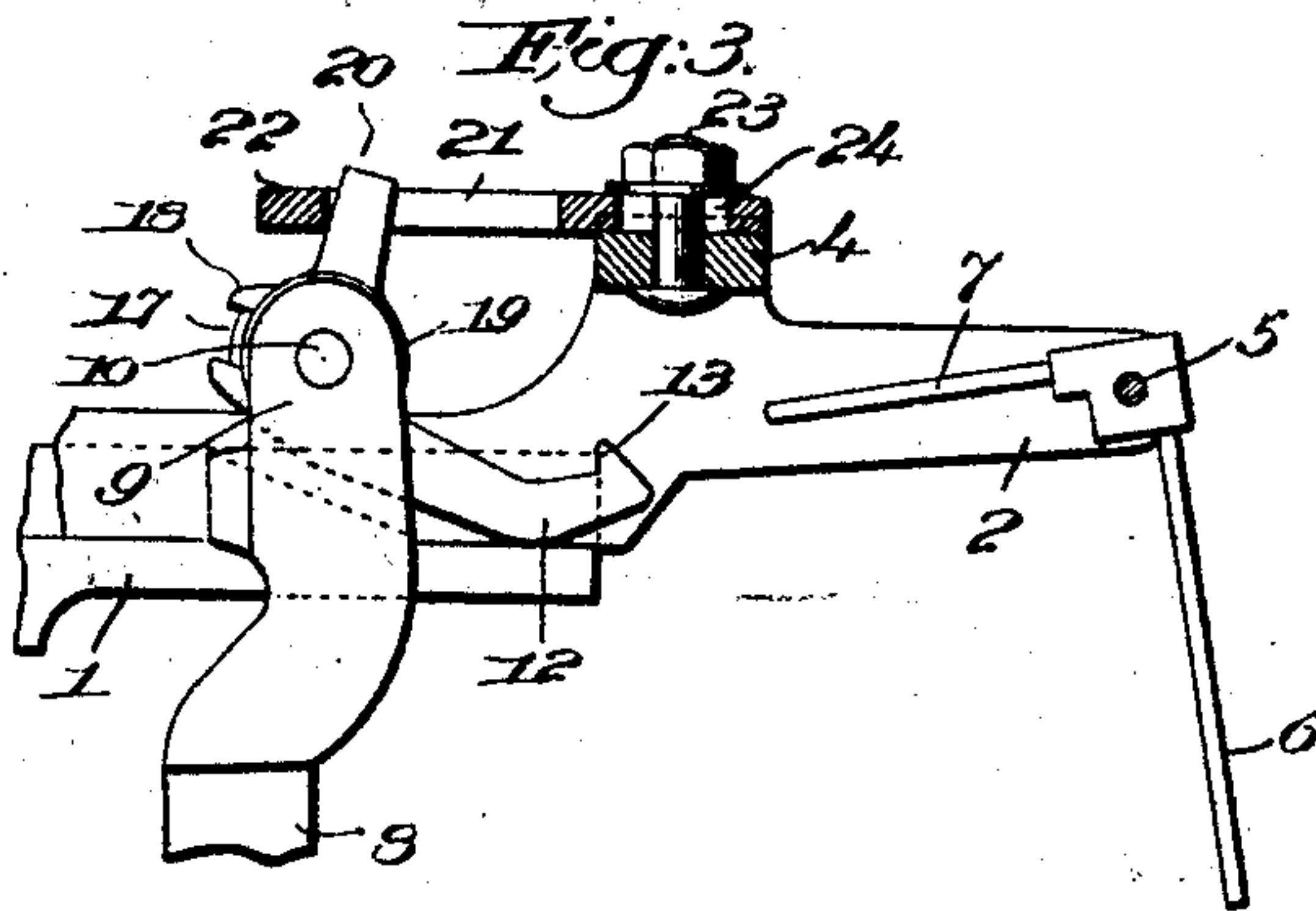
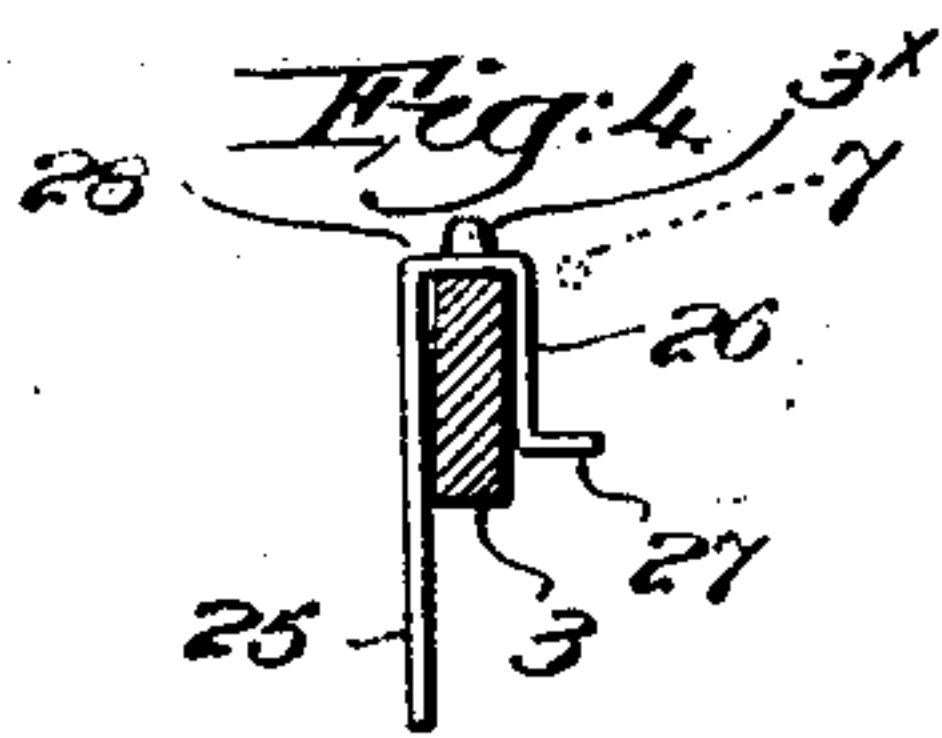
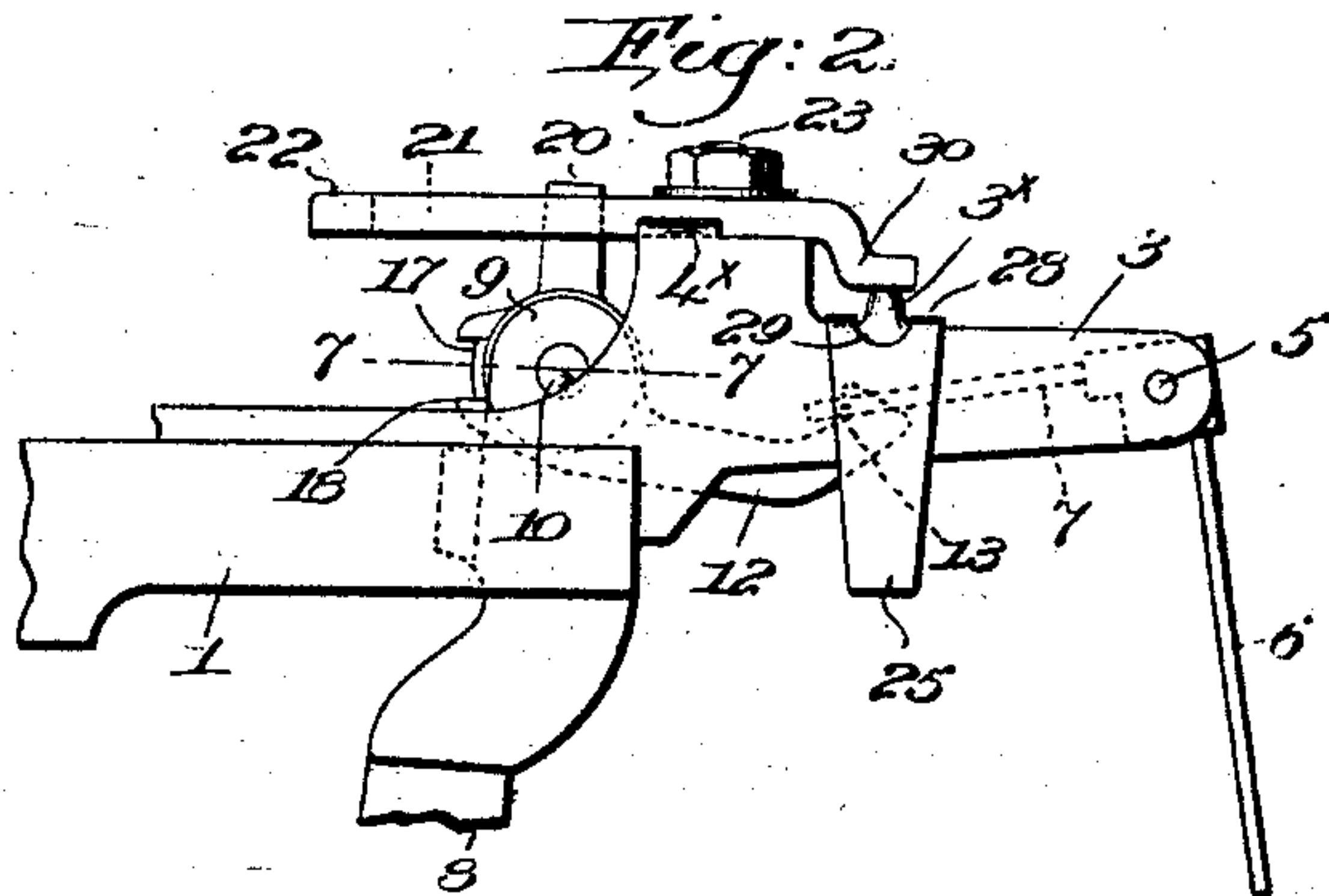
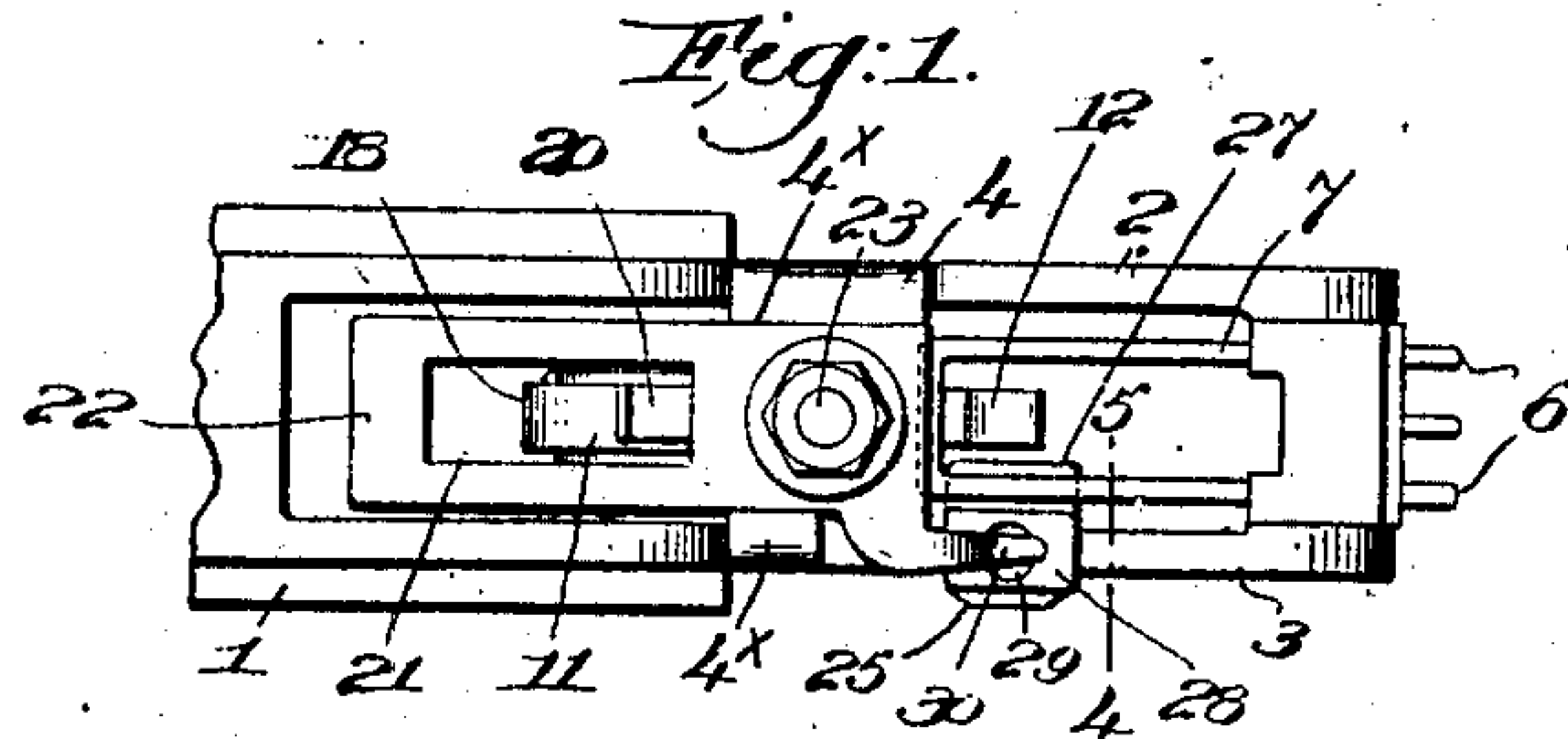


No. 840,377.

PATENTED JAN. 1, 1907.

C. F. ROPER.
FILLING DETECTING MECHANISM FOR LOOMS.
APPLICATION FILED JAN. 17, 1906.



Witnesses,
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UNITED STATES PATENT OFFICE.

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FILLING-DETECTING MECHANISM FOR LOOMS.

No. 840,377.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed January 17, 1906. Serial No. 296,457.

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 characters on the drawings representing like parts.

This invention has for its object the production of novel and efficient mechanism for detecting the failure, either by breakage or complete exhaustion, of the running filling in a loom, means being provided for preventing any engagement or contact between the filling-fork and the hook of the vibrator until filling failure occurs, and I have also provided novel means for preventing rebound or vibrating of the fork after it has been moved by engagement with the intact filling.

The rebounding of the filling-fork after it has been tilted is objectionable, as it causes more or less vibratory movement of the fork, interfering with its prompt and efficient action to detect filling failure.

In my present invention the momentum of the fork, due to its return movement to proper detecting position, is taken up or absorbed so effectually and rapidly that the fork becomes inert or "dead" practically instantaneously in position to properly detect the presence or absence of filling.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a top plan view of a sufficient portion of the filling-detecting mechanism to be understood, one form of my present invention being embodied therein. Fig. 2 is a side elevation thereof, the parts being in position ready to detect. Fig. 3 is a view, partly in elevation and partly in section, with the nearer side of the fork-slide removed, the vibrator or weft-hammer being shown at the outer end of its stroke. Figs. 4 and 5 are transverse sectional details on the line 4 5, Fig. 1, looking toward the left, showing the momentum member or check in normal and abnormal positions, respectively, to be re-

ferred to. Fig. 6 is a detail in side elevation, showing the engagement of the fork-tail with said momentum member, viewed from the interior of the fork-slide; and Fig. 7 is an enlarged section on the line 7 7, Fig. 2, of the friction coupling or connection between the vibrator and its hook.

Referring to the drawings, the guide 1, fixedly mounted on the breast-beam in practice, the bifurcated slide presenting parallel sides 2 3, herein shown as connected by a transverse bridge 4, (said slide being longitudinally movable in the guide 1,) the tilting filling-fork fulcrumed at 5 on the slide and having depending tines 6 and a tail 7, and the vibrator 8, sometimes termed the "weft-hammer," are in general of well-known construction. The forked is adapted to intermittently engage and be tilted by intact filling, the tail 7 at such time being elevated in usual manner, the fork remaining quiescent when the filling fails, and thereby causing outward movement of the fork-slide, as will be explained.

The upper end of the vibrator is herein bifurcated to present upturned cheeks 9, connected by a transverse pin 10, on which is fulcrumed the hub 11 (see Fig. 7) of the hook 12, the latter having at its free rear end a shoulder 13 to coöperate with the fork-tail upon filling failure to effect outward movement of the slide, and thereby cause a change in the operation of the loom. Said hub 11 is annularly recessed at 14 to form a seat for a coiled spring 15, and a metallic disk 16 closes the seat, the disk having a laterally-bent ear 17 extended between two projections 18 on the hub to cause the disk to turn in unison with the hub on the pin 10.

Washers 19, of leather, rawhide, or other suitable material, are interposed between one cheek 9 and one face of the hub and between the disk 16 and the other cheek, the spring acting to press hub and disk against the washers, so that the hook will remain in any angular position relative to the vibrator until positively moved to another position.

The construction just described constitutes a friction coupling or connection between the vibrator and the hook, the hub of the latter having an upturned radial lug 20.

Said lug projects into an elongated slot 21, formed in a plate 22, adjustably secured to the bridge 4 by a clamping-bolt 23, its shank extending through a slotted hole 24 in the plate, (see Fig. 3,) the plate being held from lateral displacement by the raised edges 4^x of the bridge.

The plate 22 is so adjusted that when the vibrator reaches the end of its inward stroke the lug 20 by engagement with the inner end of the slot 21 will rock the hook and elevate it into the position shown in Figs. 1 and 2 when its shoulder 13 is in coöperative relation to the fork-tail. As the fork is tilted by the intact filling the vibrator begins its outward stroke, and on such stroke the lug 20 engages the outer end of slot 21 and rocks the hook, depressing it into the position shown in Fig. 3.

There is no change in the relative position of vibrator and hook till the hook is elevated at the end of the inward stroke, as has been described, to the position shown in Figs. 1 and 2. If, however, the filling fails, the fork will not be tilted and the hook-shoulder engages the fork-tail and the slide is moved outward, carrying with it the plate 22, so that there is no chance of any accidental disengagement of the hook and the fork-tail, and the operation of the loom is changed. By means of the clamping-bolt 23 the plate 22 is accurately adjusted to effect the elevation and depression of the hook at the proper time.

I have provided a check for the fork which not only takes up the momentum thereof after it has been tilted, but also serves as a rest to sustain the fork in detecting position with its tail entirely free from contact or engagement with the hook, no engagement of hook and fork-tail taking place until filling failure is detected.

The principle in mechanics is well known that if a moving body impinges upon a body at rest of substantially the weight of the moving body the latter will be brought to rest at the moment of impact, while the motion is transferred to the body which was at rest.

I make use of this principle in my present invention, the momentum of the fork on its return movement after tilting being transferred to or taken up by a movable body, leaving the fork at rest perfectly inert in detecting position.

The momentum member or check is made of a piece of relatively thin metal bent into substantially \cap shape and having a longer outer leg 25 and a shorter inner leg 26, bent laterally at 27, the legs being connected at their upper ends by a cross-piece 28, having a hole 29 therein, Figs. 1, 2, 4, 5, and 6. This member is dropped onto the side 3 of the fork-slide, loosely straddling the same, the hole 29 receiving an upright projection 3^x on

the side to prevent displacement of the impact member, a finger 30 on the plate 22 resting on the tip of the projection.

The greater weight of the longer outer leg 25 causes the momentum member to assume a normal position, as shown in Fig. 4, slightly lifting the bend or rest 27; but when the fork returns from its tilted position the descending tail 7 impinges upon the rest 27 and acts to rock or shift the momentum member into the position shown in Fig. 5. The effective weight of the momentum member is substantially equal to the effective weight of the fork, so that the fork comes instantly to rest, while its momentum is taken up or absorbed by the movable member or check, the latter being moved to abnormal position.

By taking up or transferring the momentum of the fork to said member there is no rebound to the fork, and it remains dead or inert in detecting position, and, as will be seen from Fig. 2, the fork-tail is not in contact with the hook, being sustained by the rest 27. The fork-tail, however, is then in position to be engaged by the hook-shoulder 13 if filling failure is detected on the next detecting-pick.

As the fork is again tilted by intact filling, raising the tail from the rest 27, the weight of the leg 25 causes the momentum member to shift or move automatically into normal position, Fig. 4, in readiness to again coöperate with the fork.

So far as I am aware it is broadly new to provide means to take up the momentum of the fork after tilting, and I believe it is also new to positively change the position of the hook from operative to inoperative position, and vice versa, and accordingly my invention is not restricted to the precise construction and arrangement herein shown and described, as changes or modifications in various particulars may be made 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. The combination, in a loom, of a slide, a tilting fork mounted thereon and having a tail, a vibrator, a hook thereon to coöperate with the fork-tail upon detection of filling failure, means to positively move the hook into coöperating position with relation to the fork-tail at the inner end of the stroke of the vibrator, and means to sustain the fork in detecting position independent of the hook.

2. The combination, in a loom, of a filling-fork adapted to be tilted by intact filling and provided with a tail, a vibrator, a hook movably mounted thereon to coöperate with the tail upon detection of filling failure, means to positively move the hook into operative position with relation to the tail at the inner end

of the vibrator-stroke and to change the position of the hook at the outer end of the stroke, and means to prevent engagement of the hook and fork-tail until filling failure is detected.

3. The combination, in a loom, of a filling-fork, a vibrator having a hook to cooperate with the fork upon detection of filling failure thereby, and means to prevent any contact between the hook and fork except upon filling failure.

4. The combination, with a filling-fork having a tail, and adapted to be tilted by intact filling, of a vibrator, a hook fulcrumed thereon and to cooperate with the fork-tail upon detection of filling failure, a friction device to normally prevent relative movement of the hook, and vibrator, and means to inoperatively position the hook when the vibrator completes its outward stroke and to operatively position the hook with relation to the fork-tail when the vibrator is at the inner end of its stroke.

5. The combination, with a fork-slide and a filling-fork mounted tiltably thereon and having a tail, of a vibrator, a hook, a friction-coupling between it and the vibrator, said hook having an attached lug radial to its fulcrum, and a slotted plate mounted on the slide and cooperating with the lug, the latter by engaging the outer end of the slot depressing the hook, and elevating the hook by engaging the inner end of the slot, such elevation positioning the hook in readiness to cooperate with the tail if the fork is not tilted.

6. The combination, with a filling-fork having a tail and adapted to be tilted by intact filling, of a vibrator, a hook carried thereby, means to positively move the hook into and out of operative position relative to the fork-tail as the vibrator moves in and out, and a momentum-absorbing member to support the fork-tail free of the hook when the fork is at rest and to prevent rebound of the fork after tilting thereof.

7. The combination, with a filling-fork having a tail and adapted to be tilted by intact filling, and a slide on which the fork is fulcrumed, of a vibrator, a hook carried thereby, means acting on the inward stroke of the vibrator to positively move the hook into position to cooperate with the fork-tail, and a momentum member movably mounted on the slide and acting to support the fork-tail free of the hook when the latter is operatively positioned and to take up the momentum and thereby prevent rebound of the fork after tilting thereof.

8. The combination, with a filling-fork having a tail and adapted to be tilted by intact filling, and a slide on which the fork is fulcrumed, of a vibrator, a hook carried thereby, means acting on the inward stroke of the vibrator to positively move the hook into po-

sition to cooperate with the fork-tail, and a substantially Ω -shaped momentum member loosely straddling one side of the fork-slide and having its inner end bent laterally to support the fork-tail free of the hook when the latter is operatively positioned and to take up the momentum of the fork after tilting thereof.

9. The combination, with a tilting filling-fork, of a momentum-absorbing member to cooperate therewith and prevent rebound after the fork has been tilted.

10. The combination, with a tilting filling-fork, of a movable member to cooperate therewith after tilting and take up the momentum of the fork, preventing rebound.

11. The combination with a filling-fork adapted to be tilted by intact filling, of means which by or through its momentum stops the fork after tilting at a definite point without rebound.

12. The combination, with a filling-fork adapted to be tilted by intact filling, of a slide on which the fork is sustained, and a member movably mounted on the slide to cooperate with the fork after tilting and take up the momentum thereof.

13. The combination with a filling-fork adapted to be tilted by intact filling, of a slide on which the fork is sustained, and a member mounted to rock on the slide and adapted to cooperate with the fork after tilting thereof, the effective weight of said member being so disposed as to take up the momentum of the fork when cooperating therewith.

14. The combination with a filling-fork adapted to be tilted by intact filling and provided with a tail, of a fork-slide, and a momentum-check loosely mounted to rock on the slide and having at its inner end a projection to engage and support the fork-tail, the outer end of said check being heavier than the inner end, engagement of the fork-tail with the inner end of the check after tilting of the fork changing the position of the said check and acting by virtue of its heavier end to take up the momentum of the fork.

15. The combination, with a filling-fork provided with a tail and adapted to be tilted by intact filling, and a slide on which the fork is fulcrumed, of an upright projection on one side of the slide, of a momentum member bent to loosely embrace the side and having an aperture to receive the projection, said member having its shorter inner end bent to form a rest for the fork-tail, the impact of the latter on the said rest after tilting of the fork shifting the position of the momentum member and taking up the momentum of the fork.

16. The combination, with a filling-fork having a tail and adapted to be tilted by intact filling, of a checking device which is moved from its normal position by the im-

10 pact of the fork-tail after tilting of the fork and which returns automatically to normal position when the fork is tilted.

15 17. The combination, with a filling-fork, having a tail and adapted to be tilted by impact filling, and a slide on which the fork is fulcrumed, of a device movably mounted on the slide and which is moved from its normal position by the impact of the fork-tail after
20 tilting of the fork and which returns automatically to such position when the fork is

tilted, said device acting as a rest or support for the tail when the fork is in detecting position.

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

CHARLES F. ROPER.

Witnesses:

GEORGE OTIS DRAPER,
ERNEST W. WOOD.