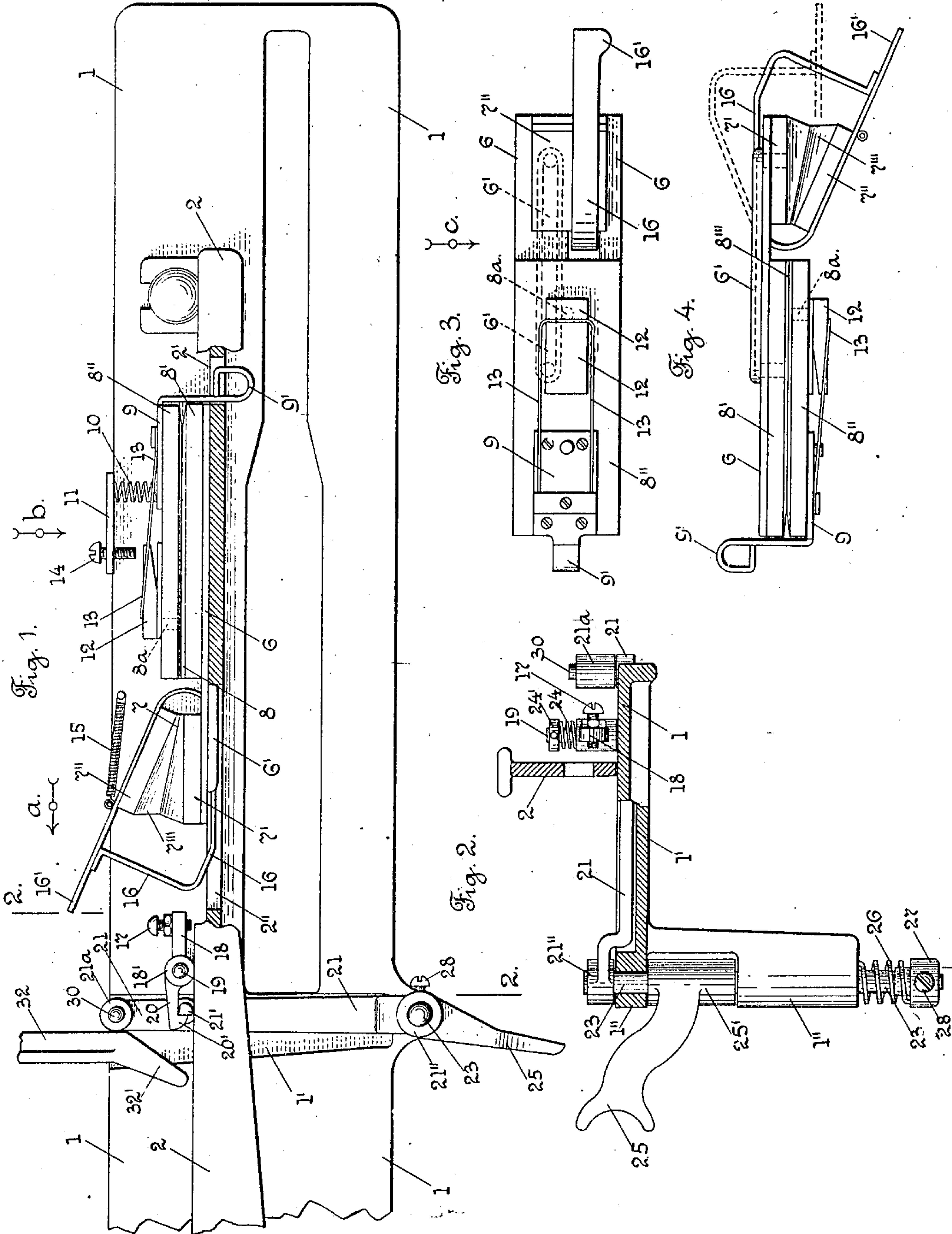


E. H. RYON.
WEFT REPLENISHING LOOM.
APPLICATION FILED FEB. 4, 1909.

943,896.

Patented Dec. 21, 1909.

2 SHEETS—SHEET 1



Witnesses
Mr. Bredt.
Mr. Haas.

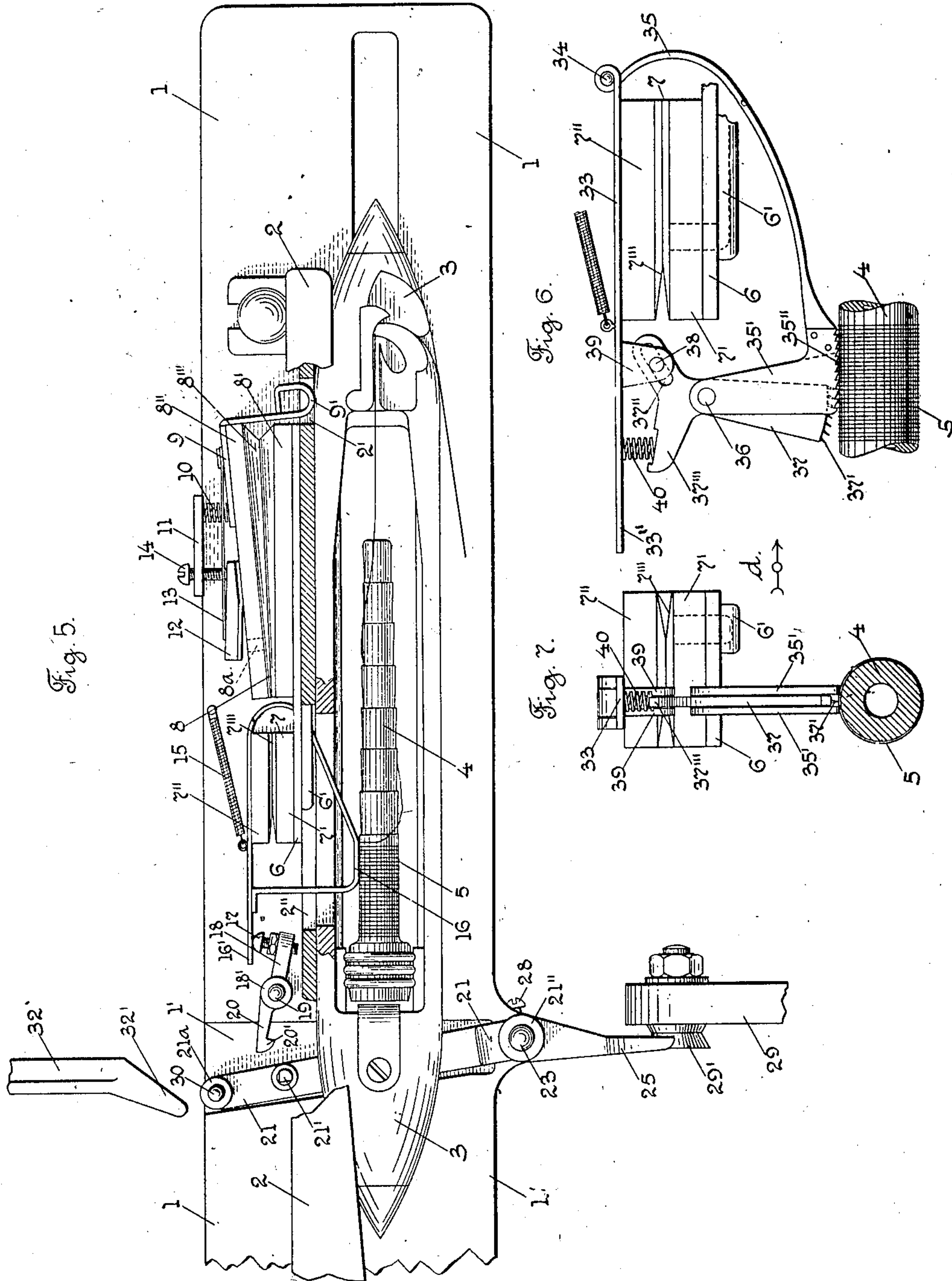
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

EPPA H. RYON, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES
LOOM WORKS, A CORPORATION OF MASSACHUSETTS.

WEFT-REPLENISHING LOOM.

943,896.

Specification of Letters Patent. Patented Dec. 21, 1909.

Application filed February 4, 1909. Serial No. 476,066.

To all whom it may concern:

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

My invention relates to a weft replenishing loom, and particularly to a filling detector mechanism for a weft replenishing loom.

The object of my invention is to provide an improved filling detector mechanism for weft replenishing looms, and more particularly to provide a filling detector mechanism having a part or member to engage the filling in the shuttle, and means to operate said part or member through the medium of air pressure.

In making my improvements in filling detector mechanism, I preferably have a movable part or member, attached to or connected with a pneumatic air device or bellows, which is preferably located on the end of the lay at the magazine end of the loom, and at the rear of the stationary shuttle box at said end of the lay. Said movable part is adapted to enter through an opening in the rear wall of the shuttle box, and through an opening in the shuttle, every time that the active shuttle enters the stationary shuttle box, and on the substantial or practical exhaustion of the filling in the shuttle, operates mechanism connected with the weft replenishing mechanism, to cause a fresh filling carrier or bobbin to be supplied to the shuttle in place of the substantially exhausted bobbin, in the usual and well known way.

The feeler or filling detector, which engages the filling in the active shuttle, is operated preferably through external air pressure, which acts to move the movable member of a pneumatic device or bellows, after the air has been partially exhausted or withdrawn from the bellows, and also to move the feeler or filling detector connected with said bellows, to cause it to enter the opening in the shuttle box and shuttle, and engage the filling in the active shuttle, and, on the practical or substantial exhaustion of filling in said shuttle, put into operation mechanism to supply a fresh filling carrier or bobbin to said shuttle.

In the preferred form of my improvements, the bellows with which the filling detector or feeler is connected, is located at the rear wall of the stationary shuttle box, and is connected, through an air tight passage or conduit, with a second bellows, also located at the rear of the stationary shuttle box. The second bellows has a larger capacity than the first mentioned bellows, and is adapted to be filled with air, or expanded, preferably by the active shuttle, when it enters the stationary shuttle box. The expansion of the larger bellows will cause the partial exhaustion of air from the smaller bellows, and the collapse, or partial collapse of said smaller bellows will operate the feeler, and through connections to the weft replenishing mechanism, will, on the substantial exhaustion of filling in the active shuttle, put into operation said mechanism to supply fresh filling.

My invention consists in certain novel features of construction of my improvements, which are adapted to be applied to, and used on any well known form of weft replenishing loom having a magazine for bobbins or filling carriers, which magazine is either stationary, or movable.

I have only shown in the drawings a detached portion of a stationary shuttle box at the magazine end of the loom, with my 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 detached plan and partial sectional view of a stationary shuttle box, and my improvements applied thereto. Fig. 2 is a section, on line 2, 2, Fig. 1, looking in the direction of arrow *a*, same figure. Fig. 3 is a rear view of the bellows, detached, looking in the direction of arrow *b*, Fig. 1. Fig. 4 is an edge or top view of the parts shown in Fig. 3, looking in the direction of arrow *c*, same figure. Fig. 5 corresponds to Fig. 1, but shows some of the parts shown in Fig. 1, in a different position, and also shows some additional parts. Fig. 6 shows, on an enlarged scale, a modified construction of the filling detector or feeler shown in the previous figures, and Fig. 7 is an end and sectional view of the parts shown in Fig. 6, looking in the direction of arrow *d*, same figure.

In the accompanying drawings, 1 is a portion of the race-plate at the end of the lay, 2

is the rear wall of a stationary shuttle box, 3 is a self-threading shuttle, which may be of any usual and well known construction, 4 is a bobbin, and 5 the filling thereon.

5 Secured to the rear side of the wall 2 is a plate 6, which in this instance has suitably mounted thereon two pneumatic devices, in the form of bellows 7, and 8. The plate 6 is provided with a longitudinal extension 6', which forms an air passage, or conduit between the bellows, and is shown by broken lines in Fig. 4. The air conduit 6' opens into each bellows 7, and 8. The bellows 8 is in this instance of a larger capacity than the bellows 7, and acts as an exhaust for the said bellows 8.

The bellows 8 may be made in any usual way, and consists in this instance of a stationary member 8', secured upon the plate 6, and a movable member 8'', and the flexible material 8''' connecting said members. On the movable member 8'' of the bellows 8 is secured a plate 9 having an inwardly extending end part, preferably with a loop end 9' thereon, which is adapted to enter through an opening 2' in the rear wall 2 of the stationary shuttle box. The end 9' extends in the path of, and is adapted to be engaged by the outer end of the shuttle, as it enters the shuttle box, as shown in Fig. 5.

30 A helically coiled expansion spring 10 bears at one end against the plate 9, or the outer side of the movable leaf or member 8'' of the bellows 8, and at its other end against a plate or extension 11 extending up from the rear of the race-plate 1, see Figs. 1, and 5. The spring 10 acts to move inwardly the movable leaf 8'', and to collapse the bellows, as shown in Fig. 1, after the shuttle has been picked from the shuttle box. A plate 12 supported on the outside of the leaf 8'' to have a rocking motion, is yieldingly held in its lowered closed position by a spring wire 13, secured to the movable leaf 8'', and said plate 12 forms an air tight cover for an opening 8^a in the leaf 8''. The plate 12 acts as a valve, which is automatically opened by the engagement of the inner end of a screw 14, in this instance carried on the plate 11, whenever the movable leaf 8'' of the bellows is moved outwardly, as shown in Fig. 5.

When the bellows 8 is expanded, through the action of the shuttle, as shown in Fig. 5, the air from the smaller bellows 7 is partially exhausted through the conduit 6', and the bellows 7 is collapsed by the external air pressure, against the action of the spring 15, attached at one end to the movable leaf 7'' and at its other end to the race-plate 1, to operate the filling feeler or detector.

The filling feeler or detector consists preferably of a frame or loop-like device 16, which is preferably made of a flat piece of metal bent into the shape shown, and secured

upon the movable leaf or member 7'' of the bellows 7, which has the stationary leaf 7' attached to the plate 6, and the flexible material 7''' connecting the two leaves 7', and 7''. The filling detector or feeler 16 is adapted to extend through an opening 2'' in the rear wall of the stationary shuttle, and to engage with the filling on the bobbin in the shuttle, as shown in Fig. 5.

When the filling on the bobbin is practically or substantially exhausted, the extension 16' on the filling detector or feeler 16 will engage in this instance a set screw 17, which is adjustably secured in the end of an arm 18 having a hub 18' loosely mounted on a stud 19.

Extending out from the hub 18' is an arm or latch 20, having a hook end 20', which is adapted to hook over and engage a projection 21' on a lever 21. The lever 21 extends in a groove or recess 1' in the upper side of the race-plate, see Fig. 2, and has its attached end offset and provided with a hub 21'', fastened on the upper end of a vertically extending rock shaft 23, which is mounted in bearings 1'' on the lower side of the race-plate 1, see Fig. 2.

A helically coiled torsion spring 24 encircles the stud 19, see Fig. 2, and is secured at one end to a collar 24' fast on said stud, and at its other end to the hub 18' of the arm 18, and acts to yieldingly move said arm and the hook arm 20, to cause the hook end 20' thereon to be held in engagement with the projection 21' on the lever 21, to hold said lever in the position shown in Fig. 1, and also hold the dagger 25 in its inoperative position, shown in Fig. 1.

The dagger 25 has a hub 25', which is fast on the vertically extending shaft 23, see Fig. 2. The lower end of the shaft 23 has thereon, in this instance, a torsion spring 26, which encircles the shaft and is attached at one end to the bearing 1'', and at its other end to a collar 27 secured on the lower end of the shaft 23 by a set screw 28. The torsion spring 26 acts to partially rotate the shaft 23 and carry the dagger 25 into operative position, when the lever 21 is released by the hook arm 20, as shown in Fig. 5. The dagger 25, when in operative position, extends in the path of and is adapted to engage, in this instance an extension 29' on the end of the transfer lever 29, see Fig. 5, which forms a part of and is connected with the transferring mechanism of the magazine, in any usual and well known way.

On the outer end of the lever 21, on a stud 30, is in this instance mounted a roll 21^a, which is adapted to extend into the path of and engage the inclined or beveled edge 32' on a stationary arm 32, on the backward movement of the lay, to cause the movement of the lever 21 and also the dagger 25, from the position shown in Fig. 5,

to the position shown in Fig. 1, and allow the engagement of the hook arm 20 with the projection 21' on the lever 21, to lock or hold said lever and the dagger 25 in their inoperative position.

In Figs. 6, and 7 is shown a modified construction of my feeler or filling detector mechanism. In said figures, the filling detector or feeler, instead of being made in one part, as shown in the previous figures, is made in several parts, and consists of a plate or strip 33, secured upon the movable member 7'' of the bellows 7. The outer end of the plate 33 carries a stud or pin 34, to which is pivotally attached one end of a curved shaped strip or plate 35; the other end of said strip 35 has in this instance attached thereto two plates 35', having a space between them, and preferably provided with teeth, or serrated edges 35'' on their engaging surfaces. The two plates 35' carry a stud 36 at their inner ends, on which is pivotally mounted a plate 37, having teeth 37' on its engaging end. The plate 37 has an elongated slot or opening 37'' therethrough, through which extends a stud 38 on an ear or lug 39 extending down from the plate 33, see Fig. 6. A helically coiled expansion spring 40 extends between an extension 37''' on the plate 37, and the outer side of the plate 33, and acts to yieldingly move the plate 37 on its pivotal support, to cause it to enter between the two plates 35' on the plate 35, and into its inoperative position.

When in the operation of the loom, the plates 35' having the tooth portions 35'' thereon, are moved toward the bobbin to engage the filling, as shown in Fig. 6, the filling is depressed, and the engagement of the teeth 37' on the movable plate 37, will cause said plate, by its engagement with the filling, to be held in its inoperative position as long as there is a sufficient amount of filling on the bobbin. When the filling on the bobbin is practically or substantially exhausted, as shown in Fig. 6, the few layers of filling on the bobbin will not be depressed sufficiently to cause the teeth 37' on the plate 37 to be held, and said plate will move away from the plates 35', as shown in Fig. 6, and allow the further movement of the plate 37, and consequently allow the extension 33'' on the plate 33 to engage an adjusting screw, corresponding to the adjusting screw 16, shown in Figs. 1, and 5, and above described, and release the lever 21 and the dagger 25, to put into operation the web replenishing mechanism, all as will be fully understood by those skilled in the art.

From the above description in connection with the drawings the operation of my improvements shown in Figs. 1 to 5, will be readily understood by those skilled in the art, and briefly is as follows:—When the loom is in operation, and the shuttle is in

the shuttle box on the opposite end of the loom from that shown in the drawings, or is in transit from said shuttle box to the shuttle box shown in the drawings, the parts of my filling detector mechanism will be in the position shown in Fig. 1. When the shuttle enters the shuttle box shown in the drawings, and approaches the end of its travel, the rear side of the shuttle, near the outer end thereof, will engage with the loop end 9' on the plate 9 attached to the movable member 8'' of the bellows 8, as shown in Fig. 5, the parts of the bellows 7 being in the position shown in Fig. 1, and will move out said plate 9 and with it the movable leaf 8'' of the bellows 8, and cause the inner end of the screw 14 to engage the outer end of the plate 12, to move said plate, against the action of the spring 13, into the position shown in Fig. 5. During the outward movement of the leaf 8'', a partial vacuum is formed in the bellows 8, causing the air in the smaller bellows 7 to pass out into the larger bellows 8, and the pressure from the external air to move inwardly the leaf 7'' of the bellows 7, against the action of the spring 15, and collapse the bellows 7, as shown in Fig. 5. The inward movement of the leaf 7'' of the bellows 7, carries inwardly the filling detector or feeler 16, and causes it to enter through the opening in the rear of the stationary shuttle box, and through the opening in the shuttle, and engage with the filling on the bobbin in the shuttle. When the end of the valve plate 12 comes in contact with the end of the lever 14, the opposite end of said valve plate is raised sufficiently to allow the air to enter the bellows 8 through the opening 8^a, and through the conduit 6' enter and fill the bellows 7, as the leaf 7'' is being drawn back by the spring 15 to its inoperative position, shown in Fig. 1. As long as there is a sufficient amount of filling on the bobbin, the loom continues to operate in the normal way, and when the shuttle is picked from the shuttle box shown in the drawings, the spring 10 acts to return the movable leaf 8'' of the bellows 8, to its inward or closed position, and the spring 13 acts to close the plate or valve 12 over the opening 8^a, and the spring 15 acts to move outwardly the leaf 7'' on the bellows 7, and with it the filling detector or feeler 16, to carry the same out of the shuttle box, as shown in Fig. 1. When the filling on the active shuttle is practically or substantially exhausted, as shown in Fig. 5, the inward movement of the filling detector or feeler 16 is sufficient to cause the extended end 16' thereof to engage with the screw 17 on the arm 18, and rock said arm, and with it the hook arm 20, to disengage it from the projection 21' on the lever 21, and allow the spring 26 to act, to move the lever 21 and the dagger 25, and carry said dagger

into the path of the extension 29' on the arm 29, as shown in Fig. 5, and operate said arm 29, to put into operation the weft replenishing mechanism, to transfer a fresh bobbin into the active shuttle to take the place of the substantially exhausted one, in the usual way.

The operation of the modified construction of my improvements has already been described.

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, an automatic filling detector mechanism, comprising a member to engage the filling in the active shuttle, and means, operative through air pressure, to operate said member and cause it to engage the filling.

2. In a weft replenishing loom, an automatic filling detector mechanism, comprising a member to engage the filling in the active shuttle, and means, operative through air pressure, to operate said member, and cause it to engage the filling, said means put into operation by the boxing of the shuttle.

3. In a weft replenishing loom, an automatic filling detector mechanism, comprising a reciprocating member to engage the filling in the active shuttle, and means to operate the same to cause it to engage the filling, said means including a shuttle, and mechanism operative by air pressure.

4. In a weft replenishing loom, an automatic filling detector mechanism, comprising a reciprocating member to engage the filling in the active shuttle, a shuttle, and means, operative by said shuttle, through the medium of air pressure, to cause the movement of said member.

5. In a weft replenishing loom, an automatic filling detector mechanism, comprising a member to engage the filling in the active shuttle, a dagger, a spring connected with said dagger, mechanism to hold said dagger against the action of said spring, and means, operated through air pressure, to cause said member to release said dagger, and allow the spring to move the same into operative position.

6. In a weft replenishing loom, an automatic filling detector mechanism, comprising a member to engage the filling in the active shuttle, a dagger, a spring connected with said dagger, mechanism to hold said dagger against the action of said spring, and means, operated through air pressure, to cause said member to release said dagger, and allow the spring to move the same into operative position, and means to automatically reset the dagger.

7. In a weft replenishing loom, an auto-

matic filling detector mechanism, a reciprocating member to engage the filling in the active shuttle, mechanism operated through the medium of air pressure and connected to said member to move the same, and a second mechanism, and means to operate the same, and an air passage from said first-mentioned mechanism to said second mentioned mechanism.

8. In a weft replenishing loom, an automatic filling detector mechanism located on and movable with the lay, and comprising an oscillating member having a second member attached to and yieldingly movable therewith, a dagger normally inoperative, and devices combined with said dagger to operate the same, and means to cause said member to feel for the filling in the active shuttle, and cause a relative movement of said members, one with the other, when said filling is practically exhausted, and connections from one of said members to said dagger, whereby said dagger is moved into an operative position.

9. In a weft replenishing loom, an automatic filling detector mechanism, comprising an oscillating member to engage the filling in the active shuttle, a swinging member pivoted on said oscillating member, and each member having an end to engage with the filling in the active shuttle, a yielding connection between said oscillating member and said swinging member, and devices operative to move said members, and cause the end of said swinging member to move over the filling on the filling carrier, when the same is practically exhausted.

10. In a weft replenishing loom, an automatic filling detector mechanism carried on and movable with the lay, and located at the magazine end of the loom, and comprising a bellows, a connection intermediate the movable leaf of said bellows and a shuttle, to extend in the path of and be engaged by the shuttle when it is boxed, and cause the expansion of said bellows, and the uncovering of an opening therein, an air conduit from said bellows to a second bellows, and said second bellows, and a feeler or filling detector attached to and movable with the movable leaf of said second bellows, and adapted to engage the filling in the active shuttle, and connections intermediate said filling detector and an operating arm of the weft replenishing mechanism.

11. In a weft replenishing loom, an automatic filling detector mechanism carried on and movable with the lay, and located at the magazine end of the loom, and comprising a bellows, a connection intermediate the movable leaf of said bellows and the shuttle, to extend in the path of and be engaged by the shuttle when it is boxed, and cause the expansion of said bellows and the uncovering of an opening therein, an air conduit

from said bellows to a second bellows, and said second bellows, and a feeler or filling detector attached to and movable with the movable leaf of said second bellows, and adapted to engage the filling in the active shuttle, and connections, intermediate said filling detector and an operating arm of the weft replenishing mechanism, said connections comprising a pivotally mounted arm carrying an adjusting screw, a hooked arm, a pivotally mounted lever engaged by said hook arm, a dagger movable with the said lever, a spring for moving said lever and dagger in one direction, and means for positively moving said lever and dagger in the opposite direction.

12. In a weft replenishing loom, a pneumatic device operative by the boxing of the shuttle, a second pneumatic device, and an air passage or conduit from said first-mentioned device to said second-mentioned device, a member to cooperate with the filling in the shuttle, said member attached to said second-mentioned device, an automatic valve attached to the first-mentioned device, and means to automatically operate said first-mentioned device.

13. In a weft replenishing loom, a pneumatic device operative by the boxing of the shuttle, a second pneumatic device, and an air passage or conduit from said first-mentioned device to said second-mentioned device, a member to cooperate with the filling in the shuttle, said member attached to said second-mentioned device, an automatic valve attached to the first-mentioned device, and means to automatically operate said first-mentioned device, and means to yieldingly hold said second-mentioned device in an inoperative position.

14. In a weft replenishing loom, a pneumatic device operative by the boxing of the shuttle, a second pneumatic device, and an air passage or conduit from said first-mentioned device to said second-mentioned device, a member to cooperate with the filling in the shuttle, said member attached to said second-mentioned device, an automatic valve attached to the first-mentioned device, and means to automatically operate said first-mentioned device, and means to yieldingly hold said second-mentioned device in an inoperative position.

15. In a weft replenishing loom, a member to cooperate with the filling in the shuttle, a pneumatic device connected with said member and adapted to operate the same, a second pneumatic device, an air passage or conduit from said second-mentioned device

to said first-mentioned device, means to operate said second-mentioned device whereby the density of air in the first-mentioned device may be changed, and means to yieldingly hold said member, which cooperates with the filling in the shuttle, in an inoperative position.

16. In a weft replenishing loom, a lay, a dagger located on said lay, a spring, and a lever connected to said dagger, and movable therewith, a latch to cooperate with said lever, and hold said dagger in an inoperative position against the action of said spring, and means operative by the shuttle to release said latch and allow said dagger to be moved by said spring into its operative position.

17. In a weft replenishing loom, a dagger, a spring connected therewith, a lever connected to said dagger and movable therewith, a latch to cooperate with said lever and hold said dagger in an inoperative position, against the action of said spring, and means operative by the shuttle to release said latch, and allow said dagger to be moved by said spring into its operative position, said means including mechanism operative through the medium of air pressure.

18. In a weft replenishing loom, a dagger, a spring connected therewith, a lever connected to said dagger and movable therewith, a latch to cooperate with said lever and hold said dagger in an inoperative position, against the action of said spring, and means operative by the shuttle to release said latch and allow said dagger to be moved by said spring into its operative position, said means including mechanism operative through the medium of air pressure, and means to automatically reset said dagger.

19. In a weft replenishing loom, a shuttle, an automatic filling detector mechanism, including a member to enter the shuttle to determine the amount of filling therein, and devices, operative through air pressure, to operate said member.

20. In a weft replenishing loom, an automatic filling detector mechanism, comprising a member to cooperate with the filling in the shuttle, means to operate said member, a transfer mechanism, and devices connected with said member and operative through air pressure, to put said transfer mechanism into operation to cause a change of filling.

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Witnesses:

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