

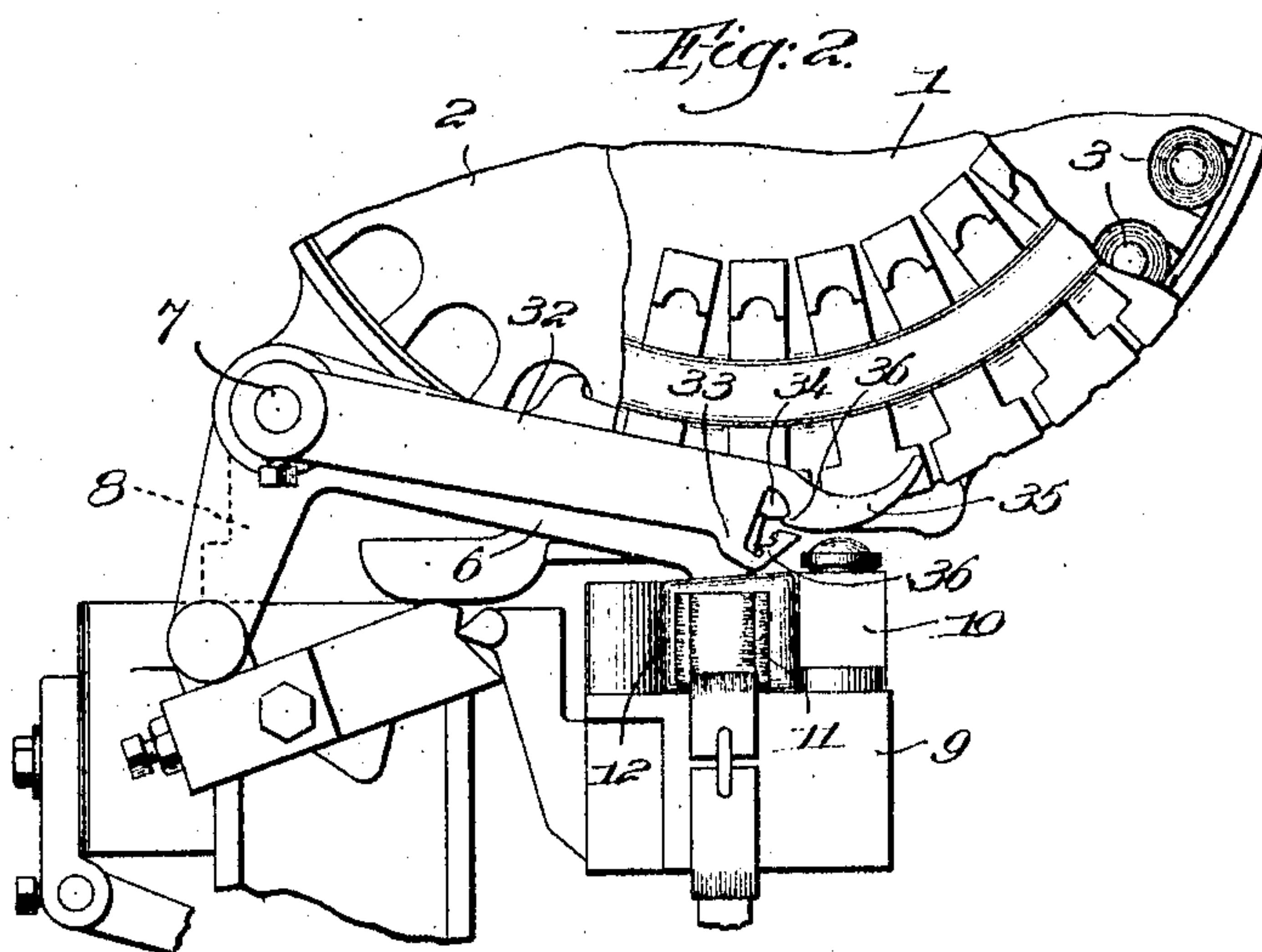
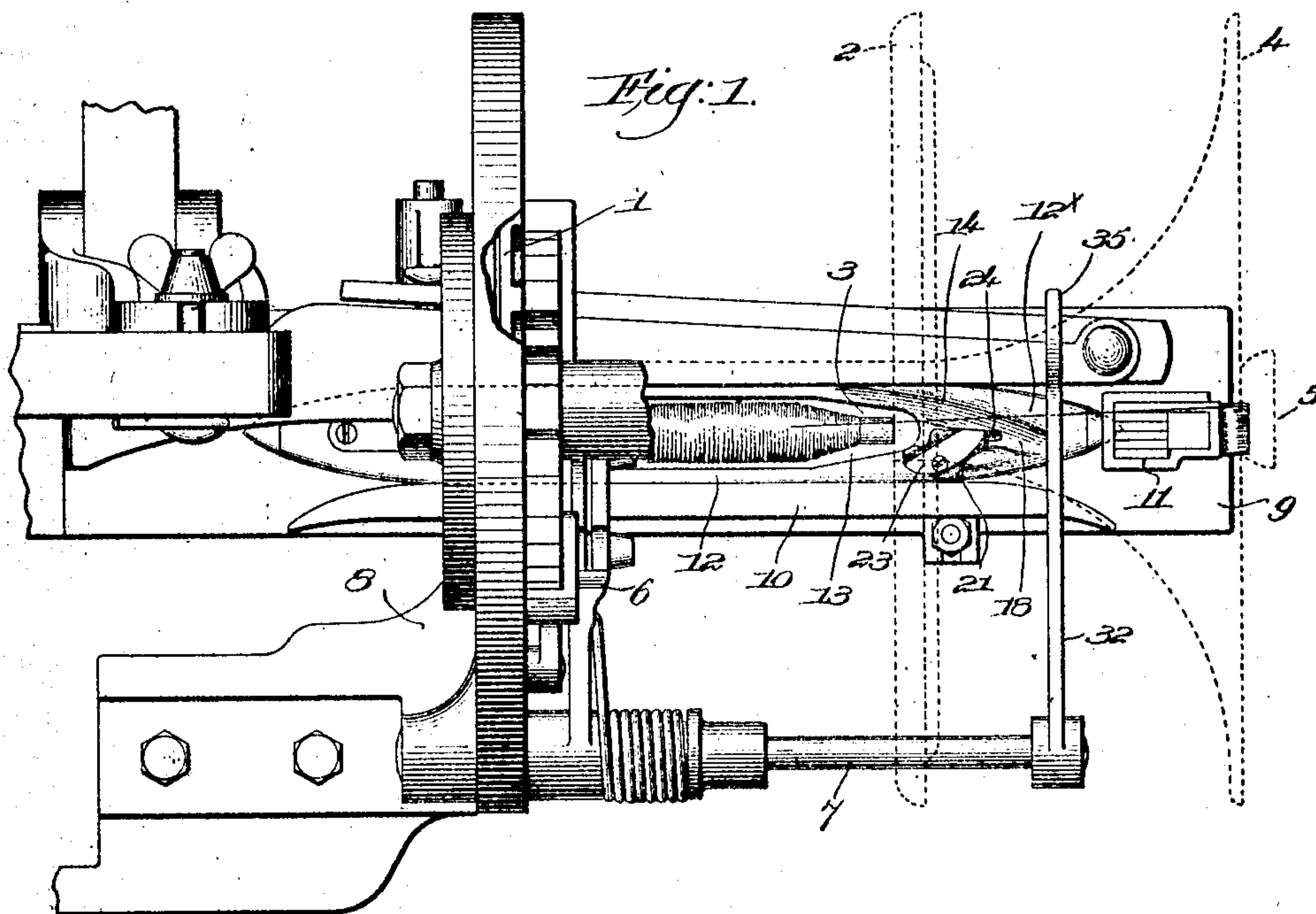
J. NORTHROP & E. S. WOOD.  
AUTOMATIC FILLING REPLENISHING LOOM.

APPLICATION FILED FEB. 10, 1908.

**926,015.**

Patented June 22, 1909.

2 SHEETS--SHEET 1.



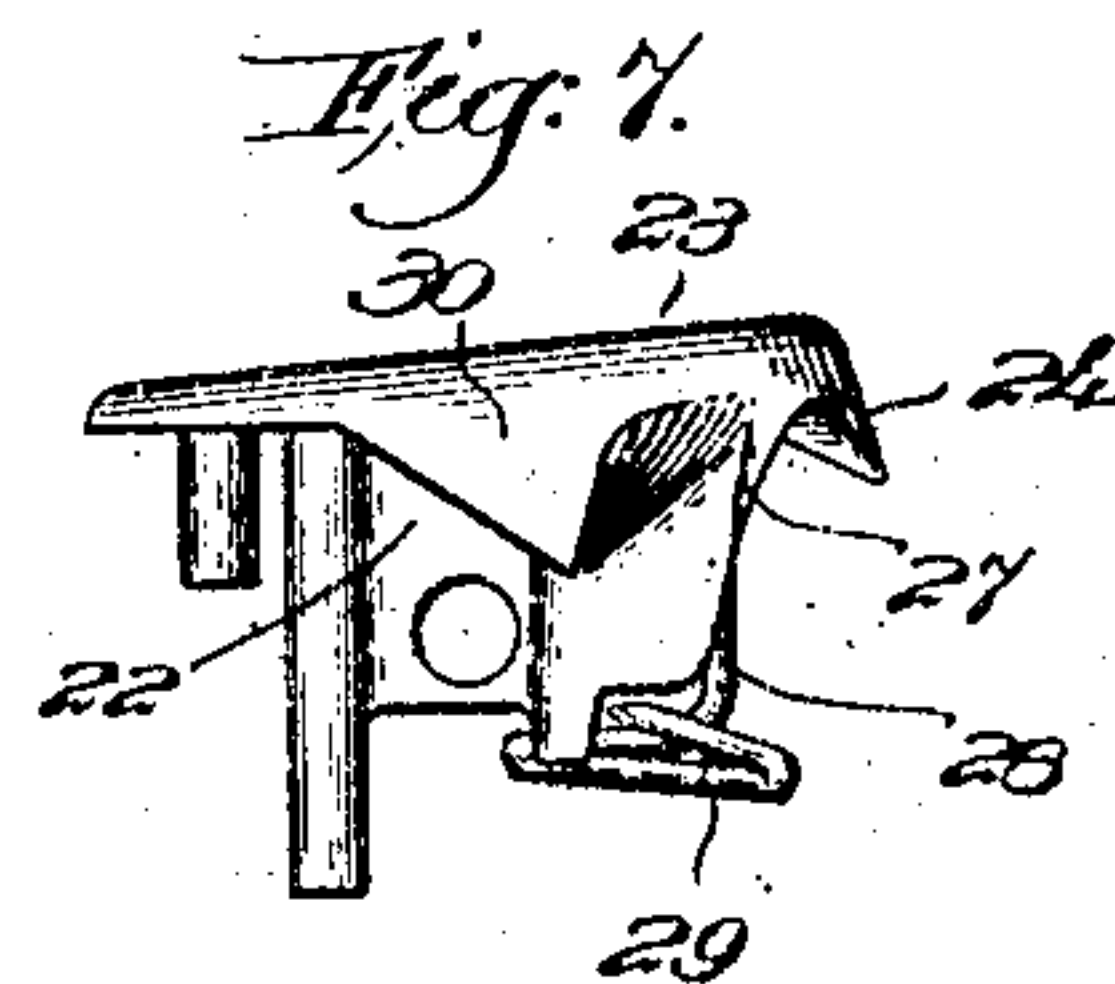
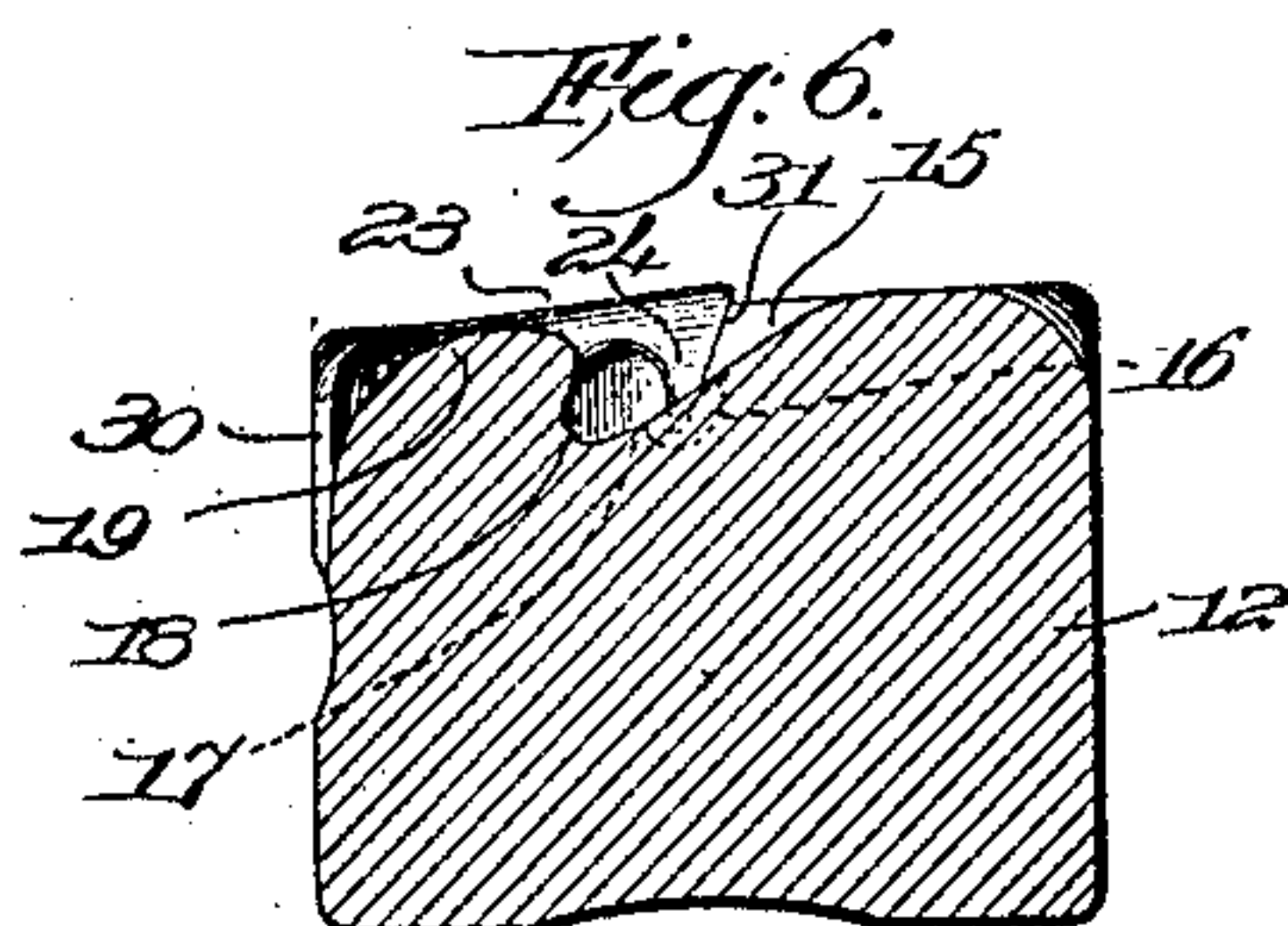
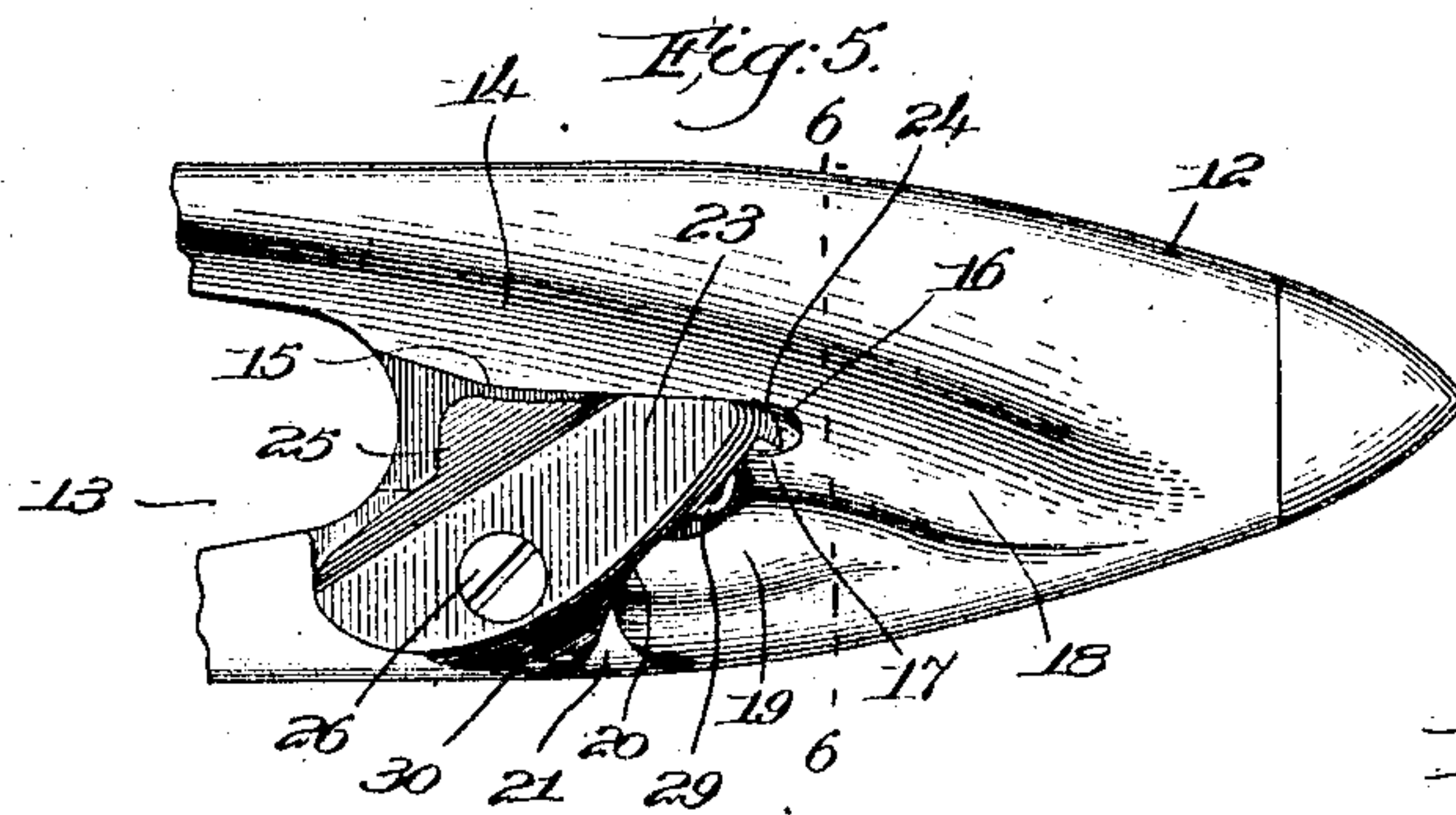
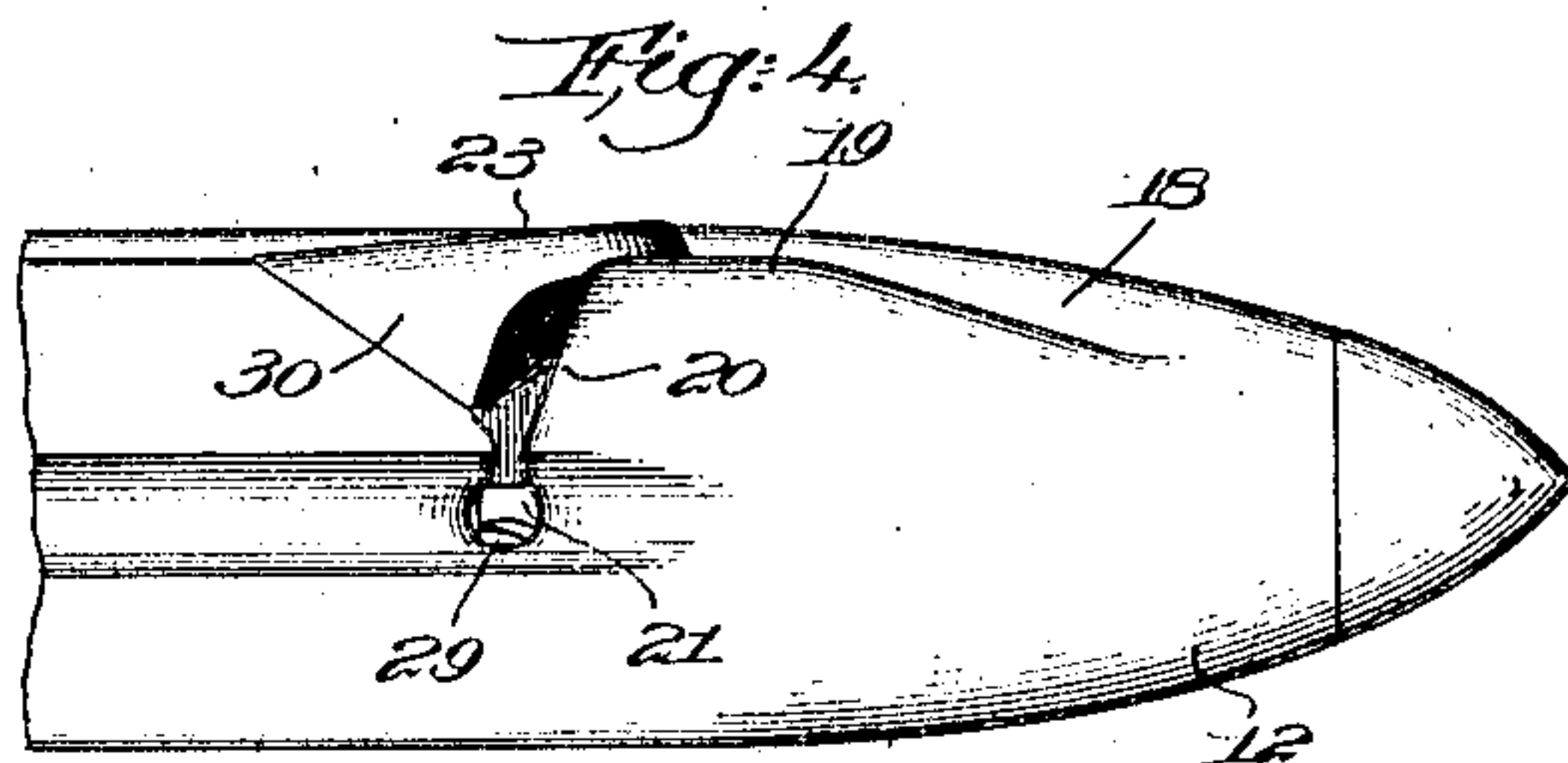
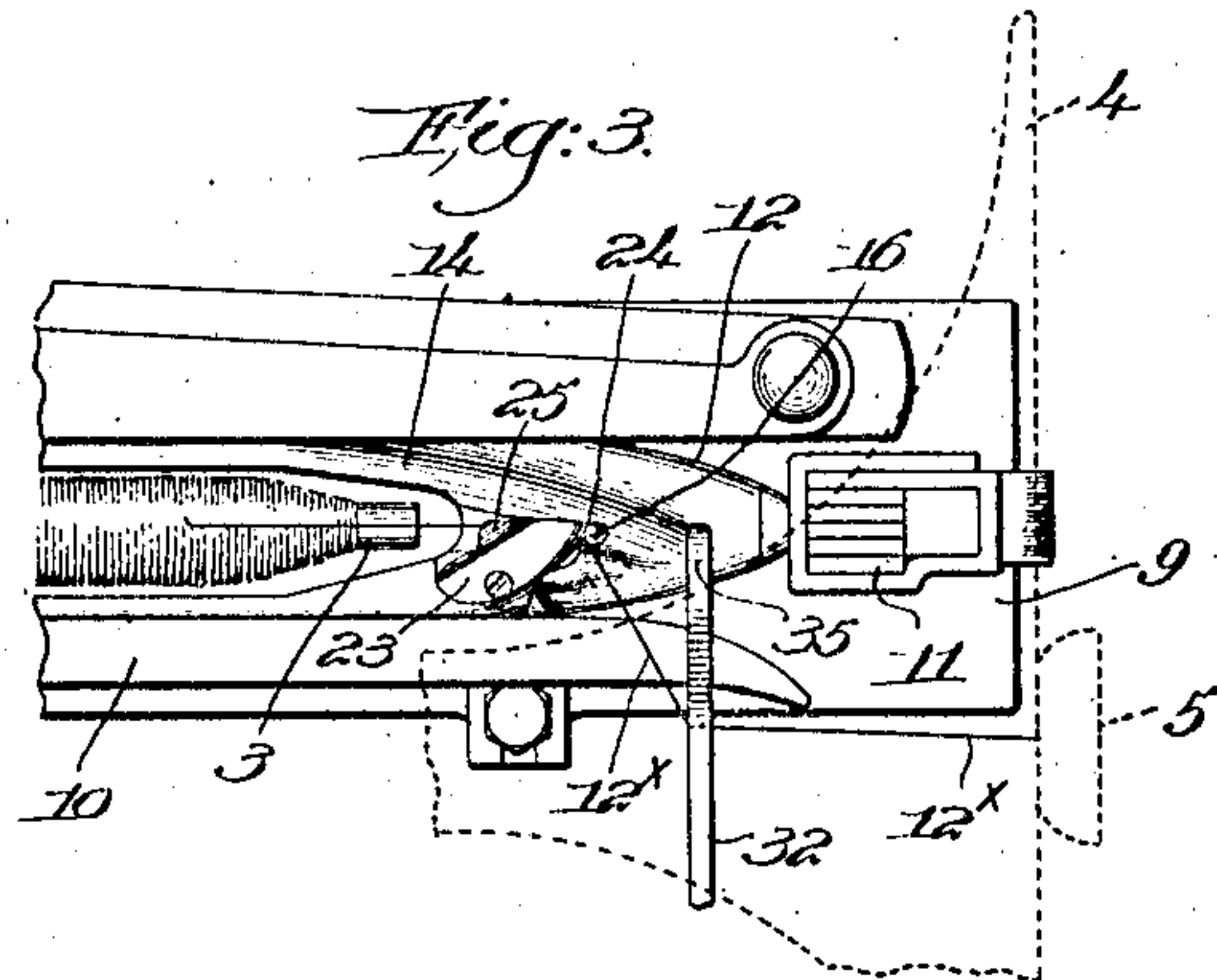
Addresses,  
S. W. Foster  
A. B. Hunter

Irvertons,  
Jorcas Northrop,  
Everett S. Wood,  
by  
Chas E. Gordon  
copy.

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 2 SHEETS—SHEET 2



Witnesses,  
*S. W. Foster*  
*A. R. Hunter*

Inventors,  
*Jonas Northrop,*  
*Everett S. Wood,*  
 by *Chas E. Gordon*



# UNITED STATES PATENT OFFICE.

JONAS NORTHROP AND EVERETT S. WOOD, OF HOPEDALE, MASSACHUSETTS, ASSIGNORS  
TO WILLIAM F. DRAPER, OF HOPEDALE, MASSACHUSETTS.

## AUTOMATIC FILLING-REPLENISHING LOOM.

No. 926,015.

Specification of Letters Patent.

Patented June 22, 1909.

Application filed February 10, 1908. Serial No. 415,180.

*To all whom it may concern:*

Be it known that we, JONAS NORTHROP and EVERETT S. WOOD, citizens of the United States, and residents of Hopedale, county of Worcester, State of Massachusetts, have invented certain new and useful Improvements in Automatic Filling-Replenishing Looms, of which the following is a full, clear, and exact specification.

10 In a certain type of automatic filling-replenishing loom, now in extensive and increasing use, when the filling on the filling-carrier or bobbin in the running shuttle is woven off or breaks the replenishing mechanism operates automatically to drive out of the shuttle the old or so-called spent bobbin and replaces it by a fresh one, that is, by a filling-carrier or bobbin having a full supply of filling. In addition to this the fresh or incoming filling must be directed automatically into the delivery-eye of the shuttle, so that it will be wound off the bobbin and properly laid in the shed as the shuttle makes its reciprocating motions across the lay, the introduction of the filling to the eye of the shuttle being technically termed "threading." A large percentage of failures to accomplish this introduction of the filling to the delivery-eye would not only render the automatic replenishing feature valueless but it would result in the production of inferior cloth.

The usual mode of threading is to draw the filling thread down into a longitudinal passage in the shuttle by the motion of the latter across the lay after replenishment, the return pick carrying the filling into the side delivery-eye, ready for weaving and completely threading the shuttle. Much ingenuity has been expended in accomplishing this operation without breaking the filling, which is generally slack twisted and tender and has to be manipulated with considerable care. At the "hopper" or replenishing side of the loom the direction of the pull of the filling when the shuttle is picked is not in line with the axis of the bobbin, but at a considerable angle thereto, and the thread is liable to catch and break under the strain to which it is subjected by the pick. At times the thread fails to enter the thread-passage, or does not remain in it, at the end of the first pick, and in either case breakage is certain on the return pick, as will be manifest to those skilled in the art. These objectionable

and annoying filling breakages are technically termed mis-threads, a hopper misthread when the breakage occurs at or near the replenishing side of the loom on the first pick after replenishment, and a real mis-thread when the filling fails to enter the delivery-eye on the return pick, and either mis-thread causes the insertion of another filling-carrier and tends to make a blemish in the cloth. While many attempts have been made to avoid these faults none have been entirely successful, and probably no piece of cloth is woven on an automatic loom of the type referred to which does not contain evidence of their existence, while the labor of the weaver is increased by handling and putting extra bobbins into the filling-feeder or hopper.

In our present invention, which relates to automatic filling-replenishing looms, our object has been to so construct and arrange the operating parts that the mis-threads have been eliminated entirely, save in instances where the setting of the mechanism is wrong or it is out of order.

In accordance with our present invention, instead of depending on the movement of the shuttle across the lay to draw the new filling thread into the longitudinal passage in the shuttle we provide means on the shuttle which, by or through backward movement of the shuttle on the lay, assumes deliverable control of the filling thread before the shuttle is picked.

By the term "deliverable control" we mean such control that the filling draws off from the shuttle in such condition that it is delivered properly to be laid in the shed, or in other words an effective or primary threading of the shuttle is attained. As a result when the pick occurs the filling draws off the bobbin substantially in the line of the bobbin axis and is unbroken, eliminating breaking strains and avoiding hopper mistreads while the positive and certain control of the thread at the end of the first pick makes a so-called real mis-thread impossible. That is, at the end of the first pick the filling will either be in the thread passage and in accurate position to be immediately directed to the delivery-eye at the beginning of the second pick, thereby effecting a complete or final threading of the shuttle, or the filling will be maintained in deliverable condition and cannot be broken on the return pick.

The various novel features of our inven-



tion will be fully described in detail in the sub-joined specification and particularly pointed out in the following claims, but the gist of our invention lies, broadly, in a construction and arrangement whereby an effective threading of the shuttle is attained by or through the backward movement of the lay, and before the pick, rather than by the movement of the shuttle during the pick.

Figure 1 is a top plan view of a portion of the replenishing side of an automatic loom embodying our invention, a portion of the filling-feeder being shown by dotted lines to avoid confusion, the fresh filling having just been inserted in the shuttle; Fig. 2 is a partial right hand elevation of the mechanism shown in Fig. 1; Fig. 3 is a top plan view showing the lay as having moved backward but before the pick, the shuttle being still in the shuttle-box, the fresh filling-end being shown as in condition to be delivered from the shuttle; Fig. 4 is an enlarged front view of the thread-delivering end of the shuttle; Fig. 5 is a top plan view thereof, also enlarged; Fig. 6 is a transverse section on the line 6—6, Fig. 5, looking toward the left; Fig. 7 is a side elevation of the thread-directing and controlling block, detached from the shuttle.

The mechanism to replenish the active or running shuttle with filling comprehends the connected, and rotatable plates 1, 2, (the latter being shown in dotted lines Fig. 1) for the reserve supply of filling-carriers or bobbins 3, the bell-shaped disk 4 and the end-holder 5 being mounted to rotate with the filling-feeder or hopper, as in the Northrop type of automatic loom. United States Patent No. 529940 granted November 27, 1894 to J. H. Northrop illustrates a loom of such type, and herein the filling-carriers are removed from the feeder by the usual transfer 6 fulcrumed on the stud 7, the latter being elongated, Fig. 1, the purpose whereof will presently appear. Such replenishing mechanism is actuated in well known manner, the feeder being mounted on a stand 8 fixed on the breast-beam at one side of the loom, and the lay 9 has a shuttle-box indicated at 10, in which the shuttle is positioned when a bobbin is inserted therein by the transfer, the shuttle being picked in usual manner, one of the pickers being shown at 11. When filling change is effected a bobbin is inserted in the boxed shuttle 12 at or about the instant the lay is at front center, Fig. 1, it being understood that the fresh end or thread of filling then leads from the tip of the bobbin along the top of the shuttle, as at 12\* Fig. 1, and under the edge of the plate 4 to the end-holder 5. The filling-end is then positioned very nearly along the longitudinal axis of the bobbin, prolonged, but as the lay moves back, the thread will be changed to lie at a considerable angle to the bobbin axis,

such angle increasing up to the instant the shuttle is picked from the box and then decreasing as the shuttle moves across the lay. In automatically self-threading shuttles heretofore devised this movement of the shuttle across the lay has been utilized to effect cooperation between the filling and the threading device, so that on the return pick the filling may be directed to the delivery-eye of the shuttle. Herein we utilize the backward movement of the lay to bring about an effective threading of the shuttle, that is, so that the filling will be delivered therefrom to be properly laid in the shed, and this is accomplished while the shuttle is quiescent in the shuttle-box prior to the pick. The means which is caused to positively engage and assume deliverable control of the filling thread by such backward movement of the lay is mounted on the shuttle but immovably with relation thereto, as will appear, the rigid and inert structure of such means being brought into action by relative movement of the shuttle and replenishing means in a direction transverse to the length of the shuttle or in the general direction of lay movement.

The shuttle 12 has the usual elongated opening 13 for the reception of the filling-carrier, held therein by any suitable means not a part of our present invention, the shuttle-body at its forward or eye end being cut away to present a diagonal, inclined wall 14 which forms the rear side of a longitudinal thread passage 15, Fig. 5, substantially in alignment with the axis of the filling-carrier. This wall at the forward end of the passage is provided with a recess or pocket 16 which at its lower edge forms a guard lip 17, and the wall is continued beyond the pocket merging into the rear side of a diagonal groove 18 which terminates at the front side of the shuttle. The front side of the groove opposite the pocket is formed by the part 19 of the shuttle-wood, which part is downwardly and rearwardly inclined at 20 to lead to the open side delivery-eye 21 through which the filling draws when the shuttle is completely or finally threaded.

The shuttle-wood is cut out back of the part 19 to receive the thread directing and controlling means, shown separately in Fig. 7, and comprising a metal block 22 having a flattened head 23 extended forward and rearward to cross or overhang the forward end of the thread passage, the head terminating in a downturned and frontwardly inclined beak 24 the tip of which enters the pocket 16 and projects below the lip 17 thereof, see Fig. 6.

The rear portion of the head 23 is downwardly inclined at 25, making with the rear part of the wall 14 a V-shaped and beveled entrance to the rear end of the thread passage 15, the front wall of the passage being



formed by the back part of the threading block, the latter being held in place by a screw 26. A horn 27 leads downward from the beak, and a guide-pin 28 depends from the horn, Fig. 7, terminating in an open loop 29. The front side of the head is downturned at 30 to fit the front wall of the shuttle back of the part 19, forming with the side 20 thereof a passage leading to the delivery-eye.

When a fresh bobbin is inserted in the shuttle the descent of the bobbin carries the filling thread leading therefrom down between the oppositely inclined parts 14 and 25 so that it will drop into the rear end of the thread passage, the thread being thus brought down behind the beak 24, the general slope and direction of the wall 14 insuring this result.

As will be noted, the top of the head slopes rearward and is highest at its end above the beak, Fig. 4, and the rear face 31 of the beak is quite sharply inclined frontward, see Fig. 6, so that when the thread is pulled or tightened it will slide down such face and under the tip or point of the beak, the high part of the head at the beak insuring the positioning of the thread behind the beak as the bobbin is transferred. This positioning of the thread 12<sup>x</sup> is shown as well as may be in Fig. 1, it being remembered that the thread leads outward under the plate 4 and thence to the holding device 5, back of the higher part of the head.

As the lay moves back after filling change the filling thread slides down the rear face 31 and under the tip of the beak, being momentarily depressed below the lip 17 and then drawing up in front of the beak and over the lip into the groove 18, all prior to the pick and while the shuttle is quiescent in the shuttle-box. Immediately the thread passes under the beak and up in front thereof the thread is in deliverable condition and the shuttle is effectively threaded, for as the shuttle is picked from the box 10 the thread draws forward in the trough-like groove 18 and between the beak and the horn 27, as will be manifest, so that the filling is properly laid in the shed. The parts of the thread directing and controlling means are altogether rigid and immovable relatively to the shuttle, obviously, and while the beak is ready to engage and assume positive and deliverable control of the fresh filling thread the carrying out of such functions are brought about by the backward movement of the lay, and not by any movement of the shuttle relatively to the lay.

As soon as the thread is carried under and in front of the beak the filling will draw freely off the bobbin substantially in alignment with its longitudinal axis so that a "hopper mis-thread" is entirely eliminated. The thread of filling cannot escape again un-

der the beak because the lip 17 is higher than the tip of the beak, such lip thereby acting as a guard against such escape.

Inasmuch as the filling draws off in substantial alinement with the bobbin axis it will be clear that there can be no derangement or mis-positioning of the filling as the shuttle continues its movement to the left hand end of the lay, the changing angle between the shuttle path and the filling between the shuttle and the held end of the filling having no effect whatever. On the return pick the filling is drawn up out of the groove 18 and over the part 19 of the shuttle-body and is drawn thence down between the rear face 20 and the part 30 of the threading block, sliding down along the horn 27, around the guide pin 28 and into the loop 29 as it is drawn through the delivery-eye 21 of the shuttle. After the filling enters the loop 29 it is held therein by the structure of the loop, but as the shuttle and its thread directing devices are not claimed herein *per se* further detailed description is unnecessary. When the filling is introduced to the delivery-eye the shuttle is completely threaded, and the filling is thereafter delivered through the eye. Should the filling fail to be directed into the eye on the second pick after replenishment there would be no breakage, for the filling would still be under the control of the beak and head and would be in deliverable condition, drawing over the top of the head as the shuttle is picked to the right. Hence no so-called "real mis-threads" can occur, due to the filling pulling off rearwardly from the bobbin.

The distance from the tip of the filling-carrier to the end-holder is quite considerable at time of replenishment, and there is at times with some kinds of filling a tendency of the filling-end to curl or kink out of its proper position behind the beak just prior to backward movement of the lay. This can be readily overcome, however, by using when necessary a catcher or holder to engage the filling-end between the bobbin and the end-holder on the hopper, and we have shown such a catcher.

The elongated end of the stud 7 has fixedly secured to it the hub of a stationary, rearwardly extended arm 32 projecting above the lay path and having its rear end enlarged at 33 and provided with an open slot 34, Fig. 2, the extremity of the arm being shaped to present an upcurved finger 35 the lower edge of which leads to the entrance of the slot. At its rear edge the slot is provided with hook-like projections 36, two being shown below and one above the entrance to the slot. The filling-feeder or hopper moves forward after each transfer, to bring the next bobbin into transferring position, and the filling-end leading from such bobbin is brought under and slides along the lower edge of the finger



35 by the advance of the hopper, the filling-end entering the slot 34 of the catching device. When this bobbin is transferred to the shuttle the filling-end drops to the bottom of the slot 34, bringing the thread as close to the top of the shuttle as possible, the position of the slot relatively to the shuttle at the time of transfer being clearly shown in Fig. 2. Now as the lay moves back the filling-end will be held by the catcher, relatively near the beak on the shuttle, see Figs. 1 and 3, but it will draw the thread down under the beak and up in front thereof into the groove 18 just as has been described, causing effective threading of the shuttle, as in Fig. 3, before the pick of the shuttle. Inasmuch as the catcher confines the filling thread quite near the beak any tendency of the filling to kink or curl out of proper position is overcome.

The general tendency of the filling-end as the lay moves back is to draw under the projection 36 nearest the bottom of the slot 34 but if there should be any tendency to kink or twist, bringing the thread up from the bottom of the slot one of the higher projections 36 will engage it and will prevent it from being pulled out through the slot entrance.

Our invention is not restricted to the precise details of construction and arrangement herein shown and described as the same may be modified or varied in different particulars by those skilled in the art without departing from the spirit and scope of our invention as set forth in the appended claims.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. In a loom, the combination of the lay, a shuttle box, a shuttle, replenishing means to replenish the filling in the shuttle, and means on the shuttle to assume control of the fresh filling and cause effective threading of the shuttle by relative movement of the shuttle and replenishing means in the direction of lay movement.

2. In a loom, the combination of the lay, a shuttle box, a shuttle, replenishing means to replenish the filling in the shuttle, and means on the shuttle and relatively immovable thereto to assume deliverable control of the fresh filling by relative movement of the shuttle and replenishing means in the direction of lay movement.

3. In a loom, the combination of the lay, a shuttle-box, a shuttle, replenishing means to replenish the filling in the shuttle, holding means for the end of the fresh filling, and means on the shuttle to assume deliverable control of the fresh filling by relative movement of the shuttle and said holding means in a direction transverse to the filling extending between said holding means and shuttle.

4. The combination, in a loom having a lay provided with a shuttle-box, of mechanism to insert automatically a fresh filling-

carrier in the shuttle when boxed, the shuttle, having a delivery-eye, and means on the shuttle immovable relatively thereto to automatically engage the fresh filling by relative movement of the shuttle and replenishing means in the direction of lay movement and position the filling to draw off the filling-carrier substantially in alinement with its axis when the shuttle is picked from the shuttle-box.

5. The combination, in a loom having a lay provided with a shuttle-box, of mechanism to insert automatically a fresh filling-carrier in the shuttle when boxed, said mechanism including a feeder from which the filling-carriers are transferred to the shuttle and a holder for the filling-ends, the feeder and end-holder being mounted on a stationary part of the loom, a shuttle having a side delivery-eye, and relatively immovable means on the shuttle to engage and assume deliverable control of the fresh filling at a point between the end-holder and the just inserted filling-carrier by backward movement of the lay and while the shuttle is still in the shuttle-box.

6. The combination, in a loom having a lay provided with a shuttle-box, of mechanism to insert automatically a fresh filling-carrier in the shuttle when boxed, said mechanism including a feeder from which the filling-carriers are transferred to the shuttle and a holder for the filling-ends, the feeder and end-holder being mounted on a stationary part of the loom, a shuttle having a side delivery-eye, and relatively immovable means on the shuttle to engage and assume deliverable control of the fresh filling at a point between the end-holder and the just inserted filling-carrier when the lay moves back and while the shuttle is still in the shuttle-box, said means including a horn to thereafter direct the filling to the delivery-eye.

7. In a loom, the combination of a lay, mechanism to provide the shuttle with a fresh supply of filling, a shuttle, and means to cause effective threading of the shuttle by relative movement of the shuttle and said mechanism in the direction of lay movement before the shuttle is picked.

8. In a loom, in combination, a lay having a shuttle-box, a shuttle, mechanism to replenish the shuttle automatically, and means on the shuttle to assume deliverable control of the filling thread by relative movement of the shuttle and said mechanism from replenishing position while the shuttle is in the shuttle box.

9. In a loom, in combination, a lay, mechanism to provide automatically the shuttle with a fresh supply of filling, a shuttle, and relatively immovable means thereon to cause effective threading of the shuttle by relative movement of the shuttle and said mechanism



ism in the direction of lay movement and before the shuttle is picked.

10. In a loom, in combination, a lay, mechanism to provide automatically the shuttle with a fresh supply of filling, a shuttle, and means mounted on the shuttle rendered operative by and upon backward movement of the lay and shuttle to assume control of the fresh filling thread and insure effective delivery thereof when the shuttle is picked.

11. In a loom, in combination, a lay, a shuttle having a delivery-eye, mechanism to provide the shuttle automatically with a fresh supply of filling, and means on and immovable relatively to the shuttle to assume deliverable control of the fresh filling by and upon relative movement of the shuttle and said mechanism in the direction of lay movement following filling replenishment and thereafter to direct the filling to the delivery eye.

12. In a loom, a lay, mechanism to insert automatically a filling-carrier into the active shuttle, a shuttle having a side delivery-eye and a longitudinal passage, and means on the shuttle to direct the filling thread to the delivery-eye, said means including a fixed and downturned beak overhanging the forward end of the passage and inclined toward the front of the shuttle, relative movement of the shuttle and mechanism in the direction of lay movement, causing the thread to pass under the beak whereby the latter assumes deliverable control of the thread prior to the pick of the shuttle.

13. In a loom, a lay, mechanism to insert automatically a filling-carrier into the active shuttle, a shuttle having a side delivery-eye and a longitudinal passage having its rear wall inclined, and means on the shuttle to direct the filling-thread to the delivery-eye, said means including a downturned and frontwardly inclined beak overhanging the forward end of the passage, the incoming filling-carrier drawing the filling thread down over the inclined wall into the passage and behind the beak, backward movement of the lay carrying the shuttle thereafter causing the thread to pass under the beak whereby the latter assumes deliverable control of the thread prior to the pick of the shuttle, and a guard to prevent escape of the thread from the control of the beak.

14. In a loom, a lay, mechanism to insert automatically a filling-carrier into the active shuttle, a shuttle having a side delivery-eye and a longitudinal passage with an inclined rear wall provided with a pocket, and means on the shuttle to direct the filling-thread to the delivery-eye, said means including a head crossing the forward end of the passage and terminating in a downturned and frontwardly inclined beak projecting into the pocket, the front edge or lip of the latter forming a guard for the beak, the incoming

filling-carrier drawing the filling-thread down over the inclined wall and into the passage and behind the beak, backward movement of the lay carrying the shuttle causing the thread to pass under the beak and up over the guard above the tip of said beak, whereby the beak assumes control of the thread and causes it to draw off from the filling-carrier substantially in alignment with its axis before the shuttle is picked.

15. In a loom, a lay, mechanism to insert automatically a filling-carrier into the active shuttle, a shuttle having a side delivery-eye and a longitudinal passage having a lip on its rear wall near its forward end, and means on the shuttle to direct the filling-thread to the delivery-eye, said means including a downturned beak overhanging the passage and frontwardly inclined, with its tip behind and below the lip, the filling-thread being drawn down into the passage and behind the beak by the incoming filling-carrier, backward movement of the lay carrying the shuttle prior to the pick causing the thread to pass under the beak and up over the lip, the latter then preventing escape of the thread under the beak, the shuttle body having a groove formed in its top leading forward diagonally from the beak, in which groove the thread is guided on the first pick after filling replenishment.

16. The combination, in a loom, having a lay provided with a shuttle-box, of mechanism to insert automatically a fresh filling-carrier in the shuttle when boxed, said mechanism including a feeder from which the filling-carriers are transferred to the shuttle, and a holder for the filling-ends leading from the filling-carriers, a stationary device to engage the filling-end of the carrier next to be transferred, such engagement being effected at a point between the tip of the carrier and the end holder, a shuttle having a side delivery-eye and means on the shuttle to engage and assume deliverable control of the new filling-end by backward movement of the lay, while the shuttle is boxed, the catcher at such time preventing displacement of the filling-end.

17. The combination, in a loom, of a lay, mechanism to replenish automatically the filling in the active shuttle, said mechanism including a feeder to contain filling-carriers in reserve, a stationary device to engage automatically the filling-end of the filling-carrier next to be removed from the feeder, a shuttle, and means thereon to engage and assume deliverable control of the new filling end by and upon backward movement of the lay carrying the shuttle prior to the pick, said stationary device at such time acting upon the filling-end and preventing accidental displacement thereof as the lay moves back.

18. The combination, in a loom, of a lay,



mechanism to replenish automatically the filling in the active shuttle, said mechanism including a movable feeder to contain filling-carriers in reserve, a stationary, rearwardly extended arm overhanging the path of the lay and having a rearwardly open slot and a curved finger leading to the opening of the slot, the finger engaging the filling-end of the carrier next to be removed from the feeder and directing the filling-end into the slot, the latter having hook-like projections on its rear side to catch and hold the filling-end, a shuttle, and means thereon to assume deliverable control of the new filling-end by and upon backward movement of the lay and shuttle before the shuttle is picked, the filling-end being retained in the slot and thereby held from displacement when the lay moves back.

19. In a loom, in combination, a lay having a shuttle-box, mechanism to insert automatically a fresh bobbin in the shuttle when boxed, a shuttle, and means mounted on and immovable relatively to the shuttle to assume deliverable control of the fresh filling thread by backward movement of the lay while the shuttle is in the shuttle-box.

20. In a loom, in combination, a lay, mechanism to insert automatically a fresh bobbin in the shuttle, a shuttle, and means brought into positive engagement with the fresh filling-thread by backward movement of the shuttle on the lay after insertion of a fresh bobbin and before the shuttle is picked, to cause an effective threading of the shuttle.

21. In a loom, in combination, a lay, mechanism to insert automatically a fresh bobbin in the shuttle, a shuttle having a side delivery-eye, means to cause effective threading of the shuttle by backward movement of the shuttle on the lay after insertion of a fresh bobbin and before the shuttle is picked, and a device on the shuttle to direct the filling thread into the delivery-eye on the return pick and thereby complete the threading of the shuttle.

22. In a loom, in combination, a lay, mechanism to insert automatically a fresh bobbin in the shuttle, a shuttle having a thread passage, a block in the shuttle form-

ing one wall of the passage and provided with a head crossing the forward end of the passage and terminating in a downturned, frontwardly inclined beak, a portion of the shuttle body forming a guard lip in front of and above the tip of the beak, the insertion of the bobbin drawing the filling-thread into the passage, behind the beak, backward movement of the lay and shuttle before the shuttle is picked causing the filling thread to pass under the beak and over the guard lip, the latter preventing release of the filling-thread from the control of the beak.

23. The combination, in a loom having a lay provided with a shuttle-box, of mechanism to replenish automatically the filling when the shuttle is in the box, the shuttle, and means thereon rendered operative directly by the relative movement of the shuttle and said mechanism transversely to the fresh filling-thread to assume control of such thread and cause effective threading of the shuttle while in the shuttle-box.

24. A loom having, in combination, a shuttle, mechanism to provide it automatically with a fresh supply of filling, and means on the shuttle rendered operative by movement of the shuttle toward the rear of the loom and away from filling-receiving position to assume control of the fresh filling and cause effective threading of the shuttle before it is picked.

25. A loom having, in combination, a shuttle adapted to lay filling, mechanism to insert automatically fresh filling in the shuttle, means to move the shuttle into and out of filling-receiving position, and means on the shuttle caused to assume control of the fresh filling by movement of the shuttle from filling receiving position and to cause effective threading of the shuttle before its movement to lay filling begins.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JONAS NORTHROP.  
EVERETT S. WOOD.

Witnesses:

WENDELL WILLIAMS,  
WILLIAM C. ELLIS.