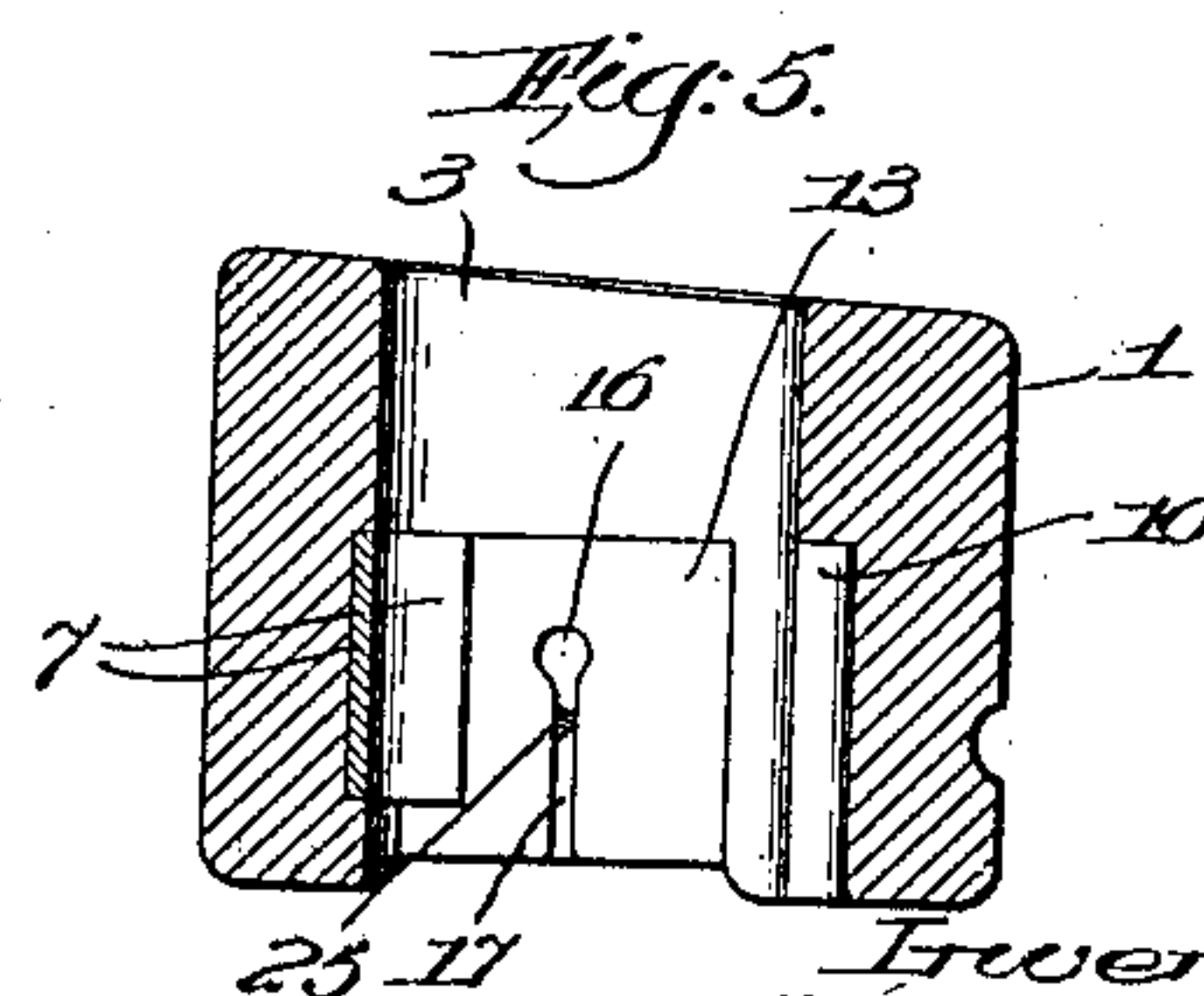
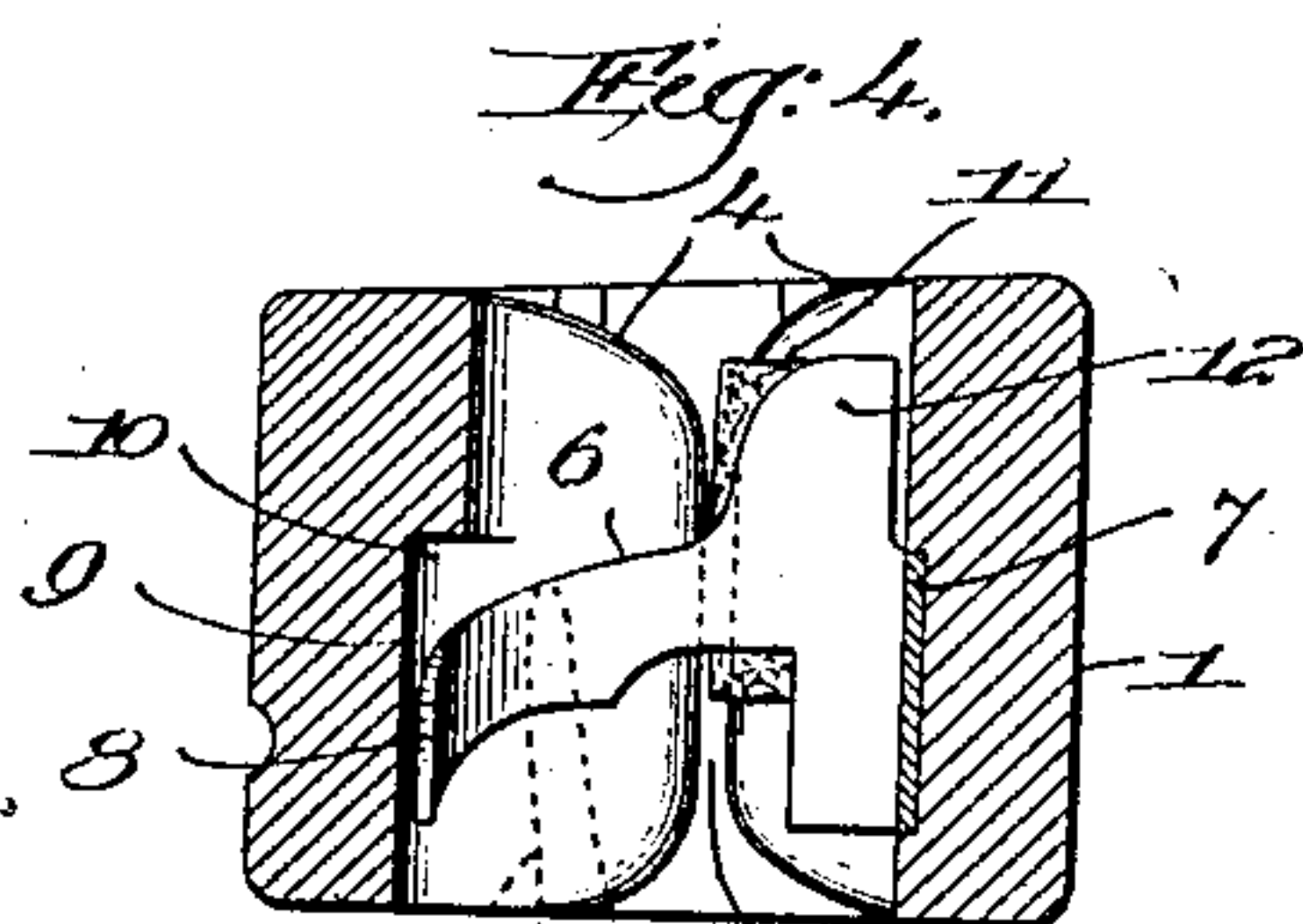
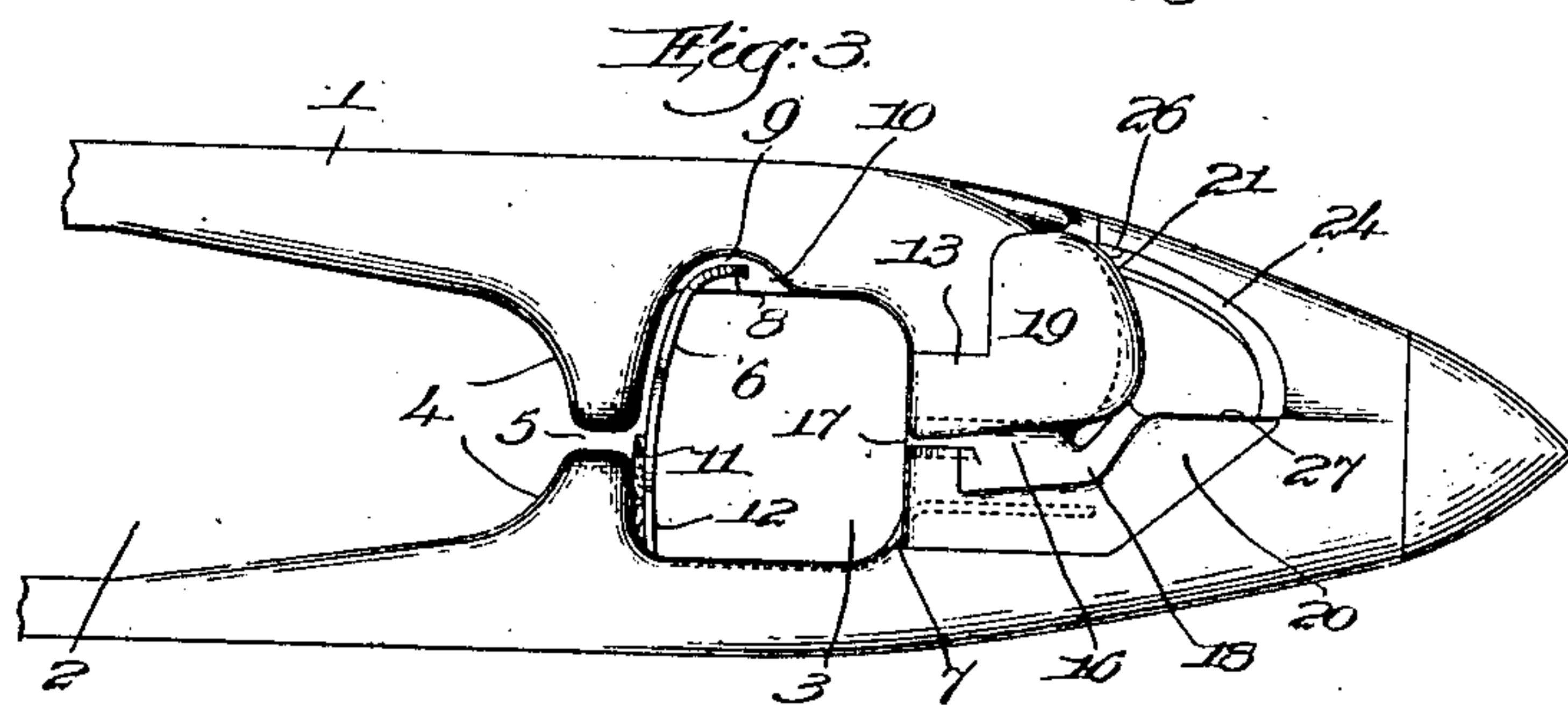
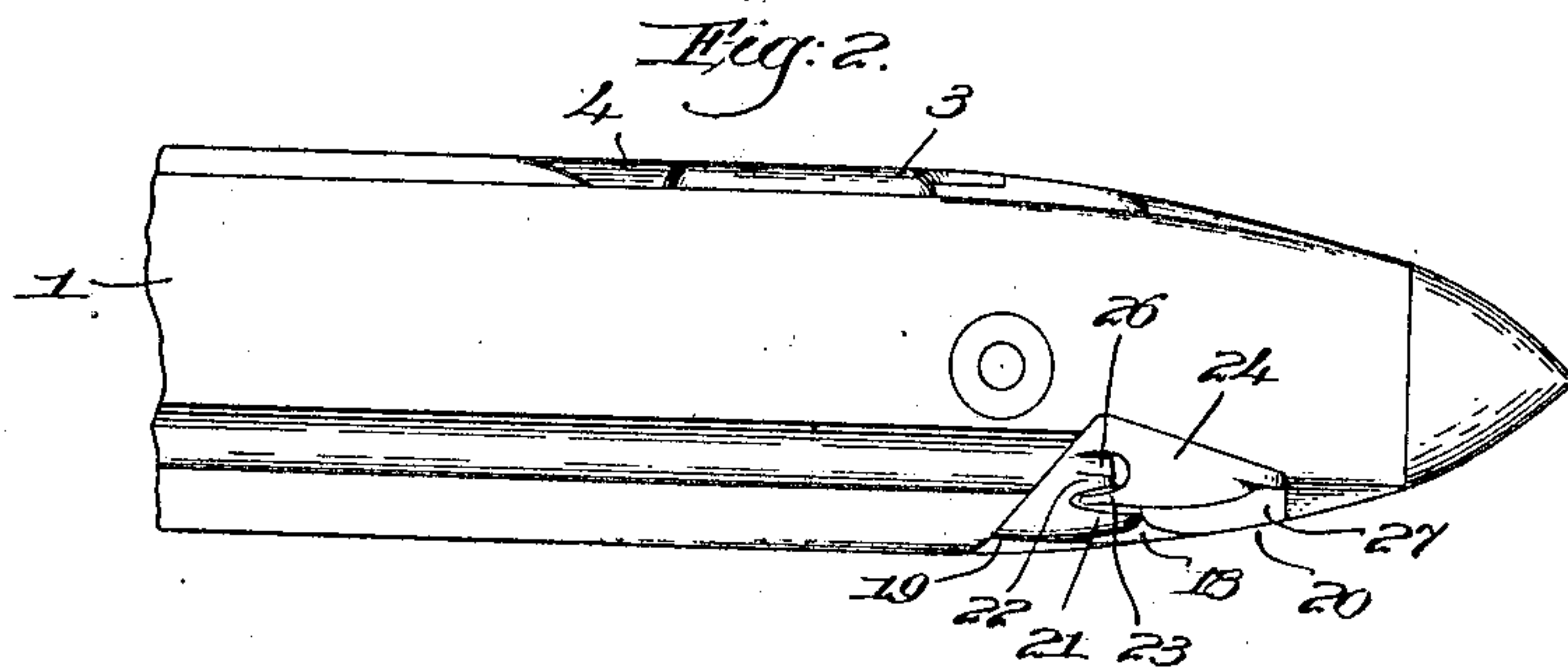
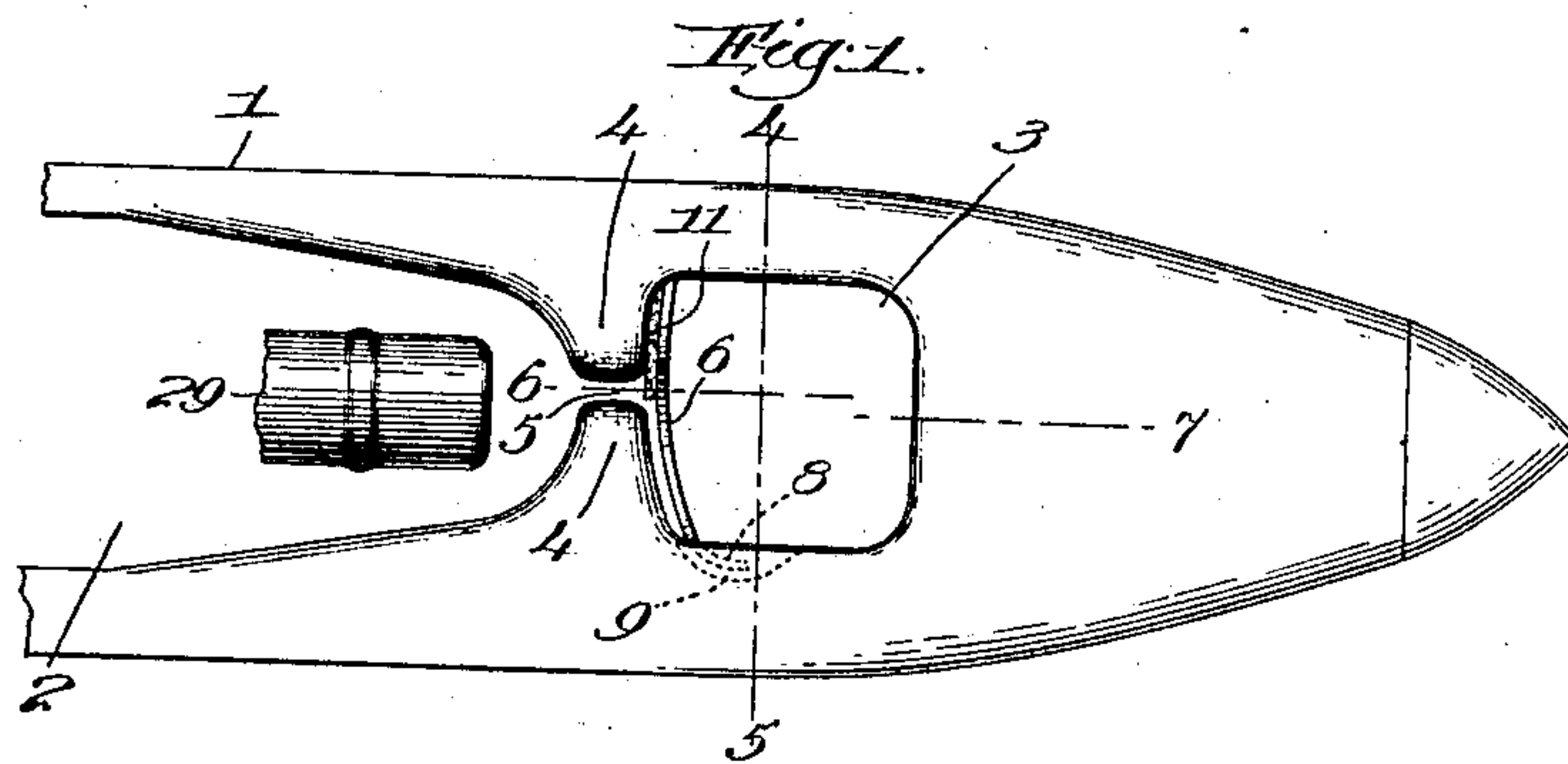


W. F. DRAPER & J. NORTHROP.  
SHUTTLE FOR AUTOMATIC FILLING REPLENISHING LOOMS.  
APPLICATION FILED MAY 23, 1908.

920,038.

Patented Apr. 27, 1909.

2 SHEETS—SHEET 1.



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*Attest*





# UNITED STATES PATENT OFFICE.

WILLIAM F. DRAPER AND JONAS NORTHROP, OF HOPEDALE, MASSACHUSETTS, ASSIGNORS  
TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

## SHUTTLE FOR AUTOMATIC FILLING-REPLENISHING LOOMS.

No. 920,038.

Specification of Letters Patent.

Patented April 27, 1909.

Original application filed November 21, 1907, Serial No. 403,111. Divided and this application filed May 23, 1908.  
Serial No. 434,682.

*To all whom it may concern:*

Be it known that we, WILLIAM F. DRAPER and JONAS NORTHROP, citizens of the United States, and residents of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Shuttles for Automatic Filling - Replenishing Looms, of which the following description, in connection with the accompanying drawing, is a specification, like numerals on the drawing representing like parts.

This invention relates to shuttles for use in looms in which mechanism is provided to replenish automatically the running filling prior to complete exhaustion thereof, and it is a division of an application for United States Letters Patent Ser. No. 403111 filed by us November 21, 1907, in which application the shuttle forming the subject-matter of this present application is shown and described.

One of the novel features of our present invention is the provision, in a loom shuttle, of means whereby the old filling-end is absolutely and positively cast off and the shuttle completely unthreaded at the time of filling replenishment, the casting off bodily of the old filling from the shuttle being distinguished from drawing the filling lengthwise through the delivery eye of the shuttle.

Other novel features of our 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 the thread-delivering end of a loom-shuttle embodying our invention; Fig. 2 is a side elevation thereof; Fig. 3 is an underside view of the thread-delivering end of the shuttle; Fig. 4 is a transverse section on the line 4—5, Fig. 1, looking toward the left; Fig. 5 is a similar section, but looking toward the right, Fig. 1; Fig. 6 is a partial longitudinal section on the line 6—7, Fig. 1, but showing the filling-support and the thread-directing device in elevation; Fig. 7 is a view similar to Fig. 6 but showing the old filling-end just about to be cast off; Figs. 8 and 9 are perspective views of the thread-directing device, detached from the shuttle-body.

In the construction of the shuttle, we have had in view the complete and positive discharge or casting off therefrom of the old

filling-end at the time of replenishment, so that by no possibility could such old filling-end or any part thereof be carried back into the cloth or left in the shuttle to foul or interfere with the new filling inserted at the time of replenishment, and in order to effect such cast off, the device on the shuttle to direct the new filling to the delivery-eye has been located at the bottom of the shuttle, so that the shuttle may be said to be threaded at the bottom.

In practice the shuttle-body 1 has the usual elongated opening 2 to receive the filling-carrier or bobbin, one end of said opening having therein any suitable or usual means (not shown) for grasping and holding the bobbin in position, and the front wall of the shuttle is also provided with an aperture, (not shown) for the intermittent entrance of a feeler to feel the yarn on the bobbin, as is usual in shuttles arranged for feeler looms. The opposite or thread-delivering end of the shuttle-body is provided with an opening or well 3 extended completely through the shuttle and separated from the bobbin-receiving opening or chamber 2 by a transverse wall or partition 4 slotted from top to bottom at 5, the upper and lower edges of the partition 4 being preferably convexed, as best shown in Fig. 4. A filling-support shown as a metallic plate 6 is fixedly secured at one side as at 7 to the side wall of the well 3 and extends transversely across the slot 5 and quite near the same, see Figs. 1, 3 and 6, the free end of the support being bent forward at 8, and downturned adjacent but at a slight distance from the opposite wall of the well, leaving a clearance 9, as shown in Figs. 3 and 4, the shuttle-body being undercut at 10, to form a species of housing for the depending end of the support.

Referring to Fig. 4, it will be seen that the upper edge of the support is gradually inclined from right to left, from a point at the right hand side of the slot 5 down to the tip of the part 8.

In practice, a piece of flannel, felt or other suitable friction-producing material 11 is interposed between the adjacent part of the wall 4 and the enlargement 12 of the filling-support, such friction material at its upright edge extending somewhat across the line of travel of the filling as it is drawn through the slot 5 and over the upper edge of the support



6, when the filling is being delivered from the shuttle.

When the filling is drawn forward, as it will be under normal conditions, it will be held at the proper height in the slot 5 by the transverse support, and cannot drop below it, but the peculiar shape and location of the support as described provides for the shedding or casting off of the old filling-end at the time of replenishment, permitting its escape downward through the clearance 9, when the spent bobbin is ejected from the shuttle, as will be explained.

The shuttle-body is cut away at its bottom in front of the well 3 to receive the threading device, preferably made as a metallic block 13, having a lug 14 to fit into a suitable socket in the shuttle-body and held in place by a transverse screw-stud 15, Figs. 6 and 7, the block 13 having extended through it a thread-passage 16, at its rear end presenting a downturned and narrow entrance 17, Figs. 3 and 5. The block 13 is laterally extended at its base at opposite sides of the open bottom 18 of such thread-passage as at 19, 20, Fig. 3, the enlargement 19 having its forward edge curved and forming at the side a guard lip 21, a second guard lip 22 being formed above it, and into the concavity between the said lips projects a rearwardly extended beak 23 forming part of a horn 24 which extends from the side of the enlargement 19 forward to the tip of the opposite enlarged portion 20 of the base of the block 13.

The wall of the thread passage at its front end above the enlarged portion 20 is shaped to present a prong 25, which prevents the dropping of the thread out of the thread passage 16 at the time the directing device is guiding the thread to the side delivery-eye 26, this delivery-eye being herein shown as formed in the casing of the thread-directing device, and located immediately above the guard lip 22.

Referring to Figs. 2, 6 and 7, it will be seen that the delivery-eye 26 is not only at the side of the shuttle-body, but it is also very near the bottom thereof, so that the thread or filling is delivered from the shuttle quite close to the raceway of the lay.

When the shuttle is in use in a loom such as is described in our co-pending application Se. No. 403111 a thread-positioner positions the new filling-end when the fresh supply of filling is inserted in the shuttle, and a thread-catcher is moved upward through the well 3 of the shuttle and grips or clamps the filling-end, the thread-catcher drawing the filling-end downward through the well 3 and across the filling-support 6, but there is no tendency at such time to shed the filling therefrom as it is sustained back of the support by the bobbin. As the shuttle is picked the thread-catcher maintains its hold on the new filling-end and the latter is prop-

erly positioned to enter the inlet 17, and the open bottom 18 of the thread-passage 16, as the shuttle moves across the lay, and the thread is drawn up over the prong 25 and under the edge of the horn 24, adjacent the upright face 27 of the enlargement 20 as the shuttle continues its movement to the non-replenishing side of the lay. The filling thus laid is beaten in, and after the change of shed the shuttle is again picked, in the opposite direction, toward the replenishing side of the loom, and the filling now draws backward, being guided by the horn 24, and over the guard lip 21 and beneath the beak 23, immediately slipping over the guard lip 22 and into the delivery-eye 26. The shuttle is now completely and permanently threaded, and delivery of the filling continues from the eye so long as the filling cannot escape from the eye because the guard lip 22 overhangs the beak 23, and the point of the beak is shrouded or protected by the upper and lower lips 22 and 21 over which the filling draws, so that once in the eye, it is impossible for the filling to escape therefrom during the normal operation of the shuttle. There is no opportunity for the filling to drop out of the narrow inlet 17, because the support 6 holds the filling up, and in the thread passage.

Viewing Fig. 6, the filling 28 is shown as it passes from the filling-carrier 29 across the support 6 and thence through the well 3 to the thread passage 16 and around the front face of the enlargement 19, and out through the eye 26, the said face being somewhat concaved or grooved at 30 leading to the eye to more smoothly and accurately direct the thread to the eye. After the threading of the shuttle is completed, it cannot be unthreaded by any throwing forward of a loop of filling, because such loop would be thrown forward out of the top of the well 3 and onto the perfectly plain and unbroken surface of the shuttle-body in front of such well, and would be eliminated by the delivery of the filling. Such a loop would not be thrown under the shuttle, as all loop-forming tendencies operate to throw it forward at the top of the shuttle. We thus eliminate an objectionable feature sometimes found to occur in the use of automatically self-threading shuttles, as heretofore constructed, where the filling-thread is directed to the delivery-eye by directing means located at the top of the shuttle, a loop when formed tending to catch over such device and causing breakage of the filling.

As the filling is firmly held in practice at the proper level with relation to the bottom of the shuttle, the introduction of the filling into the thread-passage of the directing or guiding device on the shuttle is accomplished very accurately and positively with a minimum liability to misthread at the time of replenishing, and as the complete threading



of the shuttle is a practical certainty after the filling has once been introduced to the thread - passage 16, shuttle - mistreads are obviated by the construction set forth.

5 When the shuttle is in the replenishing box, the filling-end extends from the edge of the cloth to the delivery-eye, thence through the thread-passage of the directing device and across the well 3 in the shuttle-  
10 body, and over the support 6 to the filling-carrier, and this condition obtains when a change of filling is to be effected.

The shuttle invented by us is constructed and arranged to cast off or shed from the  
15 shuttle positively and wholly the old filling-end by or through the ejection from the shuttle of the spent filling-carrier or bobbin, meaning thereby the one on which the filling has been exhausted to a predetermined ex-  
20 tent. When the bobbin is ejected from the shuttle it passes therefrom down through the usual open bottom of the shuttle-box, the tip of the ejected bobbin being shown in dotted lines at 31, Fig. 6, with the filling-end 32  
25 shown in dotted lines as leading therefrom up to the support 6, and in practice the loom is provided with means to temporarily arrest or stop the ejected bobbin just below the shuttle-box, thereby preventing a quick drop  
30 which might break the old filling-end and leave it in the shuttle, but as said means forms no part of this invention and is illustrated in the co-pending application referred to it is not shown herein. The dotted lines  
35 indicating the tip 31 of the ejected bobbin in Fig. 6 show such tip in substantially its arrested position.

As the ejected filling-carrier descends it draws the filling-end 32 downward and for-  
40 ward, so that it slides along the inclined upper edge of the support 6, as shown in dotted lines Fig. 4, and finally drops or is drawn off or shed from the tip 8 of the support, and there being then nothing to retain it in the  
45 thread-passage, the filling-end drops out of such passage and just before complete cast off of the old filling-end from the shuttle the bight or loop formed by such old filling-end assumes substantially the position illustrated  
50 in Fig. 7, wherein it is shown as just about to escape from under the beak 23 between the guard lips 21 and 22. The old filling-end is thus cast off bodily and completely, and in a positive manner from the shuttle by or  
55 through the ejection of the filling-carrier therefrom. This cast-off is effected manifestly by the ejection of the filling-carrier from the shuttle but in actual practice the old filling-end is engaged and held by the thread-  
60 catching device previously referred to and thereby the old filling-end is drawn downward, assisting the ejected filling-carrier in shedding or casting off the old filling-end from the shuttle. Such casting off will be effected,  
65 however, even if the old filling-end is not en-

gaged and drawn downward. This cast-off of the filling-end is to be distinguished from a drawing-out of the filling-end longitudinally through the eye of the shuttle, for hereto-  
fore, so far as we are aware, the only way in  
70 which the old filling-end has been removed from the shuttle (when it was removed) has been by a longitudinal pull, and if the length of the filling-end was too great or the pull was  
75 insufficient, the filling was not removed from the eye and the movement of the shuttle after replenishment would be very apt to carry the old filling-end or piece of it back into the cloth to be woven therein.

Inasmuch as we have provided for the  
80 complete cast-off of the old filling-end from the shuttle, it will be obvious that under no circumstances and by no possibility can any part of such old filling-end be carried back into the cloth. The old filling-end is cast-off  
85 before the new filling-end is presented to the thread - directing device on the shuttle. Hence there can be no fouling or commingling of the old and new filling-ends. The backward movement of the lay releases the  
90 ejected filling-carrier (which has been temporarily arrested) in such a way that when it drops its tip end is uppermost, and the filling draws off from the tip, preventing any break-  
95 age of the filling, so that the ejected filling-carrier does its part in casting off the old filling-end from the shuttle.

As the old filling-end always extends from the cloth through the delivery-eye of the shuttle to the bobbin about to be ejected, in  
100 a "feeler" loom, when replenishment of filling is called for, the shuttle forming the subject-matter of this application is particularly designed for such looms, and so far as con-  
105 cerns the invention any desired form of filling-exhaustion-indicating mechanism may be employed in connection therewith.

We believe it to be broadly new, in a loom shuttle, to provide means constructed and  
110 arranged to permit the effectual and complete cast off of the old filling-end from the shuttle upon ejection therefrom of the bobbin, and we also believe it to be broadly new to effect the threading of the shuttle from its  
115 under side or bottom.

Various changes in details of construction and arrangement may be made by those skilled in the art without departing from the spirit and scope of our invention as set forth in the appended claims, one practical em-  
120 bodiment of such invention being illustrated in the accompanying drawings and described in the foregoing specification.

Having fully described our invention, what we claim as new and desire to secure by Let-  
125 ters Patent for improvement is—

1. A loom shuttle having a bobbin cham-  
ber and a well, a separating partition slotted from top to bottom, a filling-support crossing  
130 the slot and constructed to shed the filling



and permit it to pass down through the slot when the bobbin is ejected, a threading device on the bottom of the shuttle and having a downwardly open thread-passage leading from the well, a horn terminating in a rearwardly extended beak at the side of the shuttle, upper and lower guard lips between which the beak extends, and a delivery-eye adjacent the upper guard lip and the beak, the filling passing under the beak and over the lips into the eye, said lips thereafter preventing the filling from being drawn under the beak.

2. A loom shuttle having a side delivery-eye adjacent its bottom, and means on the shuttle to direct the filling thereto, including a thread-passage, a horn to direct the filling from the front end of the passage rearwardly, a beak at the rear end of the horn and adjacent the eye, the thread passing under the beak and thence into the eye, and a guard lip above and overhanging the beak and located at the bottom of the eye, to prevent escape of the filling from the eye beneath the beak.

3. A loom shuttle having a side delivery-eye adjacent its bottom, and means on the shuttle to direct the filling thereto, including a thread-passage, a horn to direct the filling from the front end of the passage rearwardly, a beak at the rear end of the horn and adjacent the eye, the thread passing under the beak and thence into the eye, and guard lips extending laterally beyond the beak above and below it, to prevent escape of the filling from the eye beneath the beak.

4. A loom shuttle having a delivery-eye at its side, and means on the shuttle at its bottom to direct the filling to the eye, including a downwardly open thread-passage, a horn terminating in a rearwardly extended beak adjacent the eye, the horn directing the filling from the front end of the passage rearwardly to and under the beak into the eye, and upper and lower guard lips between which the beak projects, said lips holding the filling beyond the point of the beak as said filling leaves the eye and preventing escape of the filling under the beak.

5. A loom shuttle having a delivery-eye and provided with a bobbin chamber and a well back of the eye, a partition separating the well and chamber and slotted from top to bottom, a filling support crossing the slot and leaving a clearance at one end, and means on the shuttle to direct the filling to the eye and including a thread-passage leading from the well and opening downward, ejection of the spent bobbin drawing down the old filling-end off the free end of the support and out of the downwardly open thread-passage, to effect complete cast off of such filling-end from the shuttle.

6. A loom shuttle having a delivery-eye and provided with a bobbin chamber having

its transverse wall nearer the delivery-eye vertically slotted from top to bottom, a filling support crossing the slot and having one end free, to shed the old filling when the spent bobbin is ejected from the shuttle, and means on the bottom of the shuttle to direct the filling to the eye and including a thread-passage opening downward, the old filling-end being discharged from such passage when the bobbin is ejected.

7. A shuttle for automatic filling replenishing looms, adapted to contain a bobbin and having a thread-directing and delivering device and having means to permit positive and bodily cast-off of the old filling-end from the shuttle when the spent bobbin is ejected therefrom.

8. A loom shuttle adapted for the automatic insertion of a bobbin therein and provided with a delivery-eye and with means to direct the filling thereto, and means on the shuttle to permit cast-off of the old filling bodily from the shuttle when the spent bobbin is ejected therefrom.

9. A loom shuttle provided with a bobbin compartment and an adjacent well, separated therefrom by a vertically-slotted partition, a filling-support extended across the slot from one side only of the shuttle, and a threading device in the bottom of the shuttle in front of the well, the fresh filling-end at the time of replenishment being drawn down through the well, to thereby position the filling-end for coöperation with the threading device, the filling support sustaining the incoming filling in the slot while permitting the old filling-end to pass down the slot and be cast off the shuttle bodily when the spent bobbin is ejected therefrom.

10. A loom shuttle adapted for the automatic insertion of a bobbin and having means to normally support the filling adjacent the delivery end of the bobbin and constructed to shed the old filling-end at the time of replenishment, and a threading device in the bottom of the shuttle, ejection of the spent bobbin from the shuttle drawing the old filling-end from the supporting means and casting it off bodily from the threading device.

11. A loom shuttle adapted for the automatic insertion of a bobbin and having a transverse partition vertically slotted in front of the tip of the bobbin, to guide the filling, a support crossing the slot and fixed at one side thereof, the free end of the support being downwardly and forwardly inclined, to shed the old filling and permit its passage downward out of the guide-slot when replenishment is effected, said support sustaining the incoming filling in the slot, and means to effect automatically the threading of the shuttle when a full bobbin is inserted therein.

12. A loom shuttle adapted for the auto-



matic insertion and ejection of a bobbin and having means to normally support the filling adjacent the delivery-end of the bobbin and to shed the old filling-end at the time of replenishment, a threading device in the bottom of the shuttle, having a thread-passage provided with an entrance at the shuttle bottom, a side delivery-eye, a horn to direct the filling thread to the eye, said horn terminating in a beak below the eye, and guard-lips between which the beak projects, to prevent escape of the running filling from the eye, said lips acting to cast off the old filling-end from the threading device when said filling-end is shed from the supporting means and pulled down out of the thread-passage through its open entrance by ejection of the spent bobbin.

13. A loom shuttle to receive filling automatically and having a delivery-eye, means to direct the fresh filling to the shuttle eye to be delivered therefrom, and means rendered effective by or through ejection of the spent filling-carrier to permit cast off bodily of the old filling-end from the shuttle.

14. A loom shuttle to receive filling automatically and having a delivery-eye in its side and adjacent its bottom, a device in the bottom of the shuttle to direct the fresh filling to the eye to be delivered therefrom, and means rendered operative by or through ejection of the spent filling-carrier to permit cast off of the old filling-end from the bottom of the shuttle.

15. A loom shuttle to receive filling automatically and having a delivery-eye, a device at the bottom of the shuttle to direct the fresh filling to the eye to be delivered therefrom, and means to permit cast off of the old filling-end from the bottom of the shuttle when the spent filling-carrier is ejected.

16. An automatically self-threading loom shuttle adapted to contain filling, having a device to assume automatically the control of the fresh filling, and means to permit the bight of old filling between the cloth and the spent filling-carrier to be discharged bodily from the shuttle when the spent filling carrier is ejected therefrom.

17. A loom shuttle adapted for the automatic insertion of a fresh filling-carrier at its top and the ejection of a spent filling-carrier at its bottom, having in its bottom an automatically self-threading device, and means to facilitate cast off of the old filling-end from the bottom of the shuttle upon ejection therefrom of the spent filling-carrier.

18. A loom shuttle adapted for the automatic insertion of a fresh filling-carrier at its top and the ejection of a spent filling-carrier at its bottom, having in its bottom an automatically self-threading device, means to facilitate cast off of the old filling-end from the bottom of the shuttle upon ejection therefrom of the spent filling-carrier, and a

transverse filling-support on the shuttle having a clearance to permit the passage of the old filling-end therethrough when the spent filling-carrier is ejected.

19. A loom shuttle adapted to contain a supply of filling and having a threading device in its bottom, and a filling support on the shuttle to permit the old filling-end to be cast off the shuttle when a fresh supply of filling is inserted therein.

20. A loom shuttle adapted to contain a supply filling and having a side delivery-eye and a directing device at the bottom of the shuttle to direct automatically the filling to the eye.

21. A loom shuttle adapted to contain a bobbin and having means to normally support the filling and to shed it when the spent bobbin is ejected from the shuttle, and a threading device at the bottom of the shuttle.

22. A loom shuttle adapted to contain a bobbin, and provided with a delivery-eye and with means, having a thread entrance at the bottom of the shuttle, to direct automatically the filling thereto, to thread the shuttle.

23. A loom shuttle adapted to contain a supply of filling, a threading device on the shuttle at its bottom to receive the filling-thread, and a thread-support on the shuttle adapted to shed the old filling-end by or through ejection of the spent bobbin, whereby such filling-end is cast off bodily from the shuttle.

24. A loom shuttle adapted to contain a supply of filling and having a side delivery-eye adjacent its bottom, and means at the bottom of the shuttle to direct automatically the filling into the eye.

25. A loom shuttle adapted to contain a supply of filling and having a side delivery-eye adjacent its bottom, means at the bottom of the shuttle to direct the filling into the eye, said means having a downwardly-open thread entrance, the old filling-end being cast off the directing device downward by or through ejection of the spent bobbin from the shuttle.

26. A loom shuttle adapted to receive automatically a supply of filling and having a side delivery-eye adjacent its bottom, and a well back of the eye, a transverse partition between the well and the supply of filling and vertically slotted from top to bottom, a filling support within the well crossing the slot and having its free end down curved toward the front wall of the shuttle, and means on the shuttle at the bottom thereof to direct the fresh filling to the eye, ejection of the spent bobbin drawing downward the old filling-end over the free end of the support and effecting cast off of such filling-end bodily from the directing means.

27. A loom shuttle having a delivery-eye



and adapted to receive automatically a fresh bobbin at its top and to discharge the spent bobbin at its bottom, and means on the shuttle to sustain the running filling and direct it to the eye to be delivered therefrom, said means opening downward to permit the old filling-end to be cast off bodily by ejection of the spent bobbin.

28. A loom shuttle having a delivery-eye, and means to introduce the fresh filling-end thereto automatically, and means on the shuttle to permit cast off of the old filling-end from the bottom of the shuttle upon the insertion of a fresh supply of filling thereto.

29. A loom shuttle having at its bottom an automatically acting thread-directing device and an open delivery-eye adjacent thereto, said device and eye permitting the old filling-end to be cast off therefrom bodily by or through ejection from the shuttle of the nearly exhausted supply of filling.

30. A loom shuttle adapted to contain filling and having a delivery-eye, means to introduce automatically the filling to the eye from the bottom of the shuttle, and means to permit cast off of the bight of old filling in-

termediate the cloth and the spent filling-carrier upon ejection of such filling-carrier from the shuttle.

31. A loom shuttle adapted to contain a filling-carrier, and having a delivery-eye and means to thread the eye automatically from the bottom of the shuttle, and a support on the shuttle for the running filling, said support shedding the old filling-end when the latter is cast off the shuttle at its bottom by or through ejection of a spent filling-carrier.

32. A shuttle adapted for the automatic insertion and ejection of a filling-carrier and having a delivery-eye at its side, means to thread the shuttle from its bottom, and means to permit cast off bodily of the old filling when a fresh filling-carrier is inserted in the shuttle.

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

WILLIAM F. DRAPER.  
JONAS NORTHROP.

Witnesses:

WALTER F. ROPER,  
EDWARD DANA OSGOOD.



It is hereby certified that in Letters Patent No. 920,038, granted April 27, 1909, upon the application of William F. Draper and Jonas Northrop, of Hopedale, Massachusetts, for an improvement in "Shuttles for Automatic Filling-Replenishing Looms," an error appears in the printed specification requiring correction, as follows: In line 77, page 5, after the word "supply " the word *of* should be inserted; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 18th day of May, A. D., 1909.

[SEAL.]

C. C. BILLINGS,  
*Acting Commissioner of Patents.*