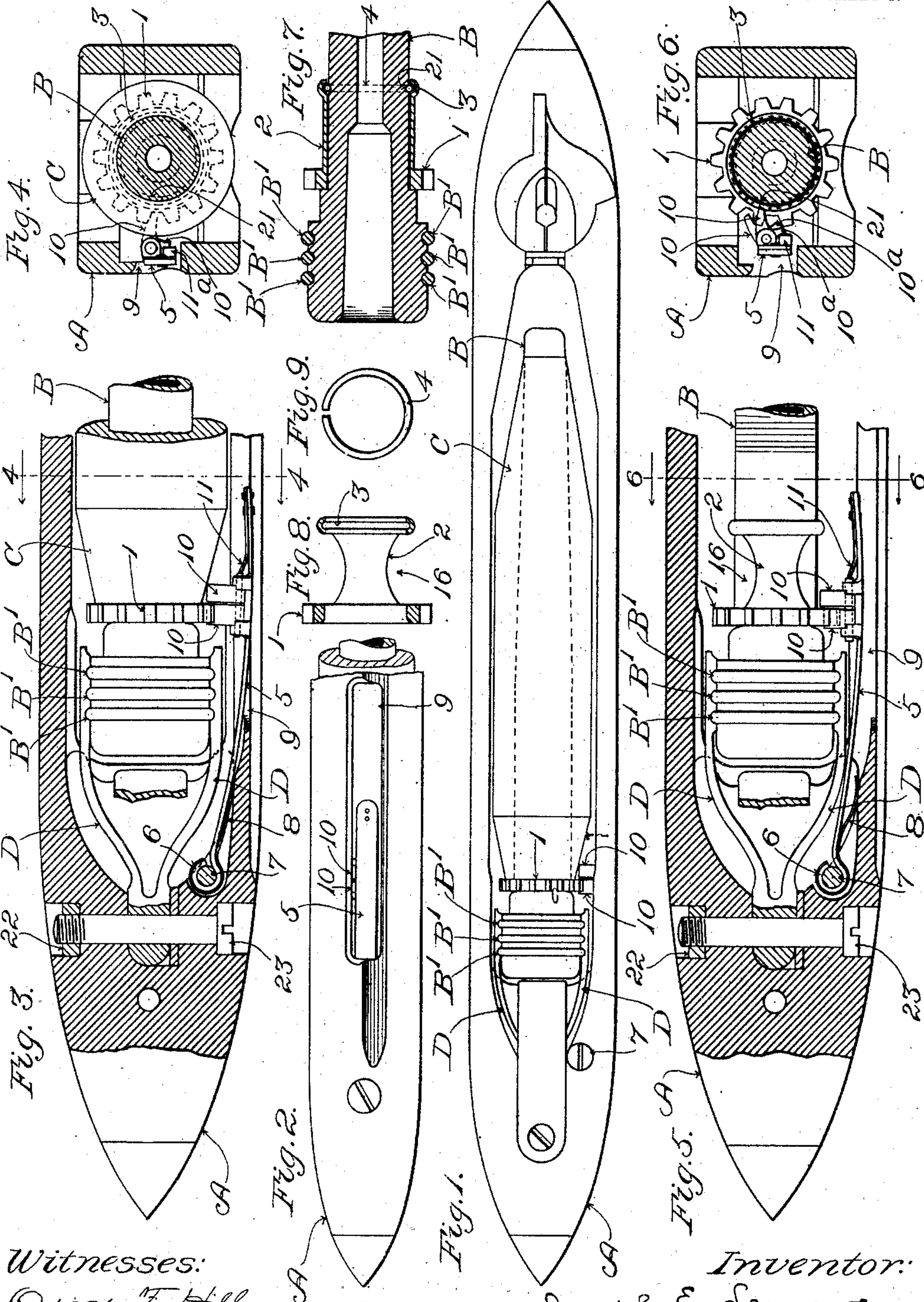


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FILLING EXHAUSTION INDICATING DEVICE FOR LOOMS.
APPLICATION FILED JAN. 27, 1908.

909,096.

Patented Jan. 5, 1909.

2 SHEETS—SHEET 1.



Witnesses:
Oscar F. Hill
Edith J. Anderson.

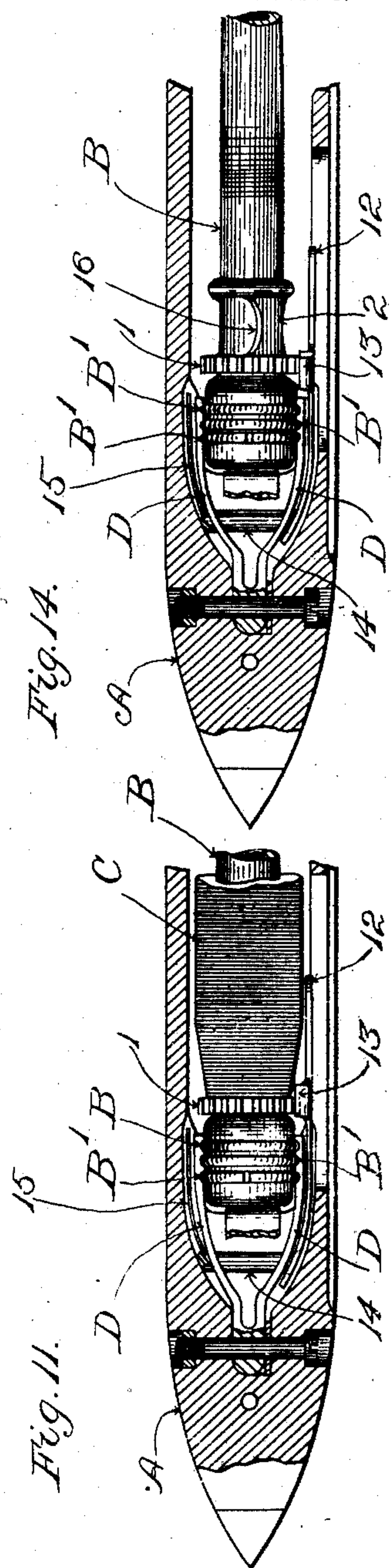
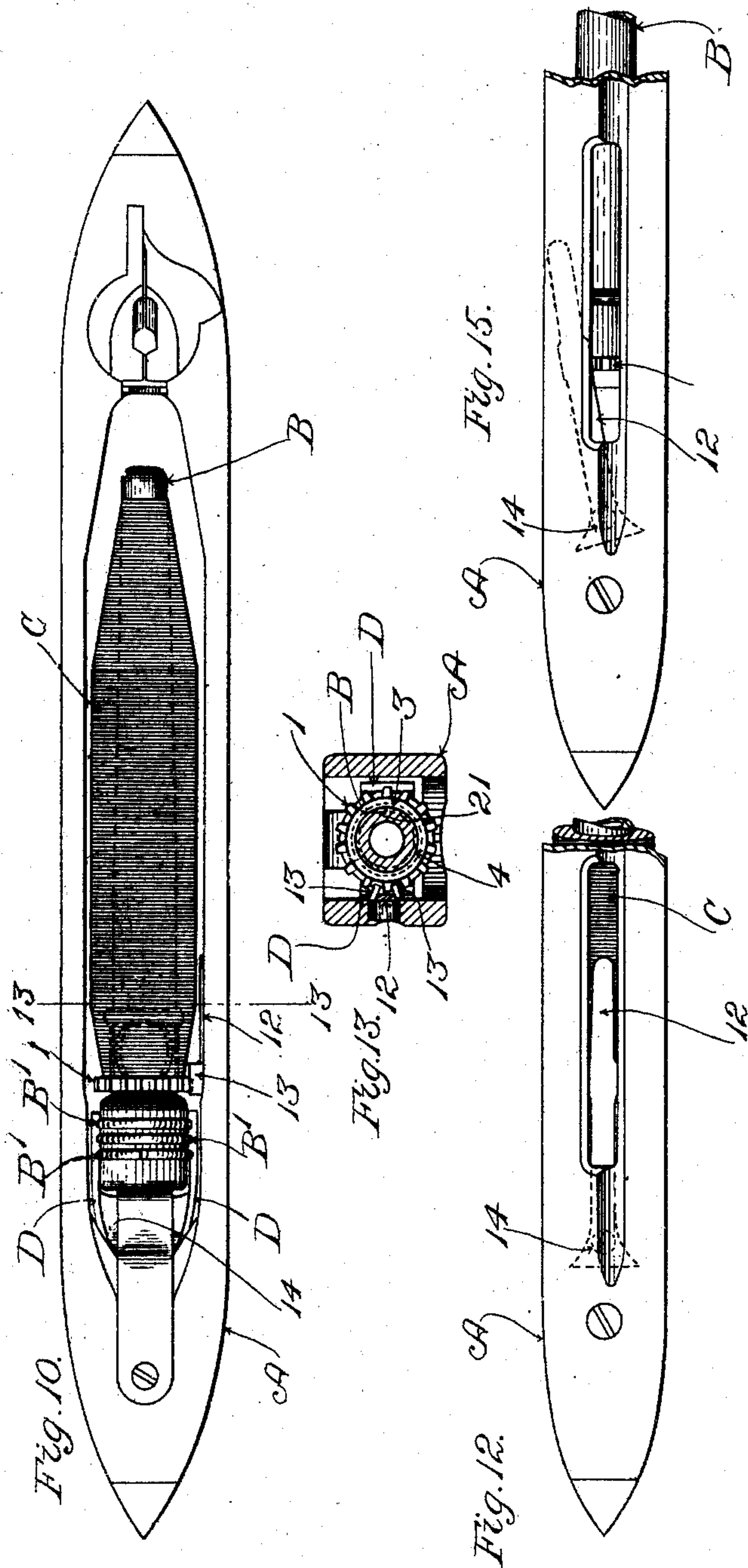
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UNITED STATES PATENT OFFICE.

JOSEPH E. LEMYRE, OF MANCHESTER, NEW HAMPSHIRE.

FILLING-EXHAUSTION-INDICATING DEVICE FOR LOOMS.

No. 909,096.

Specification of Letters Patent.

Patented Jan. 5, 1909.

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To all whom it may concern:

Be it known that I, JOSEPH E. LEMYRE, a citizen of the United States, residing at Manchester, in the county of Hillsboro, State of New Hampshire, have invented a certain new and useful Improvement in Filling-Exhaustion-Indicating Devices for Looms, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention is an improvement in devices of the general class intended to indicate when the filling or weft within the shuttle in action upon the lay of a loom has become exhausted or depleted to the predetermined extent, and bring about either replenishment of the working supply of filling or weft or stoppage of the loom before complete exhaustion occurs, in order thereby to avoid a defect in the web or cloth being woven arising from the occurrence of a partial pick in one of the sheds thereof.

The so-called "feeler looms" at present in use are provided with a device termed a feeler which is controlled in its action, either directly or through an intermediate device or devices, by the wound filling in the shuttle, and in turn controls the action of filling replenishing instrumentalities. After every flight of the shuttle to the feeler-end of the loom the said feeler engages with the wound mass of filling within the shuttle, or with an attachment or appliance in connection with the filling-carrier or shuttle and controlled by the said mass, and when the mass is exhausted or depleted to the predetermined extent the said instrumentalities are called into action. Various kinds and forms of attachments or appliances for application to the filling-carrier within a shuttle, or to the shuttle itself, for co-action with a feeler, have been proposed. Thus, a feeler-actuator or controller, itself controlled by the wound filling, and movable either radially or longitudinally of the filling-carrier, has been applied to the filling-carrier. In other instances a movable feeler-actuator or controller has been applied to a shuttle, either engaging directly with the wound mass of filling, or co-acting with a governing device applied either to the shuttle or to the filling-carrier and controlled by the said mass. In addition to purely mechanical devices and arrangements, electro-mechanical devices have been proposed, comprising in some instances a controller

or contact-device in connection with the shuttle, and a filling-controlled governing device in connection with the shuttle or with the filling-carrier contained therein, and in electrical communication with said controller or contact-device, and acting on exhaustion or depletion of the filling-supply to the predetermined extent to complete an electric circuit embracing a magnet by means of which the desired instrumentalities are called into action.

The invention consists in improved filling-exhaustion indicating devices characterized by the employment of a rotatable governing device in connection with the filling-carrier employed in a loom-shuttle, the said rotatable governing device being itself controlled by the wound filling, and being normally held thereby from relative turning movement until exhaustion or depletion of the wound mass permits such movement to take place.

The invention also comprises the combination of a rotatable governor with a controller carried by the shuttle, and which may be a feeler-contact or feeler-actuator.

The form of embodiment of the principles of the invention may vary, and in particular the character and arrangement of the controller may be changed to meet requirements.

Embodiments of the invention are illustrated in the drawings, in which latter,—

Figure 1 is a plan view of a loom shuttle having one embodiment of the invention applied thereto. Fig. 2 is a front elevation of a portion of the length of the said loom shuttle. Fig. 3 is a view in horizontal section, and on an enlarged scale, of a portion of a loom shuttle corresponding with that represented in Fig. 2, showing a full load of weft or filling upon the bobbin or filling carrier within the shuttle and the consequent locking of the controller so as to cooperate with the feeler during the regular running of the loom. Fig. 4 is a view in vertical transverse section in the plane indicated by the dotted line 4, 4, in Fig. 3. Fig. 5 is a view corresponding in character with Fig. 3, but showing the condition of the parts when the filling or weft has been drawn off from the bobbin or filling-carrier to a sufficient extent to release the rotatable governor and permit it to turn upon the bobbin or filling-carrier. Fig. 6 is a view in vertical transverse section in the plane indicated by the dotted line 6,

6, in Fig. 5. Fig. 7 is a view in central longitudinal section of a portion of the length of the bobbin or filling-carrier of the preceding figures, with the rotatable governor thereon. Fig. 8 is a view of the said rotatable governor, detached, also in longitudinal section. Fig. 9 is an elevation of the split retaining ring that is employed for keeping the rotatable governor in place upon the bobbin or filling-carrier. Fig. 10 is a plan view on a somewhat smaller scale of a loom shuttle containing another embodiment of the invention. Fig. 11 is a view in horizontal section of a portion of the length of the loom shuttle shown in Fig. 10, showing the controller locked in working position through the presence of a sufficient load of filling or weft upon the bobbin or filling-carrier within the shuttle. Fig. 12 shows in side elevation the portion of the shuttle which is represented in Fig. 11, with the controller in its working position. Fig. 13 is a view in vertical transverse section in the plane indicated by the dotted line 13, 13, in Fig. 10. Fig. 14 is a view corresponding in character and extent with Fig. 11 but showing the filling or weft substantially exhausted and the controller released and in its elevated position in which it will not engage with the feeler. Fig. 15 shows in front elevation the portion of the shuttle length which is shown in Fig. 14, and represents the controller in its said elevated position.

Having reference to the drawings,—these show self-threading shuttles of the kind commonly employed in automatic bobbin-changing looms, A being the shuttle-body in each instance, B the filling-carrier, herein a bobbin, but not necessarily such in all applications of the principles of the invention, and C the wound mass of filling upon the filling-carrier.

B' B' B' are the projecting rings with which the head of the filling-carrier is provided, and D D are the jaws between which the head of the filling-carrier is received and held, the said jaws being formed with grooves to receive the said rings.

As thus far referred to, the parts are or may be as usual, and, as well-known, the filling-carrier is introduced into the shuttle from above, its head being forced down between the jaws D D, with the projecting rings of the said head entering and occupying the grooves of the said jaws, and in the operation of automatically replacing the filling-carrier first employed in the shuttle, when its supply of filling or weft breaks or becomes practically exhausted, a fresh filling-carrier is driven down into the shuttle, expelling the previous filling-carrier and taking its place.

One form of rotatable governor embodying the invention is represented at 1. It is mounted upon the barrel or stem of the filling-carrier with capacity for relative turning

movement thereon, the portion thereof which engages with the co-acting device, (herein the controller presently to be described,) being located adjacent the head of the filling-carrier. The governor is constructed for engagement with the filling or weft which is wound upon the filling-carrier, it being, in the form shown, provided with a hub or sleeve of sufficient length to receive thereon a number of coils or turns of the filling or weft. These coils or turns hold the governor from turning upon the filling-carrier until they have been drawn off. In winding the filling or weft upon the filling-carrier a small length, slightly exceeding that of two or three picks, for instance, first is wound upon the barrel or stem of the filling-carrier above the governor, after which the base of the load of filling or weft is wound upon the sleeve or hub of the governor and the portion of the said barrel or stem next above the governor, and then the winding is continued in usual manner, throughout the length of the filling-carrier. As in an automatic replenishing loom the feeler or other device for indicating the replenishing instrumentalities into action on detection of predetermined exhaustion or depletion of the working filling-supply is located at the side of the loom which is opposite that at which the said instrumentalities are located, the extra length of filling or weft that is wound on the barrel or stem of the filling-carrier above the governor will enable the shuttle to lay a full-length pick in the shed in its flight back to the replenishing side after such detection has taken place.

The governor 1 is combined with the filling-carrier in manner restraining it from movement longitudinally of the filling-carrier. In this instance, the barrel or stem of the filling-carrier is annularly grooved at 21, Fig. 7, and the sleeve or hub of the governor is suitably shaped to produce an internal groove 3, Fig. 8. These grooves register when the governor is in place on the said barrel or stem, and are occupied by a split ring 4, Figs. 7 and 9, which permits the desired relative turning movement of the governor while preventing the undesired relative movement longitudinally of the filling-carrier.

At 5, Figs. 1 to 6 is shown one form of feeler-contact or feeler-actuator, or, as it may be termed generically, "controller." It is located at the front of the filling-chamber of the shuttle, and consists of a strip of suitable length which at one end occupies a recess in the front wall of the shuttle-body and is bent to form an eye 6 to fit upon the stem of a vertical pivotal screw 7 which is applied to the shuttle-body. The controller swings in a horizontal plane around the said pivotal screw within the said recess, between the front clamp D and the front wall of the shuttle-body. A leaf spring 8 bent to clasp the

said eye 6, and having the main portion of its length confined between controller 5 and the adjacent front wall, acts against the controller with a tendency to press its free end rearward into the filling-chamber of the shuttle. A slot, 9, in the front side-wall of the shuttle-body, and extending longitudinally of the shuttle, permits contact of the usual feeler with the controller as the lay of a loom swings forward with the shuttle in the shuttle-box at the side of the loom at which the feeler is located.

When a filling-carrier provided with a governor 1 and containing a load of filling or weft is introduced into the shuttle, the said governor, being itself held by the said filling or weft from turning upon the filling-carrier, engages with the controller and locks it in working position. Consequently, each time the swing of the lay carries the shuttle forward to the feeler the controller presses against the feeler and moves the latter slightly, thereby operating, through the connections which are provided for the purpose, to prevent the replenishing instrumentalities from being called into action. When, however, the filling or weft is woven from the filling-carrier until the coils or turns holding the governor from movement are drawn off the latter, the governor is permitted to turn, allowing the controller to recede into the yarn-cavity so that it no longer moves the feeler as before, and consequently the replenishing instrumentalities are called into action. The engagement of the illustrated governor with the controller is insured by forming the governor with a circular series of teeth extending around the same, as shown, the controller being provided with a detent or dog to coöperate with the said teeth.

In Figs. 1 to 6 two dogs 10, 10, are shown mounted side by side upon the inner side of the controller to swing in vertical planes. The engaging portion of each dog extends rearwardly toward the middle of the filling-chamber of the shuttle, and each dog is formed with a tail 10^a extending downwardly and inwardly. A spring 11 carried by the controller acts against the tails of the two dogs with a tendency to hold the latter inclined upward slightly. In the descent of the full filling-carrier into the shuttle a tooth of the governor engages with the acting portion of one or the other of the dogs, turning such dog downward upon its pivot against the resistance of spring 11 until the filling-carrier has reached its place in the shuttle, at which time the acting portion of the dog will occupy a substantially horizontal position in line with the axis of the filling-carrier and the controller will be pushed forward somewhat and held locked firmly, for coöperation with the feeler as aforesaid. While the acting portion of the dog occupies its position in line with the axis of the filling-carrier, pressure

transmitted rearwardly through the controller and dog will have no tendency to turn the governor. Hence contact of the feeler with the controller, or the action of spring 8, will have no effect in causing the governor to slip against the holding power of the coils or turns of filling in engagement therewith. When the filling or weft is drawn off until the coils or turns holding the governor from turning upon the filling-carrier have been unwound so as to release the governor, the pressure of spring 11 against the tail of the dog which is engaged with the governor will cause the dog to swing upward, turning the governor somewhat, until the acting portion is above a line extending from the pivot of the dog to the central axis of the filling-carrier, thereby unlocking the parts so that the controller may swing farther inward under the pressure of its spring 8 or of the feeler, this inward movement of the controller being rendered possible by the freedom of the governor to turn. The feeler will now permit the replenishing instrumentalities to be called into action. The reason for employing two dogs, side by side, is that in being placed within the shuttle the filling-carrier may become misplaced longitudinally to the extent of the distance separating one groove of the jaws D, D, from the next adjacent groove. A single dog of width corresponding to the extent of the displacement might be employed, but I prefer the use of two separately movable dogs because when the filling-carrier enters farthest within the jaws, so that the toothed portion of the governor engages with the dog which is nearer the jaws D, D, the other dog, not being held from play or movement, will not clamp or cut the exterior turns or coils of filling next adjacent the said toothed portion. The tails of the dogs 10, 10, serve as stops to prevent the acting portions of the dogs from descending too low. The said tails are arranged with respect to the acting portions of the dogs to act in conjunction therewith like gear-teeth in intermeshing with the teeth of the governor as the filling-carrier passes down into the shuttle, and as the dog and governor turn upwardly when the governor is permitted to rotate.

Figs. 10 to 15 show an embodiment of the invention in which the controller, therein designated 12, is arranged to swing vertically, and is furnished with rigid teeth 13, 13, for engagement with the teeth of the governor. The said controller is furnished with a journal 14, extending horizontally in the direction from front to rear, and fitted in holes which are formed in the jaws D D. A spring 15, Figs. 11 and 14, in connection with the said journal acts with a tendency to hold the controller in an elevated position, clear of the slot in the front wall of the shuttle-body. As a filling-carrier is pressed down into the shuttle, one of the teeth of its governor by

engaging with the lower tooth 13 of the controller carries the controller down also into position in line with the said slot, as in Figs. 10 to 14, in readiness to cooperate with the
 5 feeler. The two teeth 13, 13, in this position of the controller, are equidistant above and below a horizontal line passing through the longitudinal axis of the filling-carrier, as represented in Fig. 13, so that rearward pressure
 10 of the feeler exerted against the controller acts equally above and below such line and has no tendency to cause the governor to turn upon the filling-carrier. As soon as the governor is permitted to turn in consequence
 15 of the drawing-off of the coils or turns of filling or weft which are engaged therewith, the tension of spring 15 acts to raise the controller out of line with the slot in the front wall of the shuttle.

20 While I have been careful to describe fully the construction and mode of operation of the particular embodiments of the invention which are illustrated in the drawings, the invention is not necessarily restricted to the
 25 precise details of construction, etc., thus shown and described. Nor do I limit myself to the employment of the principles and features of the invention in connection with strictly mechanical arrangements alone, in-
 30 asmuch as they are also applicable in obvious manner in connection with electro-mechanical arrangements.

The sleeve or hub of the illustrated form of governor is formed with openings 16, 16,
 35 Figs. 5 and 8. These permit the coils or turns of filling which are wound in the said sleeve or hub to make contact with the portions of the barrel or stem of the filling-carrier that are exposed thereby, this enabling the
 40 governor to be held by the frictional engagement of the said coils or turns with the said portions more effectually against turning.

I have herein more particularly described the invention with reference to its employ-
 45 ment in a loom for the purpose of bringing about automatic replenishment of the working supply of filling or weft. The general manner of its employment for the purpose of bringing the automatic stopping mechanism
 50 into play for the purpose of producing the stoppage of the loom when the working supply of filling or weft becomes exhausted to the predetermined extent will be obvious to those who are skilled in the art. The pre-
 55 cise nature of the change in the operation of a loom which the invention is utilized to bring about is not material.

By forming the controller 5 with an eye at its pivotal end, and the leaf spring 8 with a
 60 similar eye fitting upon the outside of that of the controller, and by the employment of the vertical securing and pivotal screw 7, which in practice is provided with a nut, like that shown at 22 in Figs. 3 and 5 in connection
 65 with the securing screw 23 of jaws D, D, I am

enabled to provide in convenient, simple, and secure manner for holding the controller and spring in working position.

I claim as my invention:—

1. In combination,—a shuttle provided 70 with a controller, and a filling-carrier provided with a rotatable governor for the said controller, itself controlled by the wound filling.

2. In combination,—a shuttle provided 75 with a movable controller, and a filling-carrier provided with a rotatable governor for the said controller, itself controlled by the wound filling.

3. In combination,—a shuttle provided 80 with a controller having a detent, and a filling-carrier provided with a toothed rotatable governor engaging said detent and itself controlled by the wound filling.

4. In combination,—a shuttle provided 85 with a controller, and a filling-carrier provided with a rotatable governor by which said controller is restrained in given position until depletion of the filling to a predeter-
 90 mined extent.

5. In combination,—a shuttle provided with a movable controller, and a filling-carrier provided with a rotatable governor which is controlled by the wound filling and acts to
 95 position the said controller as the filling-carrier passes into place within the shuttle.

6. In combination,—a shuttle, a filling-carrier provided with a rotatable governor, and a spring which is placed under tension by the entrance of the filling-carrier into the
 100 shuttle and acts to turn the governor when the latter is freed by the unwinding of the filling.

7. In combination,—a shuttle provided with a controller and a detent in connection 105 therewith, a filling-carrier provided with a rotatable governor which engages with the said detent to determine the action of the controller, and a spring which is placed under tension by the entrance of the filling-carrier
 110 into the shuttle and acts through the said detent to turn the governor when the latter is freed by the unwinding of the filling.

8. In combination,—a shuttle provided with a controller having a dog movably con- 115 nected therewith, a spring in connection with the said dog, and a filling-carrier provided with a rotatable governor that engages the said dog as it enters into the shuttle and thereby places the spring under tension and
 120 locks the controller until depletion of the wound filling renders the governor free to turn.

9. In combination,—a shuttle provided with holding jaws having a plurality of 125 grooves, and also provided with a controller having a plurality of spring-actuated dogs movably connected therewith, and a filling-carrier having a plurality of ring-like projec-
 130 tions to enter the said grooves, and also hav-

ing a rotatable governor with projecting rim adapted to engage with one of said dogs.

10. In devices for indicating extent of filling-supply contained in a working loom-shuttle, in combination, a loom-shuttle, an indicating device, and a filling-carrier provided with a rotatable governor controlled by the load of filling and released by substantial exhaustion thereof to rotate under pressure transmitted through the said indicating device.

11. A filling-carrier for loom-shuttles, provided with a rotatable toothed governor.

12. A filling-carrier for loom-shuttles, provided with a rotatable toothed governor having a sleeve or hub adapted to receive coils or turns of filling or weft.

13. A filling-carrier for loom-shuttles, provided with a rotatable toothed governor having a sleeve or hub adapted to receive coils or turns of filling or weft, and also having an opening through which the said coils or turns may contact with the filling-carrier.

14. A filling-carrier for loom-shuttles, provided with a rotatable governor, and a ring

occupying grooves formed partly in the filling-carrier and partly in the governor and serving to restrain the governor from movement longitudinally of the filling-carrier.

15. In a filling-detecting loom-shuttle, in combination, the shuttle-body having a feeler-opening in its wall, a controller swinging horizontally in line with the said opening and having at its pivotal end an eye, a leaf spring with similar eye, and a vertical pivot pin applied to the shuttle-body and holding both controller and spring in place.

16. In a filling-detecting loom-shuttle, in combination, the shuttle-body, a controller swinging horizontally and having at its pivotal end an eye, a leaf-spring having one end bent to fit around said eye, and a vertical pivot pin applied to the shuttle-body and occupying the said eye.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH E. LEMYRE.

Witnesses:

J. A. BOIVIN,

ERNEST L. ANCTIL.