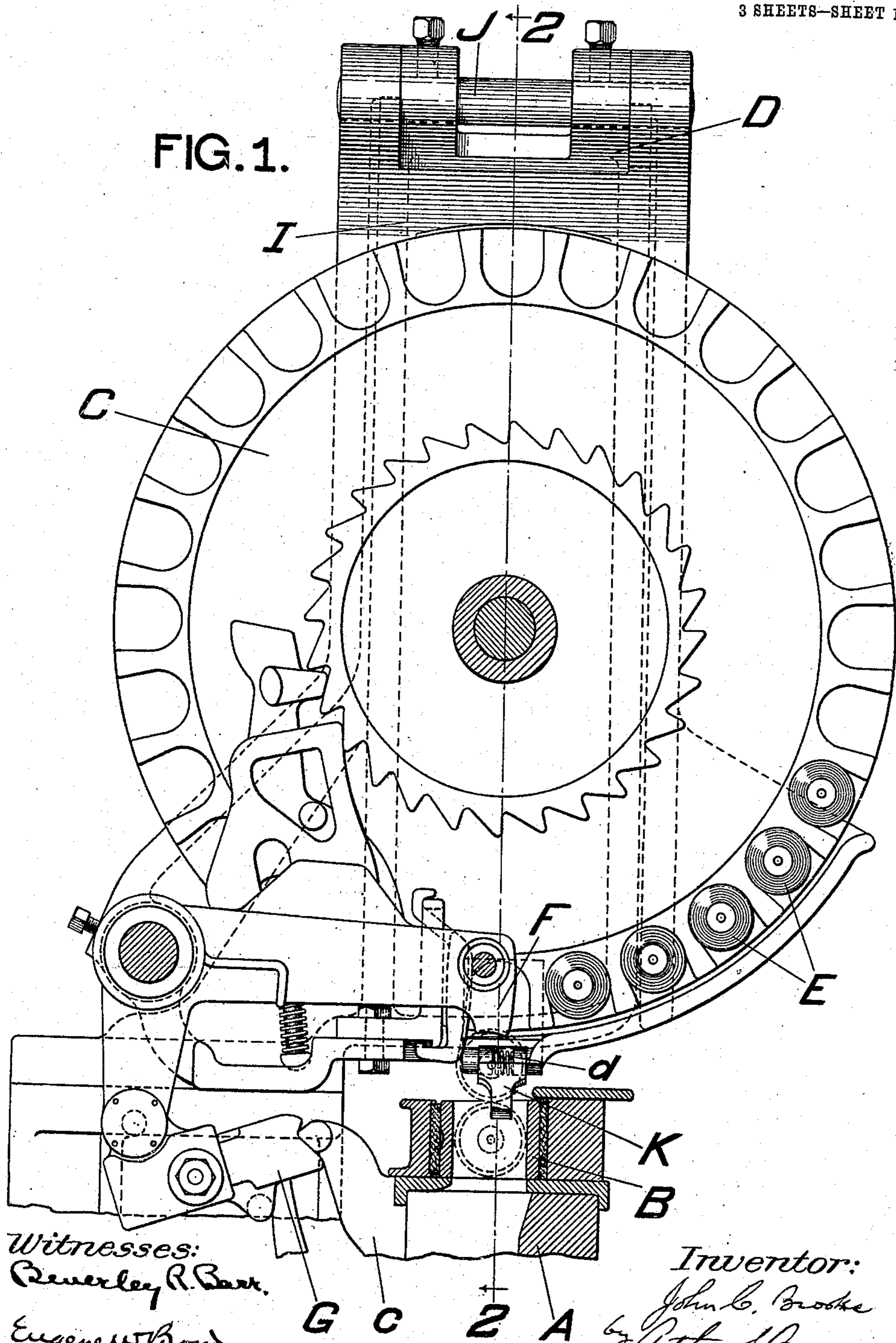


J. C. BROOKS.
 AUTOMATIC WEFT REPLENISHING LOOM.
 APPLICATION FILED DEC. 2, 1907.

911,643.

Patented Feb. 9, 1909.
 3 SHEETS—SHEET 1.



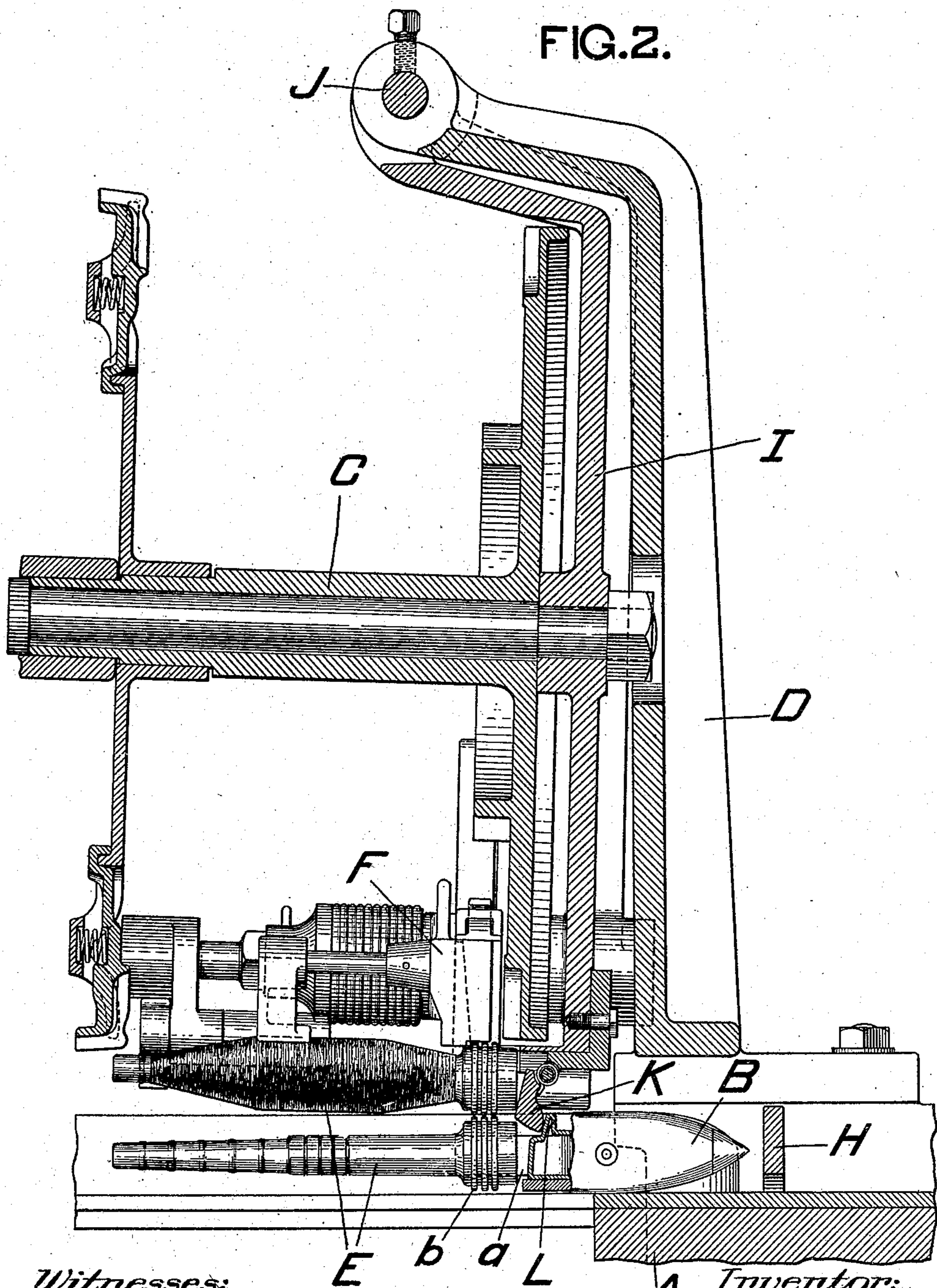
Witnesses:
 Beverly R. Barr,
 Eugene W. Bond.

Inventor:
 John C. Brooks
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 his Attorney

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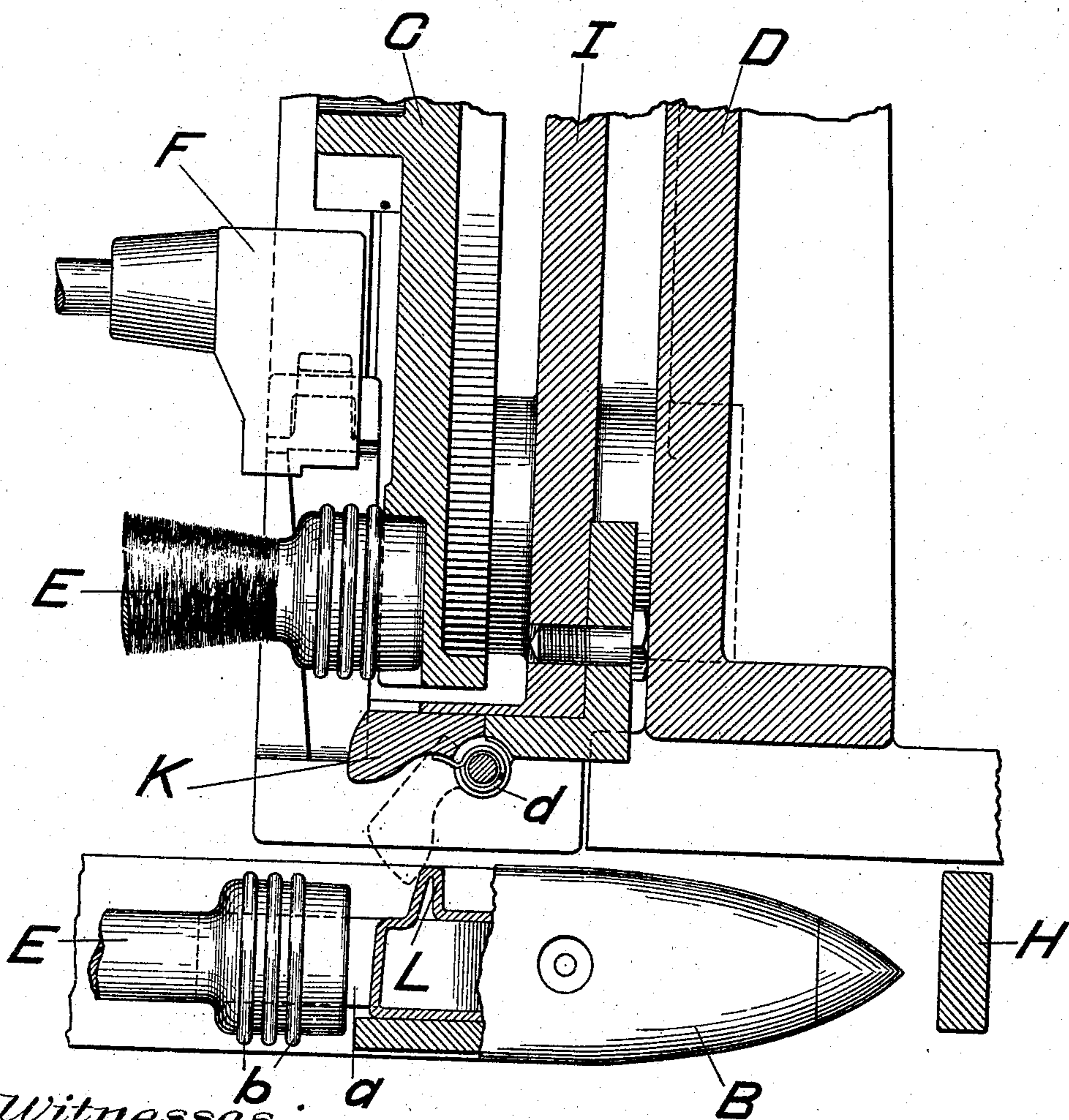
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FIG. 3.



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UNITED STATES PATENT OFFICE.

JOHN CAMPBELL BROOKS, OF PATERSON, NEW JERSEY, ASSIGNOR TO DRAPER COMPANY, OF
PORTLAND, MAINE, A CORPORATION OF MAINE.

AUTOMATIC WEFT-REPLENISHING LOOM.

No. 911,643.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed December 2, 1907. Serial No. 404,825.

To all whom it may concern:

Be it known that I, JOHN C. BROOKS, of Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Automatic Weft-Replenishing Looms, of which the following is a specification.

In the now well-known "Northrop" or "Draper" loom, the principles of which are described in United States Letters Patent No. 529,940, dated November 27, 1894, wherein weft-replenishment is effected by ejecting the spent weft-carrier (bobbin, cop, spindle, or the like) from the working shuttle and transferring a fresh weft-carrier from a magazine, hopper, or other holder into the working shuttle, it is highly important that the shuttle should be properly positioned with respect to the holder containing the spare weft-carriers when the weft-replenishing action takes place. In order to secure this proper relative position between shuttle and holder the looms in commercial practice have been provided with two expedients. In case the shuttle is too near the middle of the loom when the weft-replenishing mechanism is called into action, the transferring operation is prevented by means of a "shuttle feeler" which, coming in contact with the misplaced shuttle, renders the transferring mechanism inactive, as set forth in United States Patent No. 529,943, November 27, 1894. On the other hand, should the shuttle be too far out from the middle of the loom, the transferring mechanism acts and reliance is had upon the construction of the shuttle which is set forth in United States Letters Patent No. 538,507, dated April 30, 1895. This patent shows an automatically threading shuttle equipped with weft-carrier holding jaws (such as are more fully set forth in United States Letters Patent No. 454,807, dated June 23, 1891,) which are grooved to grasp and hold projecting ribs on the weft-carrier, and the shuttle chamber permits the concurrent ejection of the spent weft-carrier and reception of a fresh weft-carrier. This construction requires that the weft-carrier should be accurately placed in the shuttle in order that the jaws may securely grasp and hold an inserted weft-carrier.

As shown in Patent No. 538,507, just mentioned, the shuttle is provided with an inclined bridge in the vicinity of the weft-car-

rier holding jaws which engages the butt end of a fresh weft-carrier while being transferred and thereby directs the weft-carrier to the holding jaws in case the shuttle occupies a position too far from the middle of the loom. While this provision of an inclined directing bridge has been employed in the very large number of Northrop or Draper looms which have been put into commercial use, its action has not been wholly satisfactory.

As will be evident from an inspection of the drawings of the aforesaid patent No. 538,507, the relative longitudinal movement between the misplaced shuttle and the incoming weft-carrier takes place while the spent weft-carrier is being ejected under the impact of the incoming weft-carrier. At the same time, the incoming weft-carrier is being pressed down by the transferrer, whose frictional contact with the weft-carrier tends to interfere with any longitudinal movement of the weft-carrier. It also may happen during the transferring action that the projecting ribs of the incoming and spent weft-carriers may interlock and hence interfere with the relative longitudinal movement between the incoming weft-carrier and the misplaced shuttle. The result is that weft-carriers are sometimes broken, and occasionally the inserted weft-carrier is inefficiently grasped by the shuttle jaws so that a portion of the weft-carrier may be outside of the boundaries of the shuttle with resulting damage to the warp. While these objections are not sufficient to offset the many and conspicuous advantages of the commercial Draper looms, nevertheless they are serious and it is important that they should be obviated.

The object of the present invention is to cure the stated difficulties and it is effected by mechanism which moves outwardly the spare weft-carrier holder to register with the shuttle when too far out, this registering action taking place when the weft-replenishing mechanism is brought into action and in advance of any contact between the incoming and outgoing weft-carriers and before the incoming weft-carrier comes into contact with the shuttle jaws, or any part of the shuttle. The shuttle feeler is retained so that the transferring mechanism is rendered inactive in case the shuttle is too near the middle of the loom when the weft-replenishing mechanism is called into action; while,

on the other hand, should the shuttle be too far out at the critical moment, the holder moves outwardly into just the right position relatively to the shuttle for the insertion of the fresh weft-carrier.

One embodiment of the present improvements is illustrated in the accompanying drawings, in which—

Figure 1, is a vertical section through the lay, transferring mechanism and a portion of the magazine or holder of the modern form of the Northrop or Draper loom showing the present improvements and illustrating the transferrer in the act of inserting a fresh weft-carrier, the period illustrated being just in advance of the incoming weft-carrier contacting with the spent weft-carrier. Fig. 2, is a longitudinal section along the plane 2—2 in Fig. 1, and through the shuttle and the holder, illustrating the parts just after the magazine has been moved outwardly to register with the shuttle. Fig. 3, is a section similar to Fig. 2, but showing only a portion of the holder, and illustrating the normal portion thereof.

The drawings show, with sufficient fullness to enable the present improvements to be understood, certain of the ordinary parts of the well-known Draper loom in one of the present commercial forms.

A, is the lay; B, is the shuttle with its resilient weft-carrier holding jaws, *a*; C, is the spare weft-carrier magazine or holder; D, is a portion of the fixed stand or frame-work by which the holder is supported; E, E, are weft-carriers each with projecting annular ribs *b*, *b*, at its butt end; F, is the swinging transferrer; G, is the transferrer dog which, when the weft-replenishing mechanism is called into action, is moved up into position to be struck by the bunter *c*, on the lay; and H, is the shuttle feeler which prevents action of the transferrer in case the shuttle is misplaced and is too near the middle of the loom when a change is called. The shuttle feeler is shown in Figs. 2, and 3, and only in section, since its relation to the transferring mechanism is now so well known as to require no detailed illustration or description. It may, for example, be arranged as illustrated in Patent No. 529,943, above mentioned, or as shown in more recent United States Letters Patent, as, for example, in Patent No. 664,790, dated December 25, 1900. All of these parts act and cooperate in the same way as customary in the Draper loom.

The added parts illustrated in the drawings relate to the devices for moving the spare weft-carrier holder relatively to the shuttle so that the spare weft-carrier which occupies the transferable position in the holder may register with the shuttle at the moment when a transfer of weft-carriers is to take place. Instead of the holder C, be-

ing journaled directly to the fixed stand D, it is journaled to an intermediate frame I, which is hinged at J to the upper end of the stand D. The upper ends of the stand D and the swinging frame I, extend outwardly over the holder so that the axis on which the frame swings is substantially over the center of gravity of the holder. This axis is in a plane perpendicular to the length of the shuttle. Consequently, when the frame swings outwardly away from the fixed stand D the spare weft-carrier which occupies the transferable position in the holder is moved outwardly lengthwise with respect to the shuttle. Normally, the swinging frame I hangs vertically, as shown in Fig. 3, and it supports the transferrer F. The swinging frame D carries at its lower end a pivoted dog K which is uplifted and normally maintained in the position shown in Fig. 3 by a spring *d*. When in this normally horizontal position the dog K is immediately beneath the butt of the spare weft-carrier which occupies the transferable position in the holder beneath the transferrer F.

The shuttle has within its chamber and close to the butt of the contained weft-carrier (and hence in the neighborhood of the shuttle spring jaws *a*) an abutment L similar to that more fully illustrated and described in the application for United States Letters Patent of Edward S. Stimpson, Serial No. 461,831, filed November 12, 1907.

In case the shuttle is too far out from the middle of the loom at the time when a transfer of weft-carriers should take place, as indicated in Fig. 3, the holder will be swung outwardly so that the weft-carrier to be inserted will properly register with the shuttle jaws by reason of the cooperation between the dog K and the abutment L. When the fresh weft-carrier is depressed by the transferrer C its butt end encounters the free end of the dog K, thus swinging said dog on its pivot to the position shown in dotted lines in Fig. 3, at which time it encounters the abutment L. During the further descent of the weft-carrier being transferred the holder is swung outwardly by reason of its frame I swinging on the axis J, thereby insuring the proper position between the shuttle and the incoming weft-carrier, as shown in Fig. 2. Accordingly, within the scope of movement permitted by the action of the dog K on the abutment L, which may be great enough to provide for all contingencies of outward displacement of the shuttle, the incoming weft-carrier will always register with the shuttle whenever the shuttle is misplaced outwardly. Should the shuttle be misplaced inwardly too near the middle of the loom the shuttle-feeler will encounter the shuttle and prevent the transferring action as in the present Draper loom.

With the present construction it may hap-

pen that the registration between incoming weft-carrier and the shuttle may be due to conjoint movements in opposite directions of the shuttle and the outwardly swinging holder, depending upon how forcibly the usual binder acts upon the shuttle in the shuttle-box. If the binder acts forcibly the registration may be entirely due to the outward swing of the holder. On the other hand, should the binder pressure be small, there may be an inward movement of the shuttle concurrently with the outward movement of the holder, so that proper registration may result from the movement of both. While in the illustrated construction the entire holder moves outwardly, this is not essential. It would suffice if only that portion of the holder which immediately carries the weft-carrier occupying the transferable position should be arranged to move outwardly. In some varieties of holders this would be convenient.

The outwardly movable holder and the shuttle-feeler provide for all the contingencies of misplaced shuttles which arise in practice. The relation between the dog K and the abutment L of the shuttle is such that registration between incoming weft-carrier and shuttle is effected before the weft-carrier comes in contact with any part of the shuttle or with the spent weft-carrier therein, so that there is no relative longitudinal movement between the two weft-carriers while the spent weft-carrier is being driven outwardly from between the shuttle jaws and while the incoming weft-carrier is passing in between said jaws.

The dog K acts upon an abutment wholly within the shuttle so that the exterior of the shuttle is not modified, and the width of the abutment extending interiorly across the shuttle chamber compensates for the movement of the lay during the transferring operation.

I claim:

1. An automatic weft replenishing loom having, in combination, a spare weft-carrier holder; an outwardly swinging frame by which said holder is supported; a shuttle with weft-carrier holding jaws and an abutment; a transferrer to transfer a weft-carrier from the holder to the shuttle and eject the spent weft-carrier; mechanism to prevent the action of the transferrer in case the shuttle is misplaced inwardly relatively to the holder when a change of weft-carriers is called; and a spring restored dog moved by the fresh weft-carrier when acted upon by the transferrer, said dog encountering said shuttle-abutment and moving the holder outwardly when the shuttle is too far out relatively to the incoming weft-carrier.

2. An automatic weft replenishing loom having, in combination, a spare weft-carrier holder; an outwardly movable frame by

which said holder is supported; a shuttle; a transferrer to transfer a weft-carrier from the holder to the shuttle and eject the spent weft-carrier; and a dog moved by the fresh weft-carrier when acted upon by the transferrer, said dog encountering said shuttle and moving the holder outwardly when the shuttle is too far out relatively to the incoming weft-carrier.

3. An automatic weft replenishing loom having, in combination, an outwardly movable weft-carrier holder; a shuttle; and a dog moved by the fresh weft-carrier when being transferred to the shuttle, said dog encountering said shuttle and moving the holder to register with the shuttle.

4. An automatic weft replenishing loom having, in combination, a movable weft-carrier holder; a shuttle; and a dog which encounters the shuttle and moves said holder with respect to the shuttle.

5. An automatic weft replenishing loom wherein replenishment is effected by substituting a fresh weft-carrier for a spent weft-carrier in the shuttle; having, in combination, a shuttle; a spare weft-carrier holder; means for moving said holder outwardly with respect to the shuttle; and means to prevent the transfer of the spare weft-carrier to the shuttle in case the shuttle is misplaced inwardly.

6. An automatic weft replenishing loom wherein replenishment is effected by substituting a fresh weft-carrier for a spent weft-carrier in the shuttle; having, in combination, a shuttle; a spare weft-carrier holder; and means for moving said holder outwardly with respect to the shuttle.

7. An automatic weft replenishing loom wherein replenishment is effected by substituting a fresh weft-carrier for a spent weft-carrier in the shuttle; having, in combination, a shuttle; a spare weft-carrier holder; and means for moving said holder with respect to the shuttle, and lengthwise of the shuttle.

8. An automatic weft replenishing loom having, in combination, a shuttle; a spare weft-carrier holder; and means for moving said holder with respect to the shuttle, and lengthwise of the shuttle.

9. An automatic weft replenishing loom wherein replenishment is effected by substituting a fresh weft-carrier for a spent weft-carrier in the shuttle; having, in combination, a shuttle; and a spare weft-carrier holder capable of movement in a direction lengthwise of the shuttle.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN CAMPBELL BROOKS.

Witnesses:

LORETTA B. DELANEY,
PATRICK H. LAMB.