(No Model.) 2 Sheets—Sheet 1.

W. F. DRAPER.

LOOM SHUTTLE.

No. 454,797. Patented June 23, 1891.

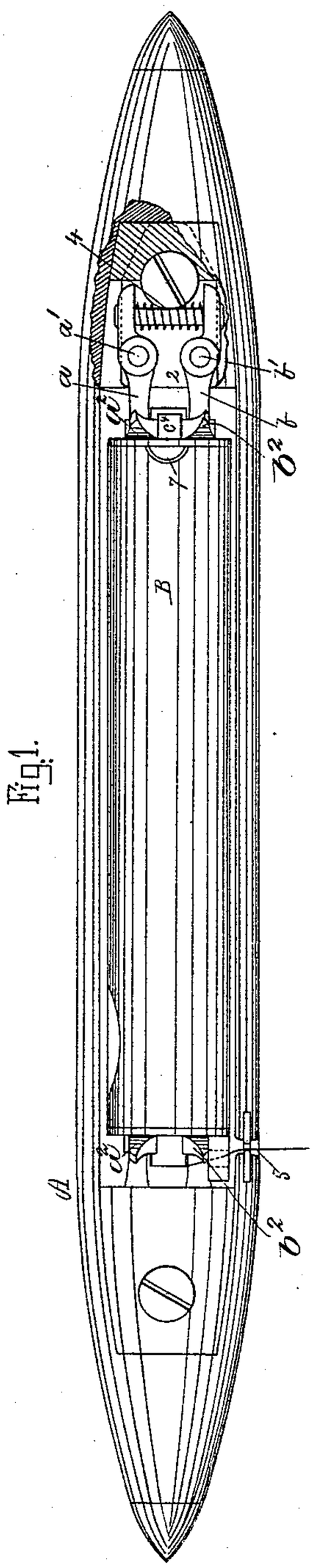

Fig. 1.

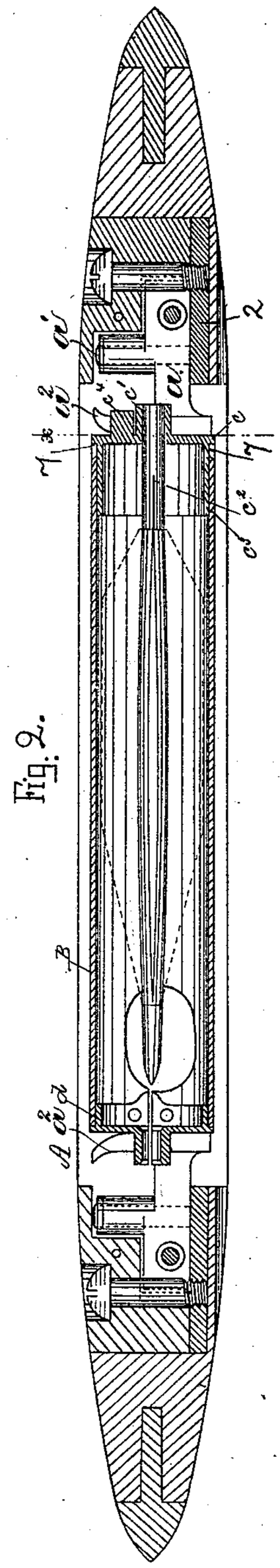

Fig. 2.

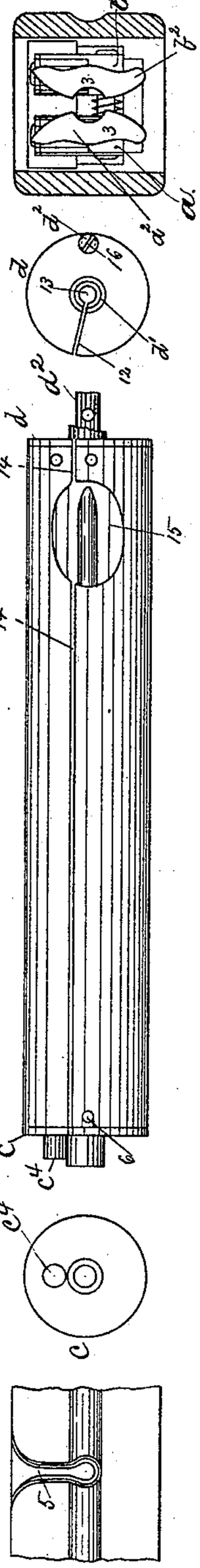

Fig. 4.

Fig. 7.

Fig. 5.

Fig. 6.

Fig. 3.

Witnesses.
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Frederick L. Emery

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William F. Draper,
by Crosby & Gregory Attys

(No Model.)

2 Sheets—Sheet 2.

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LOOM SHUTTLE.

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Fig. 8.

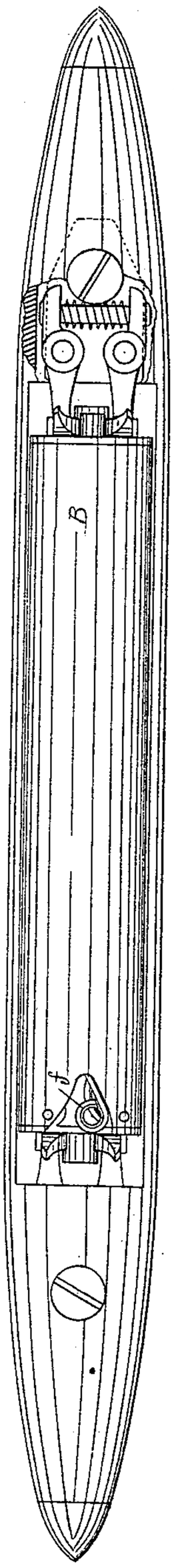


Fig. 9.

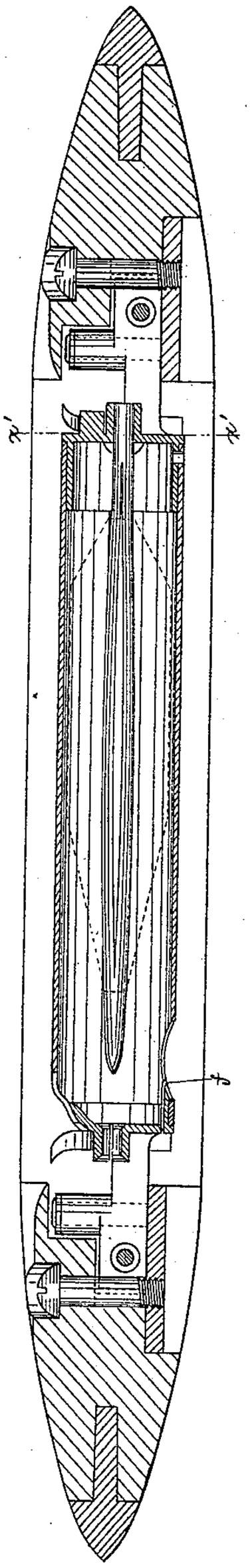


Fig. 10.

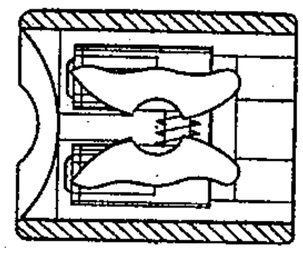


Fig. 13.

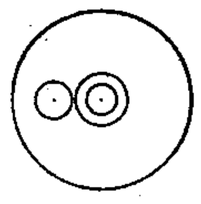


Fig. 11.

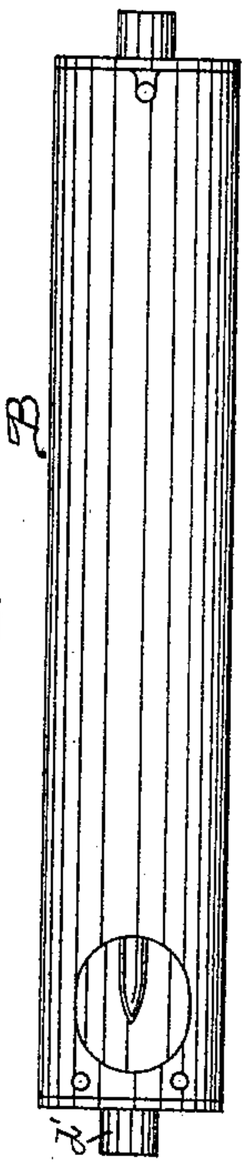
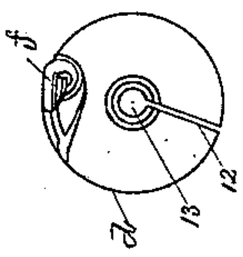


Fig. 12.



Witnesses.

Fred'k L. Emery

Frederick L. Emery

Inventor.

William F. Draper,

by Lovejoy & Gregory

Attys

UNITED STATES PATENT OFFICE.

WILLIAM F. DRAPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO GEORGE DRAPER & SONS, OF SAME PLACE.

LOOM-SHUTTLE.

SPECIFICATION forming part of Letters Patent No. 454,797, dated June 23, 1891.

Application filed May 10, 1890. Serial No. 351,220. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. DRAPER, of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Loom-Shuttles, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

My invention has for its object a novel construction of shuttle and weft-case especially adapted for use in that class of looms in which the shuttle remains in the loom and is automatically supplied with weft while the loom is in motion by or through the action of a suitable transferring device, which upon the breaking or running out of the weft or other usual causes which would ordinarily stop a loom takes a weft-case from a suitable receptacle or hopper and supplies it to a shuttle.

Prior to my invention attempts have been made to provide shuttles in looms with weft-cases; but such attempts, so far as I am aware and have been able to ascertain, have not resulted in the production of a practicable loom, for the reason that the weft-case has not been so constructed as to enable the weft to be properly taken off from the spindle holding the cop of yarn. In my experiments to improve this class of loom I have found to render the same practicable that the weft must pass from the cop or bobbin on the spindle through a suitable eye substantially or nearly in line with the spindle, so that the weft-yarn as it is unwound has a chance to travel about and around the point of the spindle without catching thereon, and beyond this eye the weft must be led through a suitable guide-eye, which will enable it to be delivered from the side of the shuttle; also, in practice the parts of the weft-case must be so constructed that when the weft-case containing a cop or bobbin of yarn is properly threaded and the outer end of the yarn is connected with some stationary part of the loom the yarn will be correctly delivered from the shuttle as the latter supplied with a weft-case therein is moved in weaving. The two weft-controlling eyes mentioned should preferably be located substantially at right angles each to the other. I have also provided the weft-case with suitable journals at its ends, which co-operate with suitable holders applied to the shuttle, the construction of the journals and the holders being such that the weft-case may be inserted into one open side of the shuttle and be discharged therefrom through its opposite open side.

One part of my invention therefore consists, essentially, in a weft-case having journals or trunnions at its ends, one of which is hollow for the delivery of the weft, combined with a shuttle having holders shaped to permit the weft-case to be inserted at one open side or top of the shuttle and to be discharged from between the said holders at the other open side or bottom of the shuttle, substantially as will be described; also, in a weft-case having heads provided with journals or trunnions, one of the said heads receiving and holding a spindle, the journal of the other head being provided with an opening or passage to permit the weft-yarn to be drawn off from the spindle in the weft-case substantially in line with the said spindle, substantially as will be described.

Other features of my invention will be hereinafter pointed out in the claims at the end of this specification.

Figure 1 is a top or upper side view of a shuttle having a weft-case embodying my invention, a part of the shuttle being broken away; Fig. 2, a longitudinal vertical section thereof. Fig. 3 is a partial side elevation of the shuttle shown in Fig. 1 chiefly to illustrate the yarn-delivery eye therein. Fig. 4 is a section in the line x, Fig. 2, looking toward the right. Fig. 5 shows the weft-case. Fig. 6 shows one end of the spindle-holding head which is inserted in the left-hand end (see Fig. 5) of the weft-case, the said head having a journal and a stop. Fig. 7 is a right-hand end view of the weft-case shown in Fig. 5, the head at that end of the weft-case being shown as slotted to aid in threading the main delivery-eye of the weft-case. Fig. 8 is a top or plan view of a modified form of my invention, a part of the shuttle being broken away; Fig. 9, a longitudinal vertical section thereof; Fig. 10, a section of Fig. 9 in the dotted line x', Fig. 9, looking to the right. Fig. 11 shows the weft-case removed from

the shuttle shown in Fig. 8. Figs. 12 and 13 are respectively end views of the weft-case shown in Fig. 11, the head or end shown in Fig. 12 being slotted to aid in threading the weft-case, while the end shown in Fig. 13 is that to which the spindle carrying the cop is attached.

Referring to the drawings, A represents a shuttle, the body of which may be composed of wood or any other usual material having proper tips at its ends, and this shuttle may be of any usual shape and size; but it will be understood that at least two sides of the said shuttle will be cut away so as to enable the weft-case B (to be described) to be passed into the body of the shuttle at one side, which may be the top side, and to be discharged therefrom at the other side, which may be the bottom side.

The shuttle-body shown in Figs. 1 and 2 has applied to it in the space near each end holders for the journals of the weft-case, these holders, as herein shown, being substantially alike at both ends, and herein they are shown as levers a b, pivoted, respectively, on pins a' b', rising from a suitable plate 2, the said levers having upright portions a^2 b^2 at their inner ends, which are notched, as at 3, and beveled at one or both sides of the said notches, so that the journal of the weft-case by acting upon the beveled portions of the uprights will act to spread them apart and enable the journals to enter the notches, where the journals will be temporarily held by or through the action of suitable springs 4, placed between the outer ends of the levers, as represented best in Fig. 1, or those ends of the levers nearest the tips of the shuttles. One wall of the shuttle (shown in Fig. 1) has a slot leading from one edge thereof to substantially the center line of the shuttle, said slot being marked 5 and serving to guide and deliver the weft-yarn to the warps as the shuttle is passed through the shed. This delivery-eye is shown as slotted, so that the yarn extended from the weft-case, when the latter is applied to the shuttle, may be readily passed without aid of the hand into the bottom of the said delivery-eye.

Referring now to the weft-case B, it is herein shown as cylindrical, as that form is considered the more convenient for practical use. The weft-case has at each end a suitable head, each head performing, however, other functions than simply closing the ends of the weft-case. The head c is represented as having a journal c' made hollow for the reception of the spindle c^2, upon which is placed and retained any usual cop or bobbin of weft, (shown by dotted lines,) the said cop of weft containing or not, as desired, a cop-tube. This spindle may be of any usual shape or construction. The head c is provided, as represented, with an annular projection, as c^3, of suitable size to enter one end of the weft-case for a little distance, so as to enable the head to be held firmly in that end of the weft-case, and to prevent the rotation of the head c in the weft-case I have provided it with a pin or projection 6, (shown best in Fig. 5,) which enters a notch in the end of the weft-case, and to enable the head to be readily engaged to withdraw it and the attached spindle from the weft-case I have shown the weft-case as notched, as at 7, to expose a little annular flange on the head to be acted on by the finger. The head c has also connected to it a stop c^4, which, lying between the uprights a^2 b^2 above the notch 3, prevents the rotation of the weft-case in the shuttle, and also it will be noticed that when the weft-case is pushed down into position between the uprights of the jaws the pin, acting upon one or the other upright, gives to the weft-case a normal position. The opposite end of the weft-case has fixed to it a head d, it being also preferably flanged to enter the weft-case, and thus aid in holding the head in position. The head d (shown separately in Fig. 7) has a hollow journal d', which, besides constituting a journal, also constitutes the main delivery-eye of the weft-case, the said weft-case having, however, an auxiliary delivery-eye d^2, which, as represented in Figs. 1, 5, and 7, is shown as attached to the head d. The head d is provided with a slot 12, which communicates with the hollow center 13 of the journal or yarn-delivery eye d', the said slot coinciding, or substantially so, with a slot 14, made in the weft-case, out through which slot at the hole 15 may be and is led the weft-yarn, it being led from the slot 14 through the slot 12 into the hollow delivery-eye 13, and from thence the said yarn is led into the slot 16 in the auxiliary delivery-eye d^2. The end of the weft-yarn coming from the cop upon the spindle described at a point beyond the slotted auxiliary delivery-eye d^2 will in practice be connected with a suitable pin, catch, or projection forming part of a loom, substantially such as represented in United States application, Serial No. 340,034, filed on the 11th day of February, 1890, the said weft-cases being placed (a number of them) in a suitable hopper or guide, so that at the proper times, as when the weft breaks or for any reason fails, a transferring device will act to take a weft-case from the hopper and transfer it into the shuttle, it at such time being in the shuttle-box at one end of the lay, the incoming weft-case striking against the weft-case then in the shuttle, but from which the weft has been exhausted or broken, causing the said exhausted weft-case to be pushed out from the bottom or opposite side of the shuttle into a proper receptacle placed to receive it, this operation being performed almost instantly and without stopping the speed of the loom. As the weft-case is being supplied to the shuttle, the latter occupies such a position in the shuttle-box that the weft-yarn between the delivery-eye d^2 and the stud, pin, or catch holding the end of the weft-yarn before it was transferred will be automatically entered

into the eye 5 of the body of the shuttle, so that in the movement of the shuttle the weft will be properly trailed behind it and delivered out from the side of the shuttle into proper position in the shed, the weft in practice not being broken off from the stud, catch, or pin holding it at the hopper until after the shuttle which has just received a weft-case has been shot once across the warps. It will be noticed that the main delivery-guide d' is substantially in line with the spindle c^2, so that the weft-yarn drawn off through the said eye has perfect freedom to travel about the point of the spindle without dragging thereon or being subjected to a pull or strain in such direction as would tend to break the delicate weft-yarn, which yarn is usually slack-twisted, and beyond the main delivery-eye the weft-yarn is turned substantially at right angles, led through an auxiliary delivery-eye, and there brought to the edge of the shuttle, so that the yarn may be delivered from the side of the shuttle into the shed. By beveling the lower ends of the uprights a^2 b^2 below the notches 3 therein, which embrace and hold frictionally the journals of the weft-case, it is possible to enable the springs 4, acting upon the levers a b, there being like levers at each end of the shuttle, to quickly close upon the journals of an incoming weft-case and that without any interruption or detention from the journals of the outgoing weft-case, the direction of movement of the incoming and outgoing weft-cases being the same.

I have referred to a loom having one form or transferring device, substantially such as may be used to carry the weft-cases into the shuttle, it being understood, however, that the shape of the transferring devices would be somewhat modified to adapt them to the shape of the weft-case rather than to the shape of a shuttle-body, as in the said application.

To transfer the weft-cases into the shuttles any well-known or suitable devices commonly used in looms for such purpose may be employed. So, also, it is not intended to limit the invention herein contained to the exact shape of the levers shown, which constitute the holding devices for the ends of the weft-case, as instead I may use any other suitable or well-known shaped arms or levers so long as they are so shaped as to permit the journals or ends of the weft-case to pass into holding position centrally in the shuttle and permit the weft-case to be removed from the shuttle-body at the opposite side thereof from whence it entered.

It is essential in the employment of a weft-case in a shuttle that the weft be free to run off the end of the spindle very rapidly, and to do this the main delivery-eye, through which the weft-yarn passes, must be located substantially in line with the point of the spindle, and that thereafter the weft passes through an auxiliary eye located at or near one side of the shuttle. This second or auxiliary eye, located substantially at right angles to the main eye and at or near the side of the shuttle, prevents the weft-yarn from being entangled in the warps.

The yarn-delivery eye 5 in the side of the shuttle is useful when the weft-case is to be inserted into the top of the shuttle and discharged from the bottom of the shuttle; but it is not intended to limit this invention to that form of shuttle in which the weft-case is applied to the shuttle at the top and discharged at the bottom, for it is obvious that the weft-case may be applied to the front side of the shuttle and be removed from the rear side of the shuttle, and prior to my invention patents have been granted in which means have been shown for applying a weft-case to the shuttle at one side and discharging it from the shuttle at the rear side, though as such transferring mechanism does not form a part of the invention herein contained I desire to state that any well-known form of such mechanism which is suitable may be employed in connection with the weft-case and shuttle forming the subject-matter of this invention.

The drawings, Figs. 8 to 13, show a modified form of my invention, in which the weft-case is adapted to be inserted at the front side of the shuttle and discharged from the rear side thereof. The weft-case B in this modified form of my invention and its heads and journals, together with the spindle contained therein and the holders for holding the journals at the ends of the weft-case, are substantially the same as in the plan shown in Figs. 1 to 7; but instead of providing the shuttle-body with an eye 5 at its side I have as a modification substituted for the auxiliary delivery-guide d^2 (shown in Fig. 7) a delivery-guide marked f, (see Figs. 8, 9, and 12,) which is located, as shown, in a small notch or space cut out from the weft-case and the head d', the said eye f being located at or near the front side of the shuttle, and being so located the shuttle-yarn may be delivered from the shuttle at its front side and gain the same advantages as though the eye 5 were used. This eye f is, it will be observed, located at right angles, or substantially so, to the main delivery-eye 13 in or forming part of the journal d', connected with the head d.

The gist of my invention lies in such construction of the weft-case and its yarn-delivery eyes and the shuttle that the weft-yarn led from the spindle in the weft-case through a delivery-eye substantially in line with the spindle and then through a delivery-eye having its openings at a proper angle thereto may be held in a position outside the shuttle, and when inserted in the shuttle will leave the end of its yarn trailing behind the shuttle in its passage across through the shed, the shuttle-yarn continuing, so long as perfect, to be delivered from the cop or bobbin upon the spindle without catching on the point of the spindle.

Inasmuch as the shuttle-body is open at top and bottom or at both sides, or, in other words, has but two walls, I denominate the shuttle as a "skeleton shuttle." It will be noticed that the main and auxiliary delivery-eyes are carried by the weft-case and not by the shuttle.

I claim—

1. A weft-case having journals or trunnions at its ends, one of which is hollow for the delivery of the weft, combined with a shuttle having holders shaped to permit the weft-case to be inserted at one open side or top of the shuttle and to be discharged from between the said holders at the other side or bottom of the shuttle, substantially as described.

2. A weft-case having heads provided with journals or trunnions, one of the said heads receiving and holding a spindle, the journal of the other head being provided with an opening or passage to permit the weft-yarn to be drawn off from the spindle in the weft-case, substantially in line with the said spindle, substantially as described.

3. A weft-case having at one end a substantially central delivery-eye, combined with an auxiliary eye, through which the weft passes at an angle to its line of movement in the substantially central eye, substantially as described.

4. A weft-case having a detachable head or end, combined with a spindle attached to the said head or end, substantially as described.

5. A weft-case, a spindle supported at one end by a head or end of the weft-case, the opposite head or end of the weft-case having an opening substantially in line with the delivery end of the spindle and slotted to permit the weft-yarn to be readily led into the said eye, substantially as described.

6. A weft-case to contain a cop of yarn, one end of the weft-case having a yarn-delivery eye substantially in line with the end of the said cop, combined with a shuttle having a slotted eye in its side to thereby permit the threading of the shuttle-yarn into the eye when the weft-case is applied to the shuttle.

7. A weft-case having journals or trunnions at its ends, one of which journals is hollow, and having a stop to prevent its rotation in the shuttle, combined with holders to support the said journals or trunnions and co-operate with the said stop, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM F. DRAPER.

Witnesses:
F. J. DUTCHER,
H. W. BEATTY.