

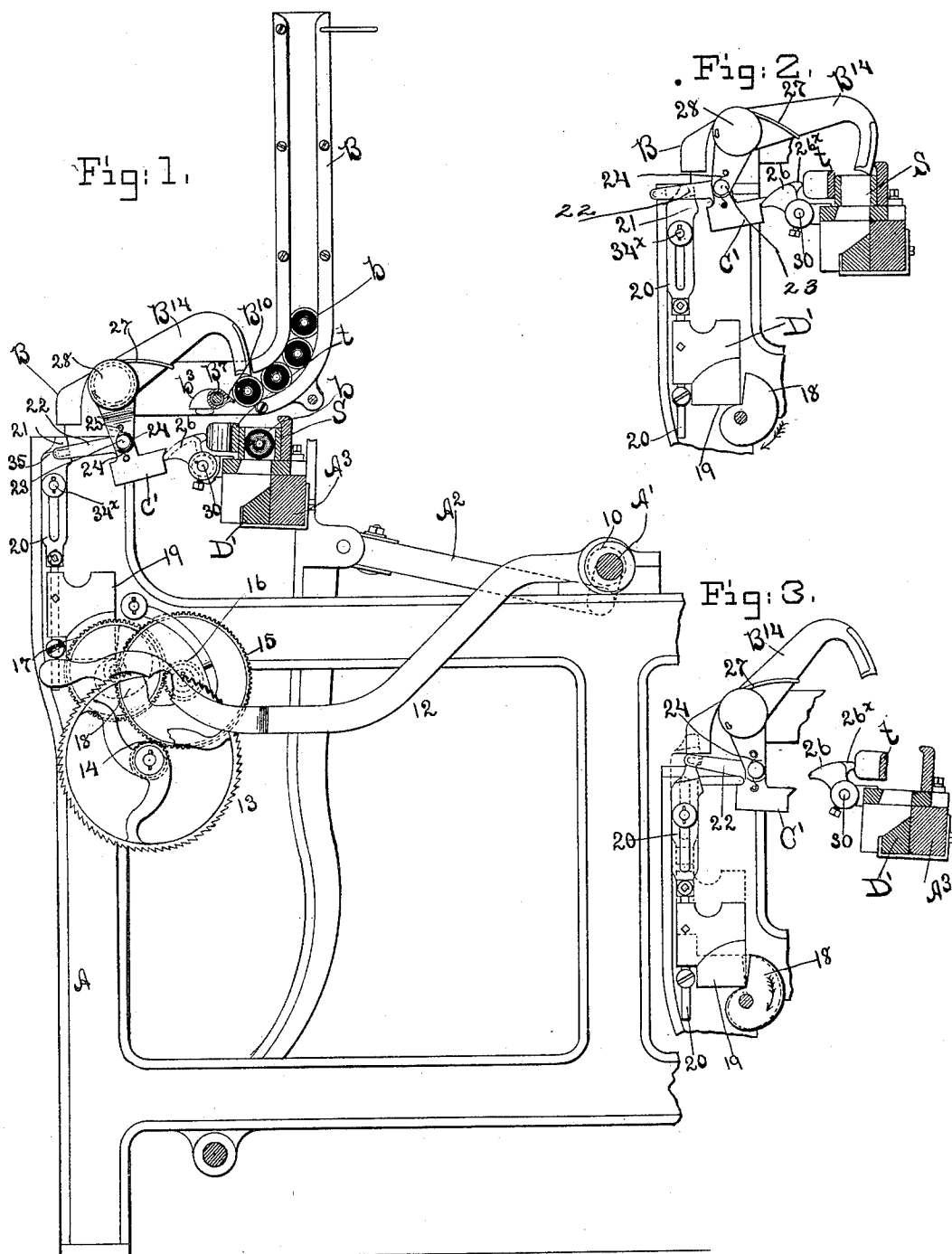
(No Model.)

2 Sheets—Sheet 1.

W. F. DRAPER & J. H. NORTHROP.
LOOM.

No. 462,919.

Patented Nov. 10, 1891.



Witnesses:

Fred S. Greenleaf.
Edgar A. Gordin.

Inventors.

William F. Draper.
James H. Northrop.
by Crosby & Gregory Attys.

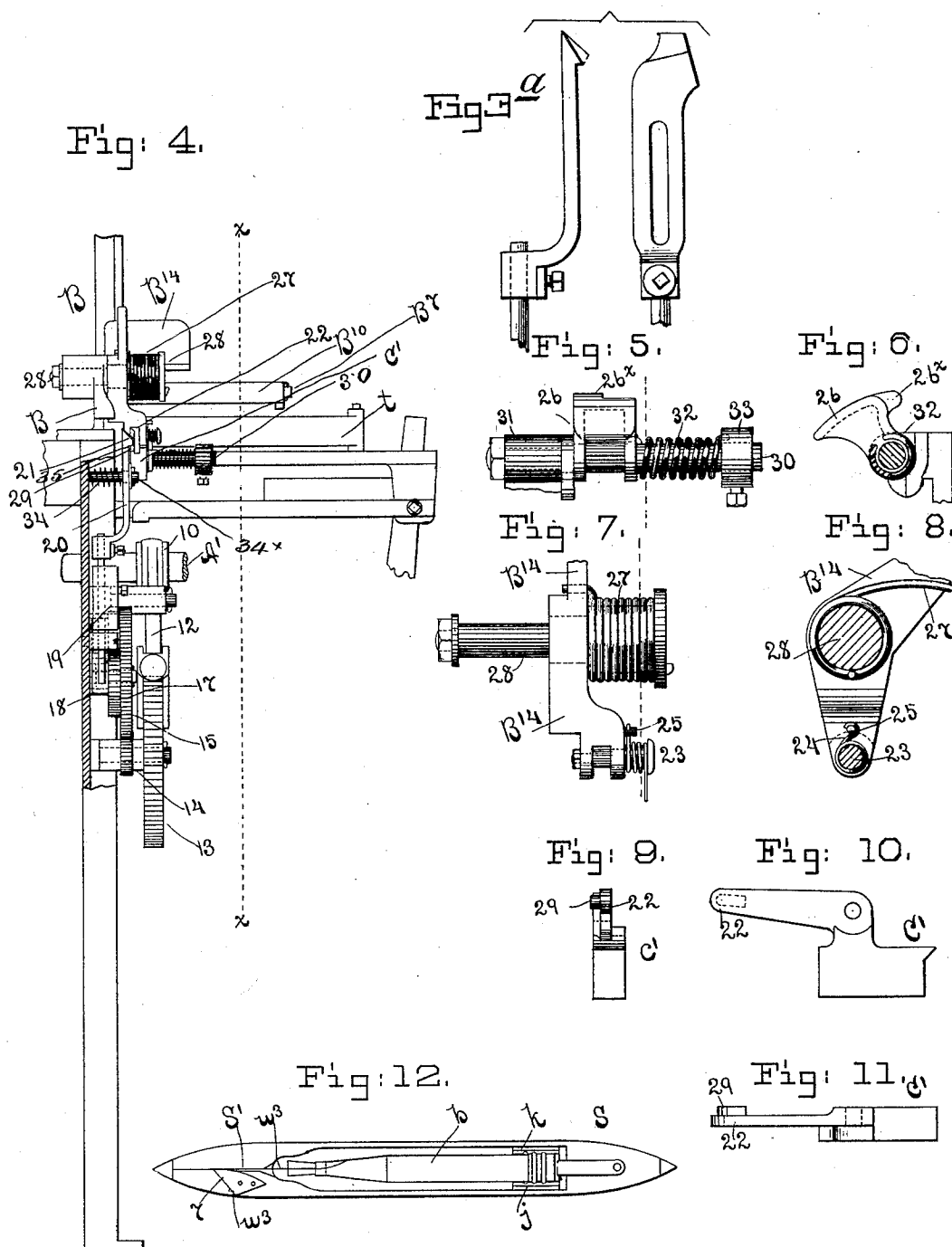
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UNITED STATES PATENT OFFICE.

WILLIAM F. DRAPER AND JAMES H. NORTHPROP, OF HOPEDALE, MASSACHUSETTS, ASSIGNORS TO GEORGE DRAPER & SONS, OF SAME PLACE.

LOOM.

SPECIFICATION forming part of Letters Patent No. 462,919, dated November 10, 1891.

Application filed May 18, 1891. Serial No. 393,092. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM F. DRAPER, of Hopedale, county of Worcester, State of Massachusetts, and JAMES H. NORTHPROP, a subject of the Queen of Great Britain, but residing at Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

United States Patent No. 454,810, dated June 23, 1891, shows and describes a loom wherein a bobbin, spindle, or filling-carrier is put automatically into a shuttle in the shuttle-box whenever for any reason the weft fails. In weaving, the filling stop-motion can act only when the filling fails, and any failure in filling makes a fault in the cloth. In coarser goods, where the filling is strong, the filling stop-motion acts only when the filling is exhausted from the bobbin or spindle in the shuttle, and in the production of finer goods with finer filling the stopping of the loom by the breakage of filling is comparatively unfrequent.

The invention to be herein described has for its object to change the bobbin, spindle, or other filling-carrier used in the shuttle after a predetermined number of picks and before the filling has opportunity of being woven off, and consequently perfect cloth as to pick or laying of weft is insured. The pusher or transferer or other device employed to put a bobbin, spindle, or weft-carrier into the shuttle and to remove from the shuttle a substantially exhausted bobbin or spindle is controlled as to its time of action by a pattern surface or indicator, which, after a predetermined number of picks, causes the pusher to act, the said pattern surface or indicator being moved in unison with or from some regularly-moving part of the loom—as, for instance, the take-up or crank.

Figure 1, in side elevation, represents a sufficient portion of a loom with our improvements added to enable our invention to be understood, the shuttle-box and shuttle therein being in section; Figs. 2 and 3, details showing the lay and pusher in different positions;

Fig. 3^a, a detail of the connection 20; Fig. 4, a detail looking from the left in Fig. 1, chiefly to show the means for moving the pusher at a predetermined time, the line x showing the line of section for Fig. 1; Figs. 5 and 6, details of the bunter controlled by the binder; Figs. 7 and 8, details of the pusher; Figs. 9 to 11, details of the trip detached from the pusher; and Fig. 12 shows a shuttle enlarged and its holder, the bobbin being in place.

The frame-work A, the crank-shaft A', the lay A³, its connecting-rods A², the hopper B, which in practice will contain a series of bobbins, spindles, or weft-carriers b , the self-threading shuttle S, having a bobbin or spindle holder composed of jaws j k , the pusher B⁴, the trip C', the bobbin or spindle rest B¹⁰, mounted on the stud B⁷ and located at the lower end of the hopper, and the incline D', connected with the lay below the slot in the shuttle-box, are and may be all substantially as in the said patent, wherein like letters are used to designate like parts.

The loom to which our improvements to be herein described will be applied will contain a picking-shaft, picking mechanism, stopping mechanism, as provided for in said patent, and some usual shed-forming devices, warp and take-up beams, and let-off and take-up devices.

The shuttle-box is slotted or cut through at its bottom, as shown in Fig. 1, to enable the bobbin, spindle, or weft-carrier b to be pushed from the shuttle S through the said slot, to be discharged at the proper time, according to the requirements of the pattern surface or indicator.

In the form in which our invention is herein embodied we have for simplicity employed a part of the regular take-up motion, which determines the number of picks in the cloth as the source of motion for the pattern surface or indicator, of whatever form used, which pattern-surface by its movement determines the time at which the pusher or equivalent device shall operate to take a full bobbin, spindle, or weft-carrier b from the hopper and put it into the shuttle, instead of the bobbin, spindle, or weft-carrier which may have been partially exhausted; but, as pre-

viously stated, the pattern surface or indicator may derive its motion from any suitable moving part of the loom, according to the particular form of loom to which our improvements are added.

The crank-shaft A', as herein represented, is provided with an eccentric 10, which actuates a pawl 12, which engages the teeth of and rotates a take-up ratchet-wheel 13, of usual construction. This ratchet-wheel 13 has at its hub a pinion 14, which in the form of our invention herein shown acts through the gears 15 16 and engages and rotates a gear 17, the hub of which carries a pattern surface or indicator 18, which in this embodiment of our invention is shown as a cam; but instead of the particular form of pattern surface or indicator shown we may employ any other equivalent pattern surface or indicator, which, at a certain part of its rotation or movement derived from some suitable source of movement by suitable devices, will set in motion the device or devices which aid in starting the movement of the pusher or transferrer to insure a new supply of filling. As herein shown, the said pattern-surface acts on a toe 19 at the lower end of a connection 20, represented as a slide-bar normally kept down with the said toe against the said cam. The upper end of the connection 20 is represented as provided with a cam-latch 21, which co-operates with the outer end 22 of the trip C', said trip being pivoted at 23 upon a part of the pusher B¹⁴. A suitable spring, as 24, connected at one end to the pin 25 on the said pusher and at its other end to a suitable pin on the trip, acts to normally keep the inner end of the trip down or out of the range of movement of a bunter 26, attached to or moving with the lay. The pusher is normally kept elevated, as represented in Fig. 1, and for such purpose we prefer to employ some sort of spring, as 27, it being represented as wound about the stud 28, forming the fulcrum for the pusher, one end of the spring being connected to the pusher and the other to the stud. The trip has at one side a lug 29, as shown best in Figs. 9 and 11.

The machine described in the patent referred to contained a bunter, which at times struck the trip, but in the said patent the bunter was fixed to the lay. In this our invention, however, the bunter is made movable on or with relation to the lay and is placed under the control of the shuttle-box binder t, it being a binder pivoted at one end and adapted to swing out and in at its other end, as common in looms. This bunter 26 will preferably be mounted loosely upon a stud 30, suitably mounted in an ear 31 at the front of the lay. A spring 32, herein represented as surrounding the said stud and connected at one end with the bunter and at the other end with an adjustable collar 33 on the stud, acts to keep the heel 26^{*} of the bunter pressed against the shuttle-box binder t, as represented in Fig. 3. When the shuttle is

absent from the shuttle-box, the toe at the left-hand end of the bunter, viewing Figs. 1, 2, and 3, will always stand out of range of movement of the trip, even though the trip had been lifted to effect the transfer of a bobbin or spindle from the hopper into the shuttle; so it is impossible to make the pusher act except when the shuttle is in the proper shuttle-box. The pattern surface or indicator in its movements acts to lift the connection 20, and as the latter rises the upper end of the incline or cam-shaped latch 21 thereof, by acting upon a part of the trip, preferably upon the under side of a lip or projection 29 thereof, lifts the outer end of the trip and carries its inner end down, (see Fig. 3,) so that the bunter cannot hit it. At this same time the upper end of the latch 21 is gradually pushed in toward the loom side, compressing a spring 34 on a stud 34^{*}. The connection 20, at the lower end of its beveled face 21, (see Figs 1 and 4,) has a shoulder 35, preferably inclined, as shown in Fig. 1 by dotted lines and enlarged in Fig. 3^a, which as the connection ascends finally catches over a part of the arm 22 of the trip, preferably over the lip or projection 29 thereof, the spring 34 acting normally to cause the hook to engage the said lip or projection as soon as the shoulder 35 gets above it. As or after the shoulder 35 of the connection engages the arm 22 of the trip the toe 19 in the further rotation of the pattern surface or indicator drops from the heel of the cam or from the dotted-line position, Fig. 3, into the full-line position, Fig. 2, (the weight of the toe being preferably sufficient to cause it to drop thus,) and the connection acts on the arm 22 to put the front end of the trip into the range of movement of the bunter 26, as in Fig. 1, so that during the forward stroke of the lay, if a shuttle is properly in the shuttle-box, so as to push the binder out and put the bunter in operative position, the said bunter will strike the trip, as in Fig. 1, and as the lay goes yet farther forward the bunter, acting on the trip, will actuate the pusher, bringing it into the position Fig. 2 and effecting the transfer of the lowermost bobbin, spindle, or weft-carrier b from the hopper into the shuttle S in the shuttle-box, causing the incoming bobbin, spindle, or weft-carrier to act on and eject the previously-exhausted bobbin, spindle, or weft-carrier from the shuttle. Instead of depending upon the weight of the toe to pull down the connection 20, we may use any equivalent device, such as a spring. When the bunter strikes the trip, as stated, to depress the pusher, the trip is pushed toward the breast-beam, and at such time the lug or projection 29 on the arm 22 of the trip is made to travel horizontally under the shoulder 35 referred to, and the surfaces in contact being slightly inclined or beveled the connection 20 is lifted slightly, so that as soon as the lug or projection 29, in its movement toward the breast-beam, passes beyond the said

shoulder 35 the connection drops and puts the
 shoulder 35 below the lip or projection 29, leav-
 ing, however, the front end of the trip in con-
 tact with the bunter. When the lay starts
 5 on its movement away from the breast-beam,
 the bunter is in contact with the trip, and
 the two are kept in contact by the action of
 the spring 27 in lifting the pusher; but after
 the lay has been moved partially back away
 10 from the breast-beam the bunter retires from
 the trip, leaving it free to drop. The forward
 end of the trip then assumes a position out
 of the path of the bunter, so that the latter
 cannot again hit the bunter until the trip
 15 has again been put in operative position by
 the pattern surface or indicator.

In practice it will be understood, as pro-
 vided for in the said patent, that the hopper
 will contain a series of spindles, bobbins, or
 20 weft-carriers; that the outer ends of the fill-
 ing or weft wound on the said spindles, bob-
 bins, or weft-carriers will be held by some
 suitable holder, and that the shuttles used
 will have self-threading eyes to enable the
 25 filling or weft put into the shuttle by the
 pusher to be automatically threaded into the
 shuttle-eyes during the movement of the shut-
 tle in the loom, all as provided for in the said
 patent.

In this present invention, based upon the
 invention contained in said patent, we have
 omitted from the drawings many parts com-
 mon to all looms for weaving cotton and
 other cloth, and have tried to illustrate only
 35 those parts of our present invention added
 to other known parts.

From the foregoing description it will be
 understood that a bobbin being used in a
 shuttle may, by or through a pattern-surface,
 40 be put out of the shuttle and another bobbin
 be put in its place from a hopper holding
 bobbins in reserve after any desired or pre-
 determined number of picks, this depending
 on the pattern-surface, and by arranging the
 45 bobbins in the hopper in the desired sequence
 as to color striped goods may be woven.

This invention is not limited to the exact
 shape shown for the pusher or to the exact
 shape or construction of the parts interme-
 50 diate the pusher and the pattern surface or
 indicator to enable the pusher to be actuated
 by the bunter or equivalent while the lay is
 being moved toward the breast-beam and a
 shuttle is in the shuttle-box. The shuttle

(shown on a larger scale in Fig. 12) is open at 55
 opposite points for the reception of a bobbin
 or spindle into the holder or jaws *j k* and for
 the discharge from the opposite open face of
 the shuttle of a bobbin somewhat exhausted
 or to be changed. 60

The substantially-straight threading-slot
S', horn 7, and slotted eyes for the thread will
 or may be as provided for in said patent, and
 so need not be herein further described.

Having described our invention, we claim 65
 as new and desire to secure by Letters Pat-
 ent—

1. A pusher to push a bobbin, spindle, or
 weft-carrier into a shuttle in a shuttle-box,
 combined with a pattern surface or indicator 70
 to control the time at which the said pusher
 may be made to act and transfer a bobbin, as
 stated, substantially as described.

2. A shuttle-box, its binder, and a bunter,
 the position of which is made to vary when 75
 the shuttle is in or is absent from the shuttle-
 box, combined with a pusher to push a bob-
 bin into the shuttle in the shuttle-box and
 intermediate devices to be struck by the
 bunter and turn the pusher at the desired 80
 time, substantially as described.

3. A loom containing the following instru-
 mentalities, viz: a hopper to contain a series
 of bobbins, spindles, or weft-carriers, a lay
 having a shuttle-box, a shuttle in the said 85
 shuttle-box and provided with means to hold
 a bobbin, spindle, or weft-carrier, a bunter, a
 pusher to push a bobbin into a shuttle, a pat-
 tern surface or indicator, and means under
 the control of the said pattern surface or in- 90
 dicator to enable the bunter to actuate the
 pusher at a predetermined time, substantially
 as described.

4. In a loom, a hopper to contain bobbins,
 spindles, or weft-carriers, a pusher, and a con- 95
 nected trip, combined with a pattern-surface
 and connections intermediate it and the trip
 to move the trip upon the pusher, to operate
 substantially as described.

In testimony whereof we have signed our 100
 names to this specification in the presence of
 two subscribing witnesses.

WILLIAM F. DRAPER.
 JAMES H. NORTHPROP.

Witnesses:

O. H. LANE,
 E. D. BANCROFT.