2 Sheets--Sheet 1.

A. CANIS & F. HIGGINS.

Looms.

No. 136,133. Patented Feb. 25, 1873.

Fig. 1.

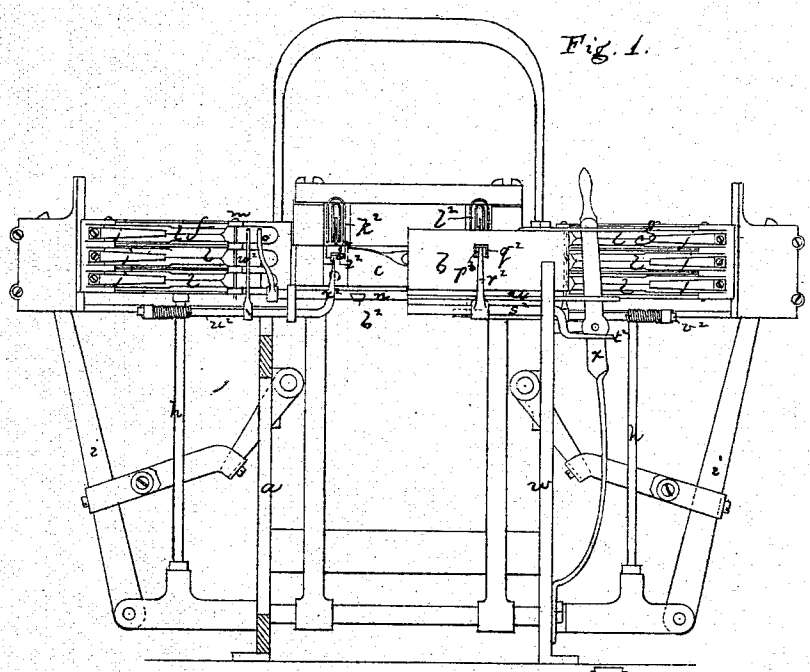
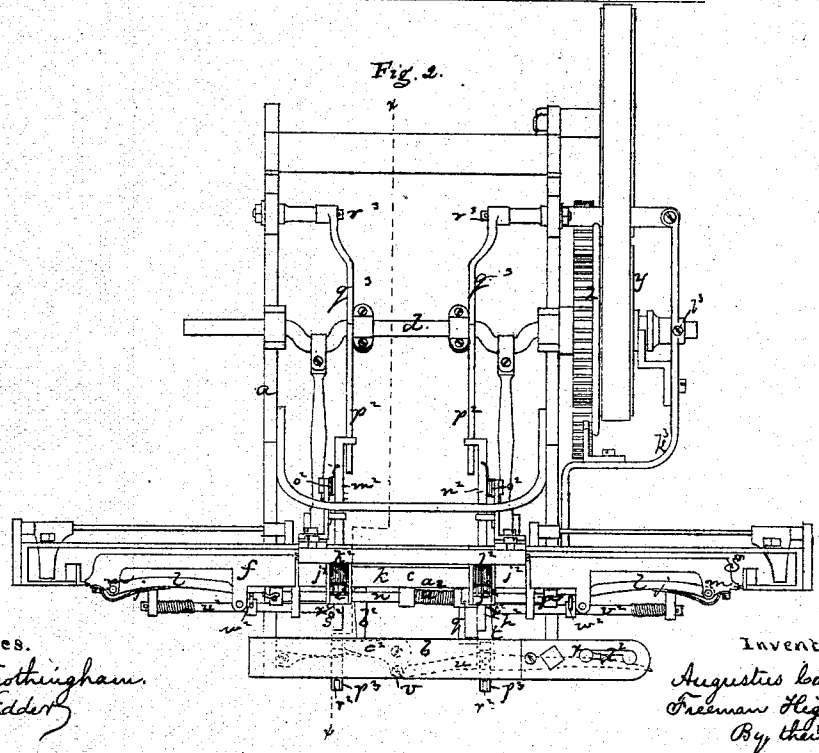


Fig. 2.



Witnesses.
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S. W. Kidder.

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Freeman Higgins.
By their Attys.
Crosby & Gould.

2 Sheets--Sheet 2.

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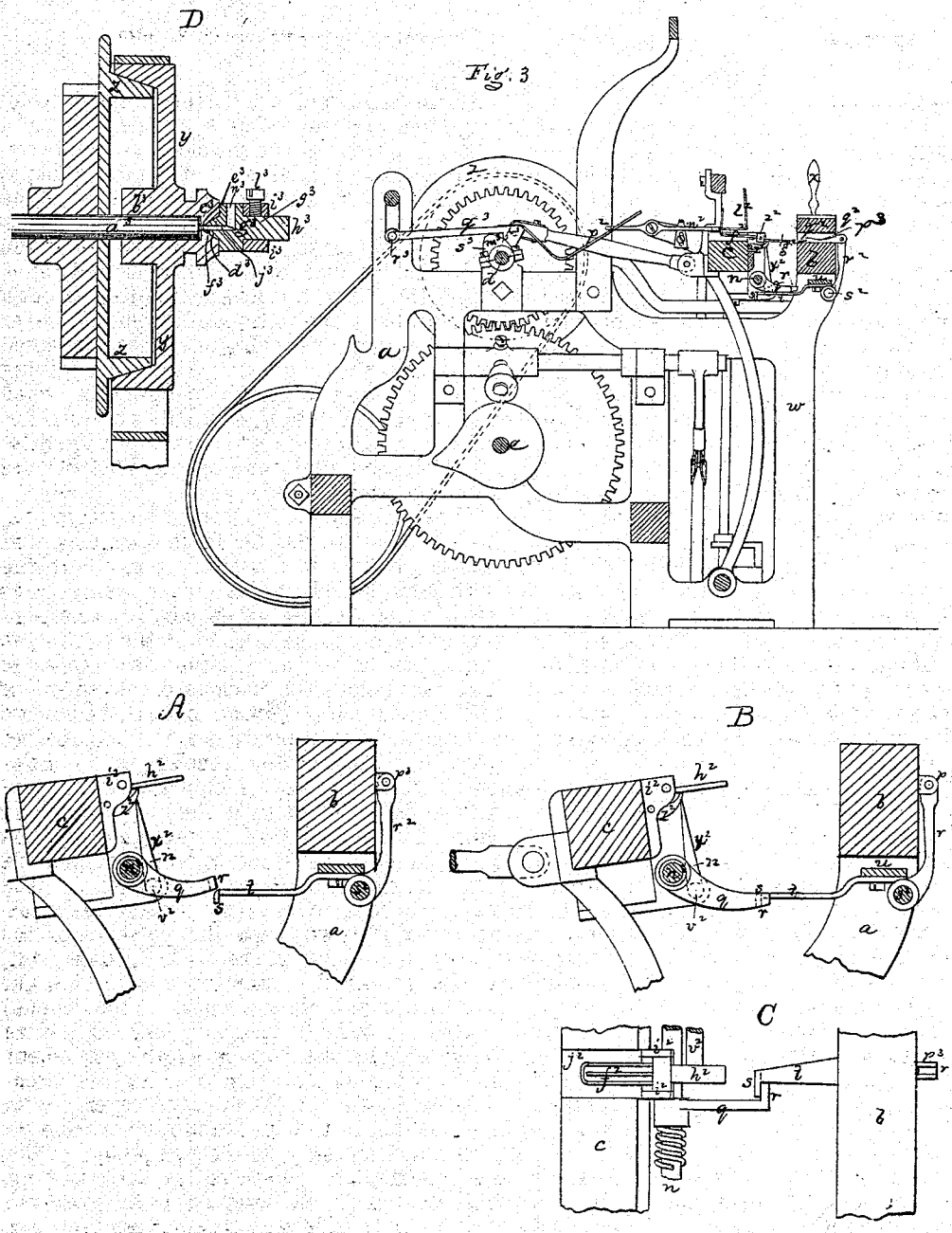

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UNITED STATES PATENT OFFICE.

AUGUSTUS CANIS AND FREEMAN HIGGINS, OF MANCHESTER, N. H.

IMPROVEMENT IN LOOMS.

Specification forming part of Letters Patent No. **136,133**, dated February 25, 1873.

To all whom it may concern:

Be it known that we, AUGUSTUS CANIS and FREEMAN HIGGINS, both of Manchester, in the county of Hillsborough and State of New Hampshire, have invented certain Improvements in Looms; and we do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of our invention sufficient to enable those skilled in the art to practice it.

The invention relates particularly to that class of looms employing drop-boxes for weaving fancy goods, or to the combination and arrangement in such looms of mechanism for knocking off or stopping the loom in case any shuttle remains in either box, or a full shuttle-box is brought into line with the race at the time a shuttle is to be thrown from the opposite box, or in case the shuttle is not thrown. The invention also relates to the combination and arrangement of devices for knocking off or stopping a loom in case of breakage of the yarn or filling; also to the construction of the friction-driving or clutch pulley with reference to lubrication of its journal-pin or gudgeon.

The drawing represents a loom embodying the invention.

Figure 1 shows the loom in front elevation. Fig. 2 is a plan of it. Fig. 3 is a sectional elevation, taken on the line *x x*.

a denotes the frame; *b*, the breast-beam; *c*, the lathe; *d*, the crank-shaft; *e*, the cam-shaft; *f g*, two sets of shuttle-boxes mounted upon rods *h* and sliding vertically, and having their movements imparted to them in the usual manner. *i i* are the picker staves; *k*, the shuttle-race. The harness mechanism is not shown, as no part of such mechanism has any immediate connection with our invention. Each shuttle-box has its shuttle-binder *l*, hinged at *m*, pressed inward by a spring, *j*, and forced outward against the stress of the spring by the shuttle whenever a shuttle enters or is present in a box. For convenience, we show the two upper shuttle-boxes in line with the race for the flight of the shuttle from one to the other. In front of the lathe is a rocker-shaft, *n*, turning in bearings fixed to the lathe, and at the opposite or respective ends of this shaft are arms *o p*, the upper end of each of which stands directly in front of the free end of the binder of the shuttle-box, which may be in line with the race, each arm being pressed up toward the adjacent binders by the stress of a suitable spring. From the shaft *n* extends forward an arm, *q*, having at its end a hook, *r*, and in line with this hook is a catch, *s*, at the end of an arm, *t*, extending backward from a knocking-off lever, *u*, which is pivoted at the under side of the breast-beam, as seen at *v*, Fig. 2, the end of this lever extending through the upright *w*, and in front of the shipper-lever *x*, the shipper-lever being shown as connected by a connecting-lever with the friction-driving or clutch pulley *y* in such manner that when freed from its retaining-notch it is pressed forward by a spring and throws the friction-driving or clutch pulley out of connection with the gear and crank-shaft pulley *z*.

When the shuttle is thrown from either box, the spring a^2 turns the shaft *n* slightly, and causes the ends of the arms *o p* to follow the shuttle-binder, which is thrown in by its springs when the shuttle leaves its box. In this position of the shaft the hook *r*, at the end of the arm *q*, stands in the position seen at A, so that, just before the backward movement of the lathe is complete, and before the shuttle has reached the opposite box, the hook passes over the catch *s* without touching it. If, however, either box into which a shuttle is to be thrown is occupied by a shuttle, or if a box charged with a shuttle is brought into line with the race at the end to which the shuttle is to be thrown, or there be shuttles in both boxes at once, or by any reason the shuttle is not thrown, then the presence of the shuttle causes the binder to be pressed out, turning the shaft so that the hook is brought into direct line (in its path of movement) with the catch, as seen at B and C, and as the lathe completes its backward movement the hook strikes the catch, drawing the catch-lever forward, and causing the lever, by its movement, to throw the shipper-lever from its notch, thus effecting the disengagement of the friction-driving or clutch pulley, and stopping the loom when the lathe is on the extreme back motion; in other words, unless each box on line with the lathe is empty directly after the picking takes place or should take place, and while the shuttle, if thrown, is on its flight, the protector will stop the loom just as the lathe completes its backward movement. The shaft *n* has a dagger, b^2, extending from

it, and as the lathe beats up this dagger passes under a lever, c^2, (under the breast-beam,) if the shuttle has been thrown and is in the box; but if the shuttle-boxes are both empty by reason of the entanglement or stoppage of the shuttle in its flight, or from any other cause, then the shaft will be held in normal position by reason of the shuttle-binder not pressing out its arm, and the point of the dagger will be held in position to strike and move the lever c^2, which lever, being jointed to the lever u, imparts end movement to it, and causes the incline d^2, at its end, to act against the shipper-lever, dislodging it from its notch, disengaging the friction-driving or clutch wheel and stopping the loom.

It will thus be seen that either in the event of a charged box or a shuttle being wrongly in position at either end of the race, as the lathe beats back, or in the event of the shuttle-boxes being, from any cause, both empty when the lathe beats up, the loom is instantly stopped, and before the next pick, so that the web is preserved from injury.

Also, in the flight of each shuttle it passes over two sets of prongs or fingers, e^2 f^2, each extending from an arm, g^2 or h^2, pivoted in a bearing, i^2, each arm extending forward from the lathe, and its fingers extending back over the shuttle-race and lying normally below the plane of the top of the race in a recess, j^2, in the top of the shuttle-race, so that the yarn or filling passes freely over the fingers. Over the two sets of fingers e^2 f^2, respectively, extend two sets of prongs or fingers, k^2 l^2, on the front arms of two levers, m^2 n^2, the front arms of said levers being normally thrown up by the stress of suitable springs, o^2, and the rear arms being thrown up (when the lathe beats forward) by striking inclines p^2, which inclines are on the ends of arms q^3, pivoted at r^3, the arms being thrown up when the lathe beats forward (and into position to effect the descent of the prongs k^2 l^2) by cams s^3 on the crank-shaft, the cams letting the inclines down at the start back of the lathe, so that the springs o^2 can instantly throw up the prongs k^2 l^2. The weight of the arms g^2 h^2, or the stress of suitable springs, holds the fingers e^2 f^2 above the bottom of the recesses j^2, and when the prongs k^2 l^2 descend as the lathe beats up, and the shuttle having been thus thrown and the yarn thereby laid across the race, the prongs press down upon the yarn, and cause the yarn stretched across the fingers e^2 f^2 to press down said fingers, thereby raising the arms g^2 h^2. In the breast-beam, in line with each arm g^2 h^2, is a slide-catch, p^3, sliding loosely in a mortise, q^2, cut through the beam, each catch p^3, at its front end, being jointed to an arm, r^2, extending from a rocker-shaft, s^2, both arms r^2 extending from the same shaft s^2, this shaft having at its end an arm, t^2, extending alongside the shipper-lever.

When the finger-arms g^2 h^2 advance toward the breast-beam their ends will enter the mortises and pass over the slide-catches, if the arms be thrown up, and they are always thrown up if the yarn is drawn over the fingers e^2 f^2; but if the yarn be broken, then the prongs k^2 l^2, as they descend, will pass down through or between the fingers e^2 f^2, which will then remain up, and the arms g^2 h^2 being tipped down, they will, as the lathe beats up, strike the slide-catches p^3, and press such catches forward, the movement of the catches turning the shaft s^2, and causing its arm c^2 to dislodge the shipper-lever from its notch, and disengage the friction-driving or clutch pulley. The absence of the yarn over either set of fingers e^2 or f^2 will of course permit the prongs above them to pass through the fingers; but as the web is narrower than the space between the fingers e^2 and the fingers f^2, and as the selvages are therefore inside of the fingers, one or the other set of fingers is always free when the shuttle is thrown, whether the yarn is broken or not. It will be obvious, therefore, that some device is necessary to keep the arm g^2 or h^2 up at that end from which the shuttle has been thrown. For this purpose we combine with each arm g^2 or h^2 and its fingers a mechanism by which the binder of either box in line with the race, when empty, shall cause the arm to be held up so that it will not strike the catch, said mechanism being so arranged as to be thrown out of connection with the other arm by the presence of the shuttle in the opposite box. In front of the opposite ends of the lathe are two rocker-shafts, u^2 v^2, each having an arm, w^2, extending up and resting at its top against, or standing just in front of, the free end of the shuttle-binder, in line with the race. At the inner end of each shaft is another arm, x^2, extending up under an incline, z^2, as seen at A, on the bottom of the finger-arm g^2 or h^2 of the corresponding end of the lathe.

Each shaft u^2 v^2 is held normally in position, or so that its arms w^2 x^2 are pressed under or toward the shuttle-binder and the incline z^2 back of them; and when the arms are in these positions, which they can only be in case the shuttle-box back of either arm w^2 be empty, the arm x^2, acting upon its incline z^2, presses up the finger-arm so that it will pass over the slide-catch p^3 in line with it, and impart no movement to such catch, and the loom will continue to work. Now, as the shuttle flies from either box, and leaves such box empty, the spring of the shaft u^2 or v^2 under such box is enabled to press the arm w^2 in, the shuttle-binder yielding; and as the shaft so turns it of course carries the arm x^2 at the end of such shaft under the incline z^2 above it, and thereby presses the arm g^2 or h^2 up so that it is in position to clear the catch, the fingers e^2 or f^2 being so pressed down and the arm held up by the arm x^2 or y^2, instead of by the yarn, the yarn being drawn up to the selvage, and not extending across the fingers. At the same time the flight of the shuttle into the opposite box causes the binder of said box to be pressed forward, thereby pressing forward the arm w^2 in front of said box, turning the shaft u^2 or v^2,

to which said arm is attached, and moving the arm g^2 or h^2 of said shaft forward so that it passes out from under the incline z^2 above it. The arm g^2 or h^2 over said incline z^2 being thus released, it drops, causing its fingers to rise; and, if the yarn is drawn over said fingers by the shuttle, the prongs k^2 or l^2, moving down against the yarn, will depress the fingers and raise the arm, so that the arm will clear the catch p^3 as the lathe beats up, and there is no stoppage of the loom; but if the yarn is broken, then the arm g^2 or h^2 will remain down, there being nothing to depress the fingers, and remaining down will run against the catch p^3 as the lathe beats up, and will stop the loom, as before described.

It will be observed that each of the shafts u^2 or v^2 and its connections, with the finger-arms and shuttle-binder over it, is independent of the other shaft and its corresponding connections, and that by reason of such independence a breakage in the yarn at the throw of the shuttle in either direction knocks off the loom, the fingers e^2 or f^2 at the end of the race from which the shuttle is thrown being moved from their normal position, so that they cannot effect the stoppage while the fingers at the opposite end of the loom are in normal position, so that by failure of the yarn to extend over them they will be in position to effect the stoppage of the loom.

It will thus be seen that whether the shuttle fails to be thrown or a shuttle be in a wrong box, or two shuttles be in opposite boxes, or the yarn be broken, or the shuttle fails to complete its flight, the loom is always stopped before a new pick is thrown.

By these provisions an operative is enabled to tend two or more looms, and to do so easily, or without very close application, whereas without such provisions and all of them it requires the very close and exhaustive attention of the operative to prevent injury to the web by failure of the loom to stop whenever a yarn breaks or the shuttles are not properly thrown.

The invention also effects the saving of skill, labor, and time often expended by the operative in picking out the filling and mending the web in the use of looms not having our improvements.

The friction-driving or clutch pulley of the loom is mounted and turns loosely on the axial gudgeon extending from the gear-wheel—or, in other words, upon the projected end of the crank-shaft. The application of the oil thereto causes the oil to be thrown outward between the pulleys, so that it comes into contact with the leather ring that makes the friction-surface, soon rendering the friction more or less inoperative. D shows the pulley in section.

In the friction-driving or clutch pulley here shown the pulley is mounted and turns upon the gudgeon or gudgeon-pin a^3; but the pulley is made with a hub, b^3, near the end of which is a shoulder, c^3, which bears or may bear against the end of the gudgeon a^3, when the friction-driving or clutch pulley y is forced upon the gear-pulley z. At the outer end of the hub is a tapering socket, d^3, from which extends a small central hole, e^3, leading through to the shoulder c^3; and into this socket enters a stationary conical pivot, f^3, projecting from the face of a flange or head, g^3, a pin, h^3, extending from which passes through a bearing, i^3, in the clutch-lever k^3, being confined in position by a screw-pin, l^3, for adjustment. Through the pivot f^3 and into the head g^3 extends an axial passage, j^3, and into the top of the flange g^3 extends a vertical passage, n^3, which runs into the passage j^3; and the passages n^3 j^3 constitute the oil-passage, oil being dropped into the hole n^3 and passing through the pivot f^3 into and through the hole e^3 to the gudgeon a^3, the hub and gudgeon being thereby readily supplied with oil without exposure of the oiled parts.

We claim—

1. The rocker-shaft n held in normal position by a suitable spring, and carrying at its opposite ends the arms o p, outward pressure of either of which by a shuttle-binder carries a hook, r, into position to actuate the lever u and knock off the shipper-lever x, the arrangement and operation being substantially as described.

2. The two pivoted finger-arms g^2 h^2, each located and pivoted as shown and described, and each with its fingers held normally, as described, and each having combined with it the lifting and falling prongs k^2 l^2, and there being in line with each a slide-catch, p^3, the arm, if down, striking the catch p^3, turning the shaft s^2, and knocking off the shipper-lever, and, if up, passing over such catch without moving it.

3. In combination with the arms g^2 h^2, arms or inclines m^2 n^2, which are thrown up to actuate the prongs k^2 l^2 when the lathe beats up, and which are thrown down before the lathe beats back, and arms q^3 and their inclines p^2, substantially as and for the purpose described.

4. The two independent rocker-shafts u^2 v^2, operated by the shuttle-binders, each having an arm, w^2 or x^2, operating to hold the finger-arm g^2 or h^2 in position to pass over the catch p^3, when the shuttle has been thrown from a box on the same side with said shaft, and each releasing the finger-arm (so that it will strike the catch if not raised by the pressure of the yarn) when a shuttle is thrown into the adjacent box.

5. The clutch or friction-driving pulley y made with the socket d^3 and oil-hole e^3, a stationary pivot, f^3, extending into the socket, and said pivot having an axial oil-passage, j^3, leading through it and into a vertical oil-passage, n^3, in the flange m^3 of the pin h^3, all substantially as shown and described.

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