T. Ingraham,

2 Sheets, Sheet 1.

Loom.

No. 43656. Patented July 12. 1864.

Fig: 1.

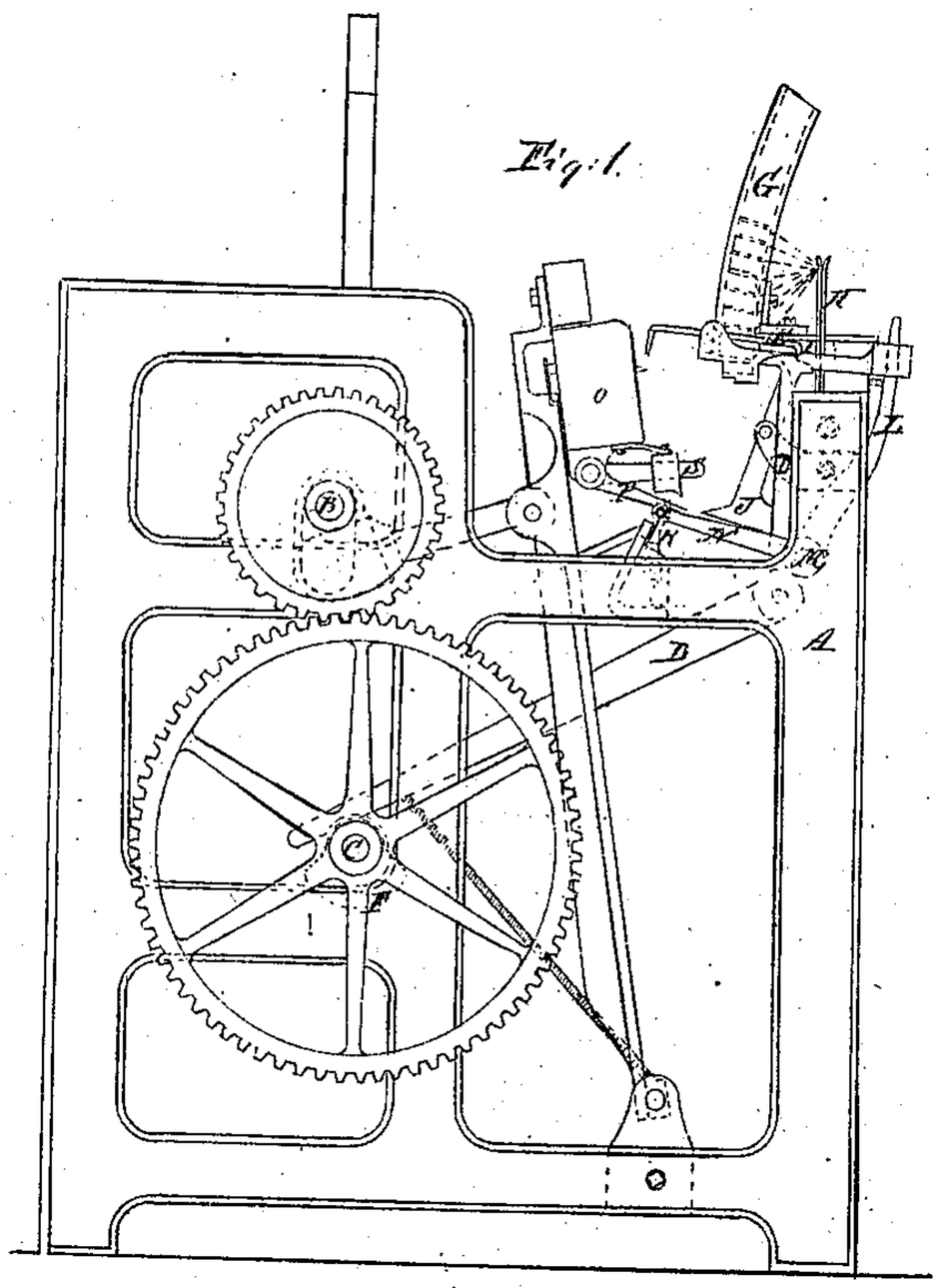
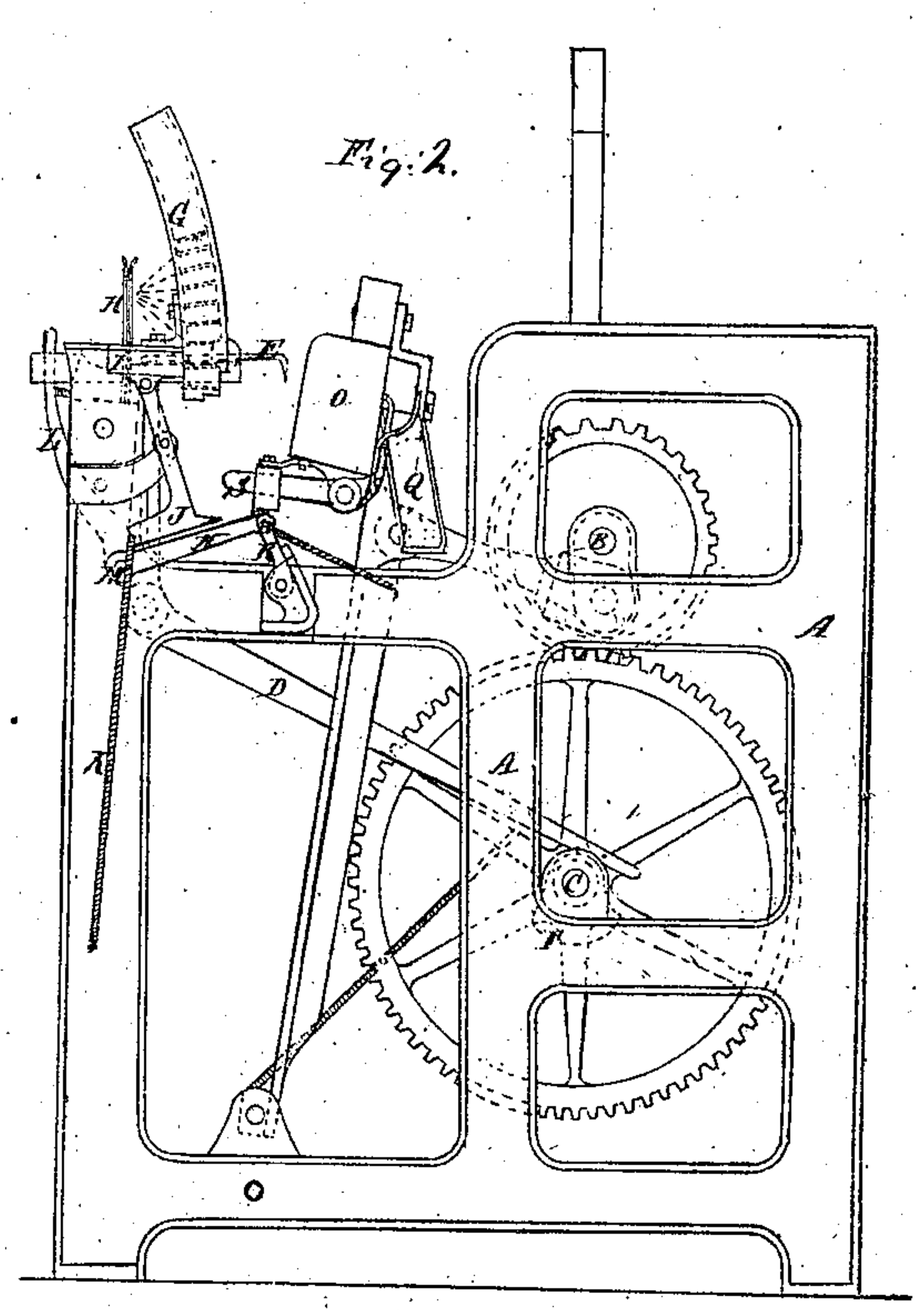


Fig: 2.



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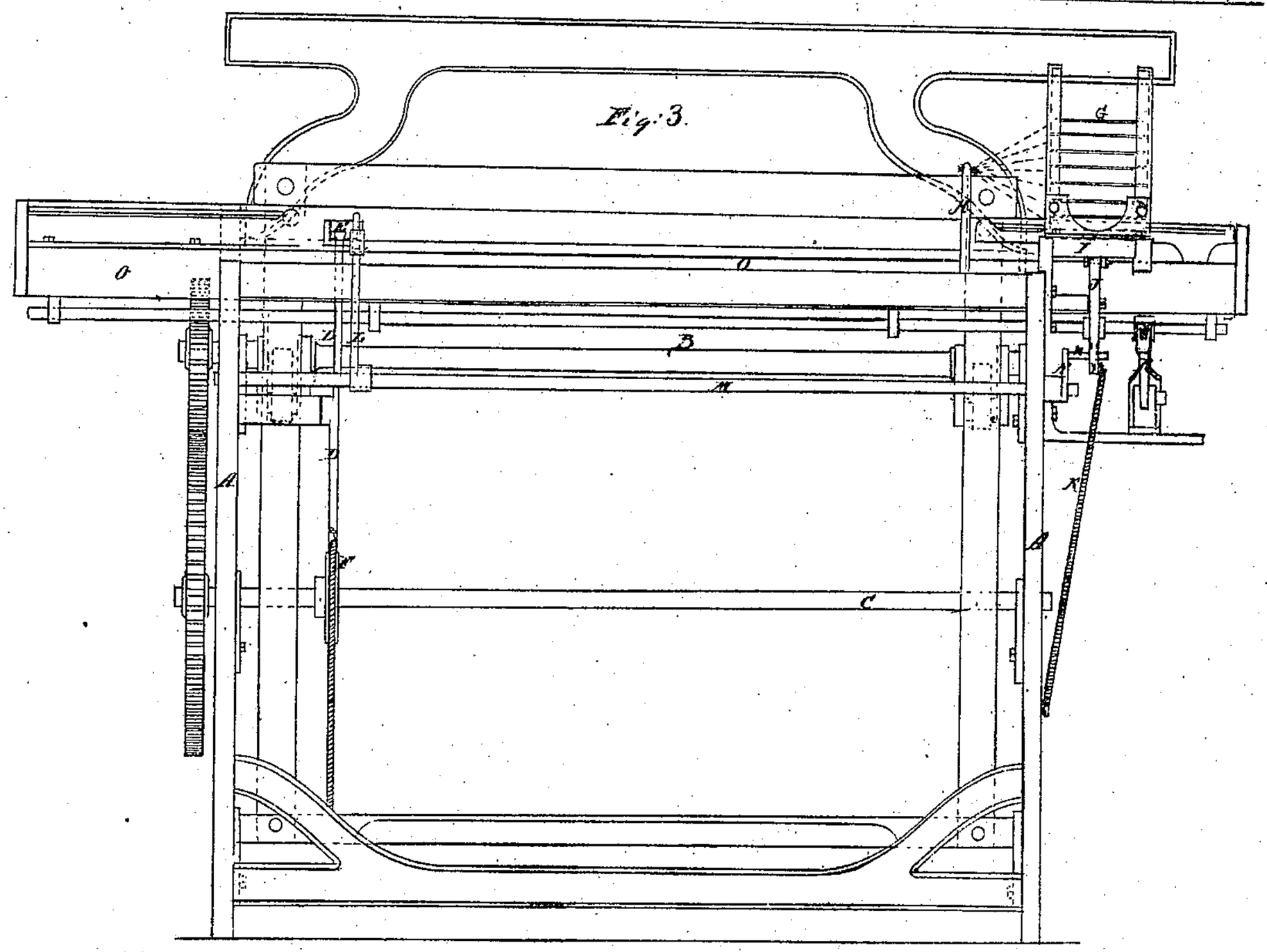


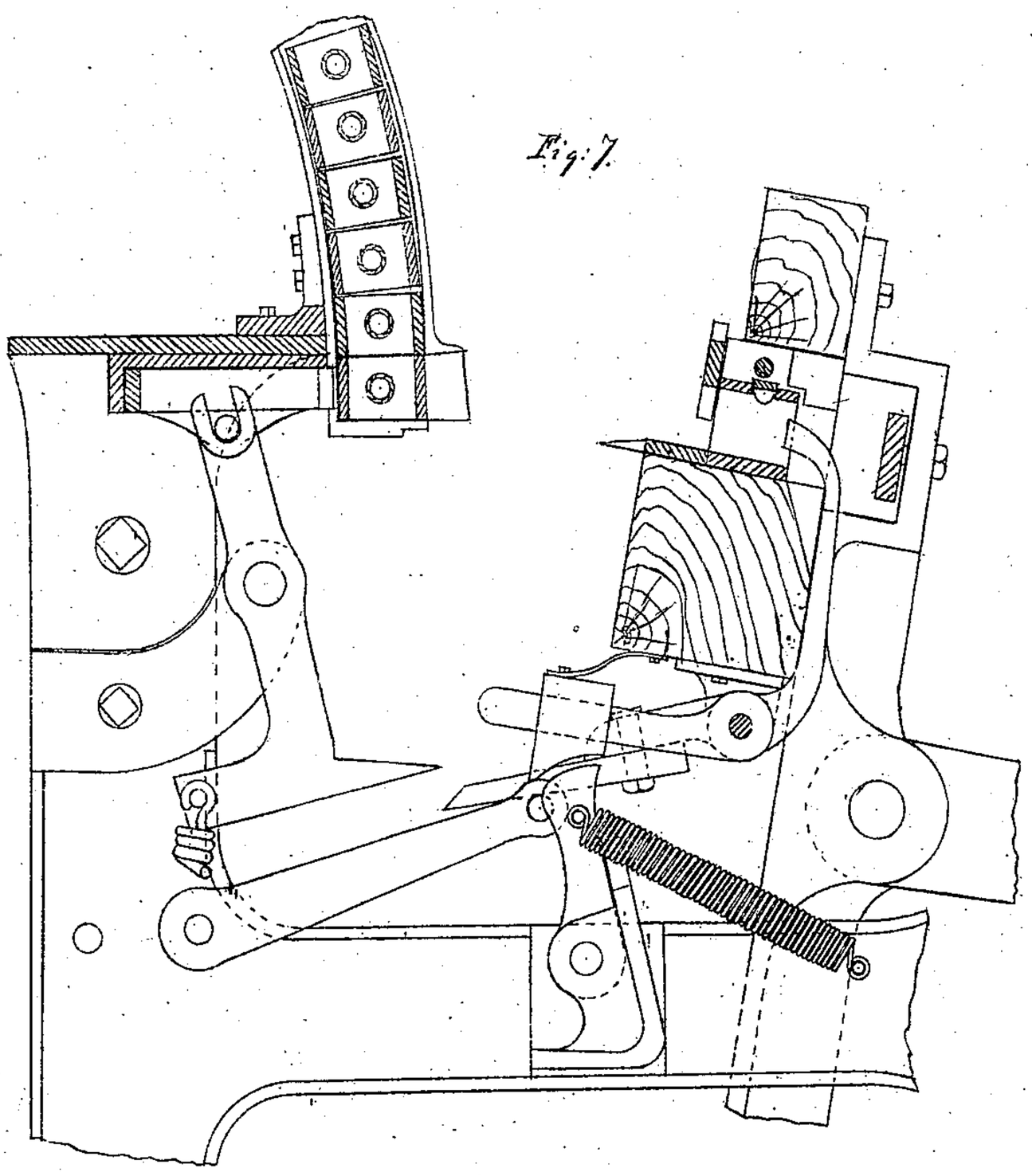
T. Ingraham,

2 Sheets, Sheet 2.

Loom.

No. 43,550. Patented July 12. 1864.

Fig: 7.



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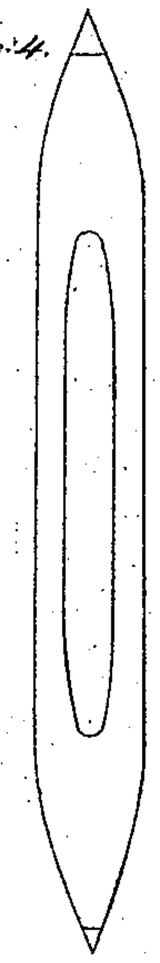
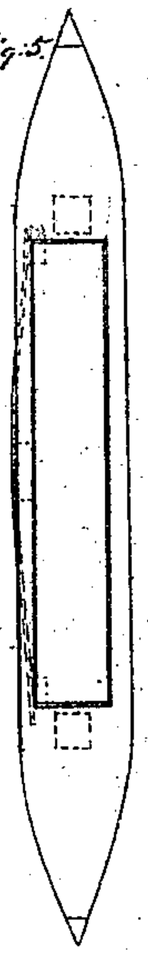


Fig: 5.



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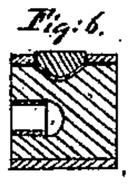


Fig: 8.

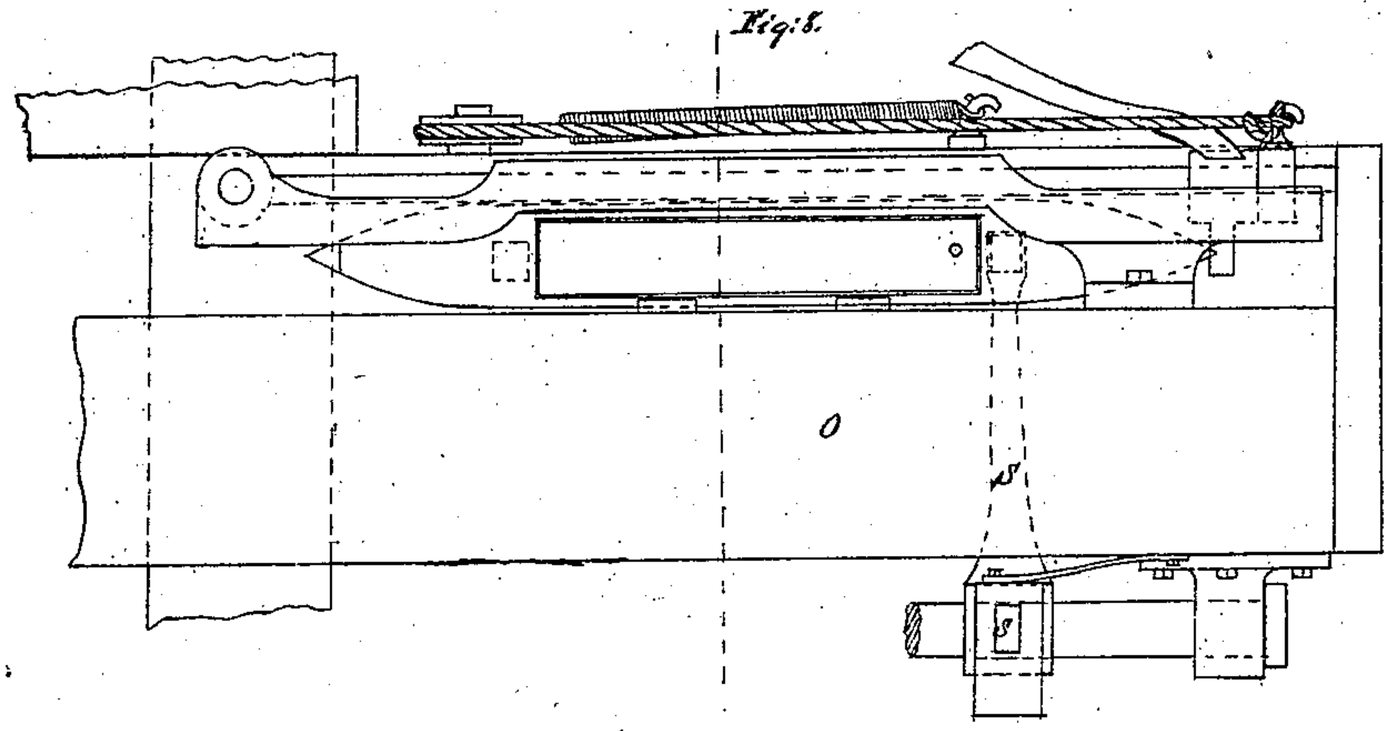


Fig: 9.

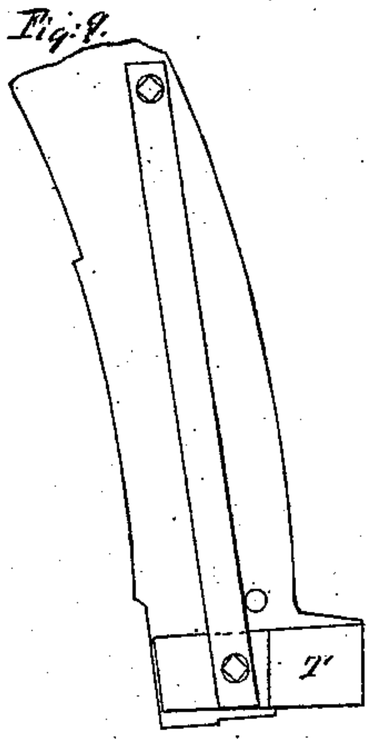
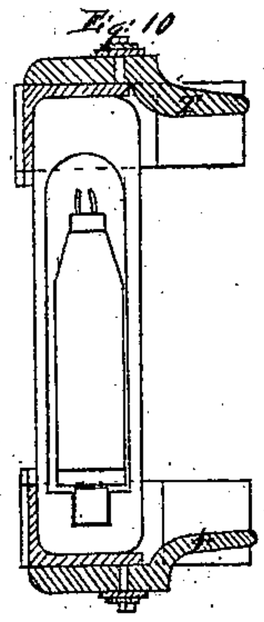


Fig: 10



UNITED STATES PATENT OFFICE.

THOMAS INGRAM, OF BRADFORD, ENGLAND.

IMPROVEMENT IN DEVICES FOR SUPPLYING WEFT TO THE SHUTTLES IN LOOMS.

Specification forming part of Letters Patent No. **43,556**, dated July 12, 1864.

To all whom it may concern:

Be it known that I, THOMAS INGRAM, of Bradford, in the county of York and Kingdom of England, have invented new and useful Improvements in Looms for Weaving; and I do hereby declare that the following is a full and exact description thereof, reference being had to the annexed two sheets of drawings.

The improvements relate to means for effecting a continuous action in looms, or to a method of supplying weft to the shuttles without stopping the loom for that purpose, whether the weft be used up or broken in the shed.

Figures 1 and 2 are end elevations, and Fig. 3 is a front elevation of my improved loom. Figs. 4 and 5 are detail views of the shuttle which I employ, showing that it is formed with an opening through its sides for a case or box containing a cop of weft to be introduced at one side and expelled at the other. Fig. 6 is a section of the shuttle and cop-case.

The ends of the cop-case are notched, so that a spring latch or lock in the shuttle will enter when the case is pushed into the said shuttle and hold it steady therein until pushed out at the opposite side by the introduction of another case.

A is the frame-work of the loom; B, the crank-shaft, and C the tappet-shaft. D is the weft-hammer or lever upon which the weft fork E catches when there is no weft in the shed on the beat up of the lay, and F is a tappet fixed on the shaft C, which at each revolution operates the lever D. G is a rack or hopper fixed to the frame, so formed as to hold a series of cop-cases one upon another, ready for supply to the shuttles, the bottom case being placed exactly opposite the opening in the side of the shuttle when it is in the shuttle-box and when the lay or batten is up at the cloth. H are a pair of clamps or clips fixed to the frame to hold the loose end of the weft of each cop when the cases are placed in the hopper. I is a propeller placed in slides fixed to the frame opposite the bottom cop-case. J is a lever hinged to the frame, clipping a pin in the propeller, which it operates thereby, and K is a spring attached to the said lever and the frame for keeping the propeller clear of the cop-case, except when operated as hereinafter explained. L is a lever carrying the weft-fork or weft-feeler, which is fixed on a shaft, M, extending across the loom, and N is another lever fixed at the other end of the said shaft. O is the lay or batten, (carrying the shuttle-boxes,) operated by arms or rods from the crank-shaft, as usual. P is a tongue hinged on the stop-rod under the batten, which is supported upon and rides over a projecting pin, *n*, on the lever N, and passing under the lever J, as the lay beats up when there is a full supply of weft in the shed. Q is a spout placed behind the shuttle box to receive and conduct away the expelled cop-cases. R is a spring-tumbler for actuating a lever, S, (which is also hinged to the lay), for locking the shuttle in the shuttle box in a proper position for changing the cop-cases and liberating it again in time for the pick.

Fig. 7 is a section through the hopper and shuttle-box on an enlarged scale, showing more clearly the means of changing the cop-cases or weft-cases; and Fig. 8 is a front view of the shuttle-box with a shuttle and cop-case locked in proper position for change. Fig. 9 is a side elevation of the hopper, and Fig. 10 is a sectional plan of the same with a cop-case therein, showing how it is held until required for the change by means of spring-clamps T, which also form guides for the cases from thence to the shuttle.

The action of this loom is as follows: The hopper is supplied with any convenient number of cop-cases, each containing a cop of weft, and the loose ends of weft are fastened in the clamps H on the breast-beam. When the weft breaks or becomes used up, the weft-fork acts in the same manner as in ordinary looms, but instead of actuating the strap-guide to stop the loom it operates the lever L, shaft M, and lever N, the pin *n* lifting the end of the tongue P above the inclined foot of the lever J, which on the beat up of the lay or batten is thereby pushed back. The propeller I is simultaneously driven forward and drives the bottom cop-case out of the hopper into the shuttle, (which is at that time fixed in proper position in the shuttle-box by the lock-lever S.) The said case pushes the other case (wherein the weft broke or was used up) out of the shuttle into the spout Q, which conducts it away to be replenished by the attendant and replaced in the hopper on the top of the other cases, the end of the weft being made

fast in the clamps as before. As one case is driven out of the hopper the others lower into position, ready to follow when required.

It will now be obvious that the object of this invention is to avoid the stoppage of the loom for the supply of weft, which occupies a considerable amount of time and necessarily subtracts from the effective and beneficial working of the loom. Now, by this invention no stoppage is required for this purpose. However frequently the weft may break, another cop is supplied on the shuttle getting into the box, and the attendant can always keep the hopper supplied with cases containing weft.

It will be seen that the feeding need not be limited to the front of the shuttle-box, but may take place also from the back, top, or bottom of the same, as may be desired.

I do not confine myself to the use of the tongue P for actuating the propeller I; but in some cases I would actuate this propeller by a tappet or cam attached to the shaft B or C, or by other equivalent means.

Having thus described the nature of my said invention and the manner in which the same is to be performed, I would have it understood that what I claim is—

1. The combination of the lever D with the weft-fork E and the tappet F, substantially as and for the purpose set forth.

2. The combination of the lever L with the weft-fork E and the shaft M, substantially as and for the purpose set forth.

3. The combination of the lever N with the shaft M and the pin *n*, substantially as and for the purpose set forth.

4. The combination of the lever J with the propeller I, the pin *n*, and the spring K, substantially as and for the purpose set forth.

5. The combination of the clamps H with the hopper G, the propeller I, and the shuttle-boxes of the lay or batten O, substantially as and for the purpose set forth.

6. The combination of the tongue P with the pin *n*, the lever N, and the lever J, substantially as and for the purpose set forth.

7. The combination of the lever S with the tumbler R and the shuttle-boxes of the batten O, substantially as and for the purpose set forth.

Done at Bradford, England, this 12th day of December, in the year of our Lord 1863.

THOMAS INGRAM. [L. S.]

In presence of—

JOSEPH EDMONDSON,
Of Frizinghall, Nr. Shipley, Yorkshire, Manufacturer.

SAM GREEN,
Of Frizinghall, Nr. Shipley, Yorkshire, Bookkeeper.