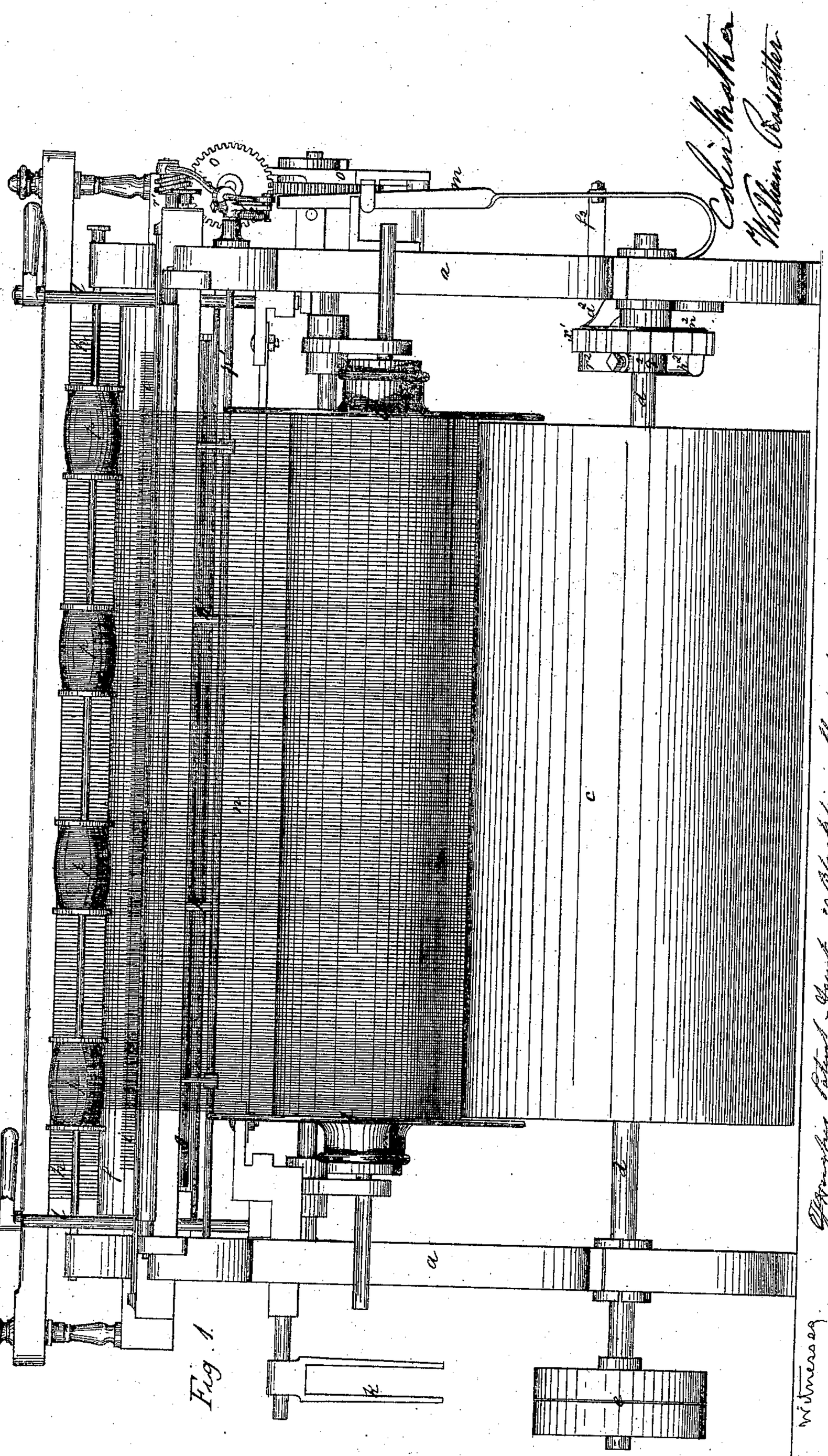
5 Sheets—Sheet 1.

C. MATHER & W. ROSSETTER.

WARPING MACHINE.

No. 104,329, Patented June 14, 1870.



Witnesses.

Inventors.

Fig. 1.

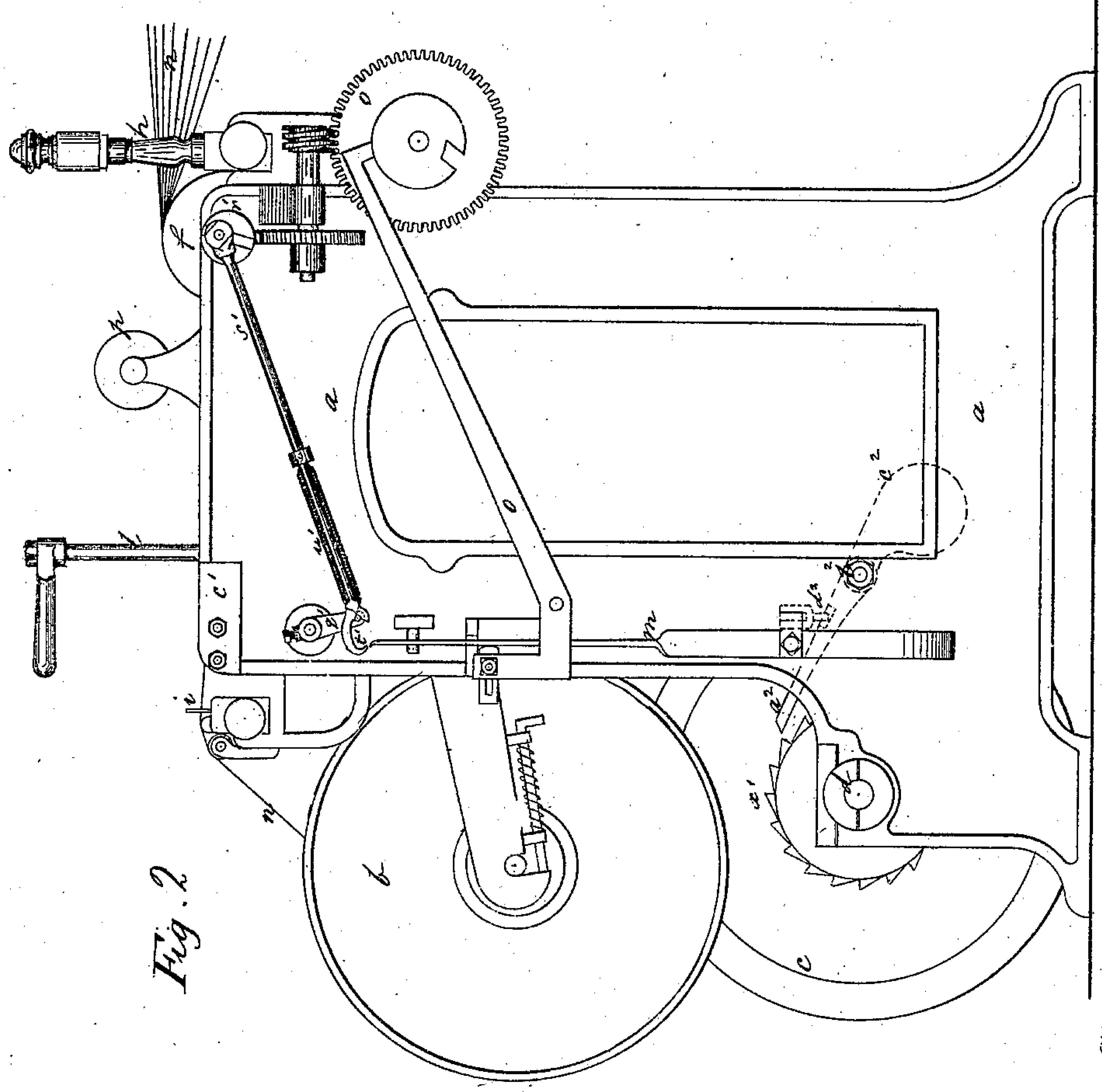
5 Sheets—Sheet 2.

C. MATHER & W. ROSSETTER.

WARPING MACHINE.

No. 104,329. Patented June 14, 1870.

Fig. 2



Colin Mather
William Rossetter

Witnesses,
J. W. Hughes Patent Agent 39 Blackfriars Street Manchester
Westminster Hughes Patent Agent. 39 Blackfriars Street Manchester

5 Sheets—Sheet 3.

C. MATHER & W. ROSSETTER.

WARPING MACHINE.

No. 104,329. Patented June 14, 1870.

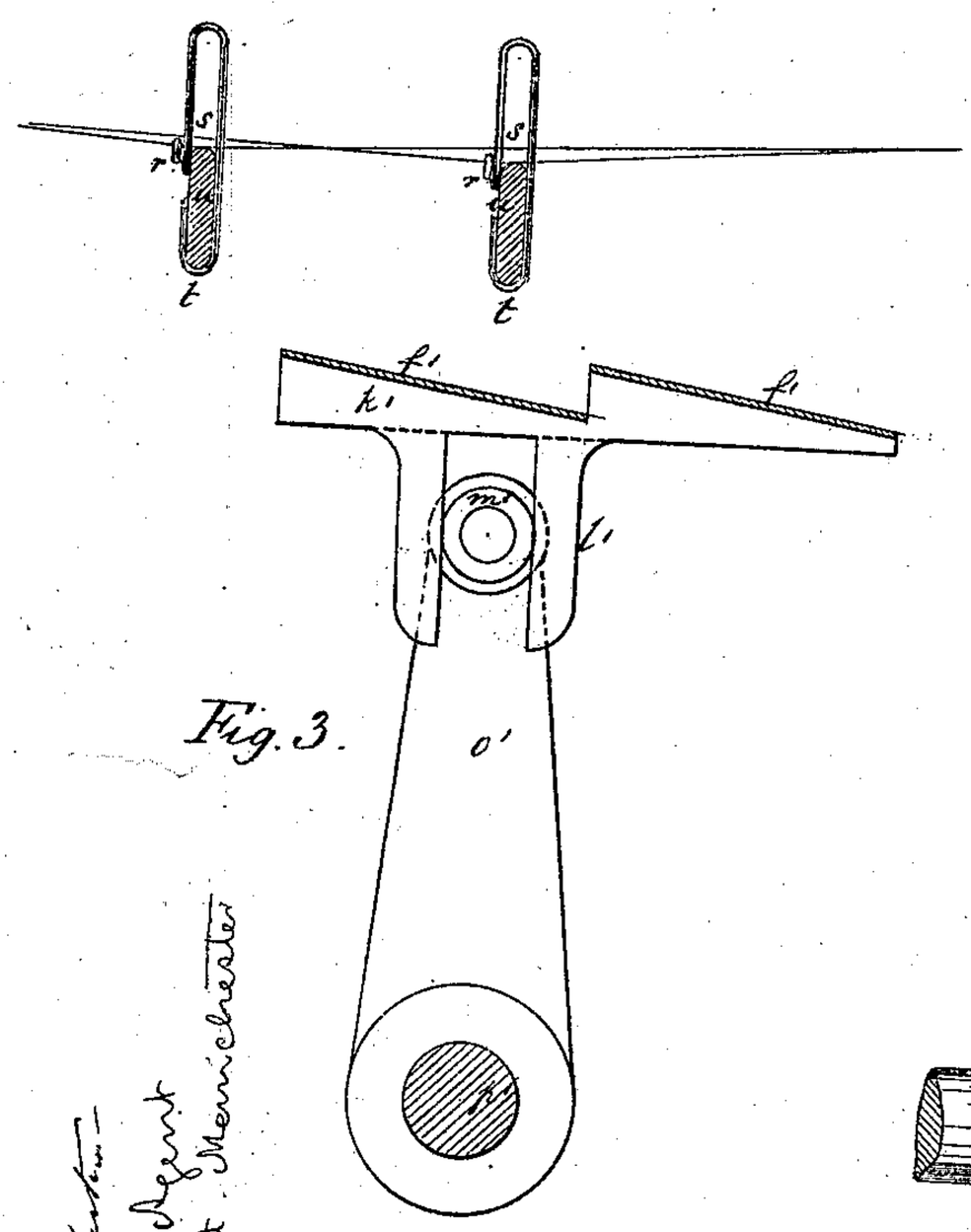


Fig. 3.

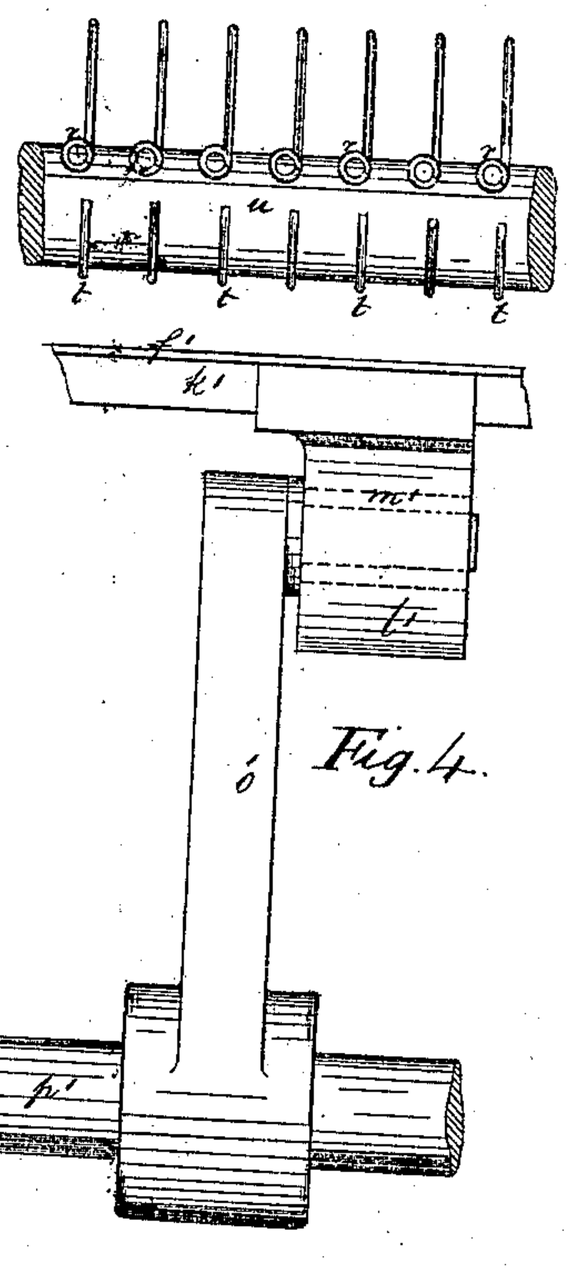


Fig. 4.

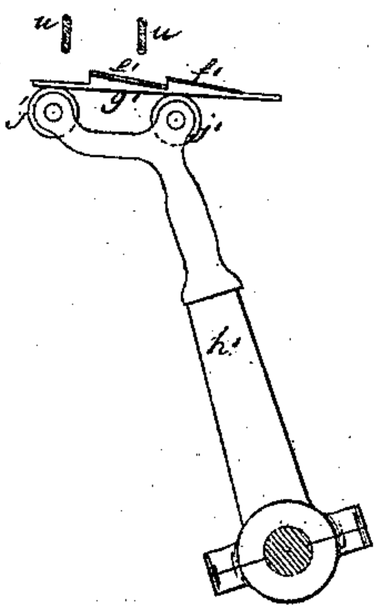


Fig. 5.

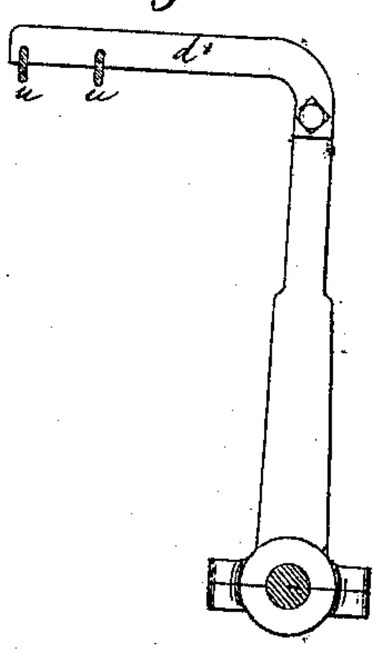


Fig. 6.

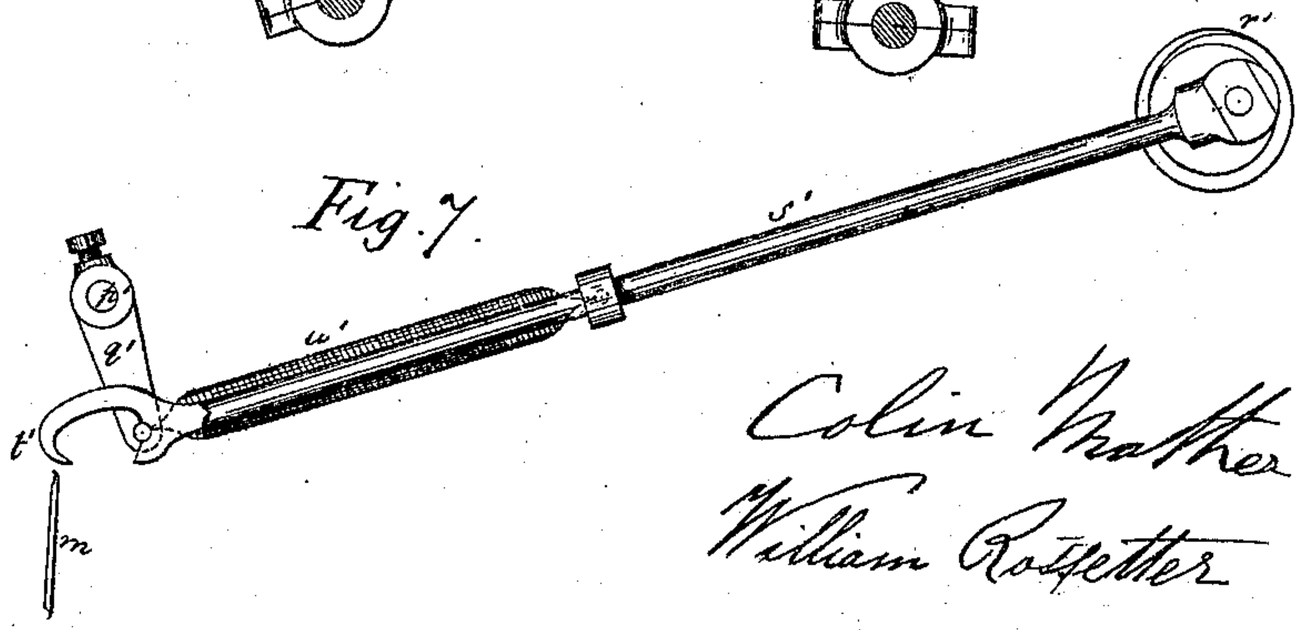


Fig. 7.

Witnesses,

Colin Mather

William Rossetter

5 Sheets—Sheet 4.

C. MATHER & W. ROSSETTER.

WARPING MACHINE.

No. 104,329, Patented June 14, 1870.

Fig. 8

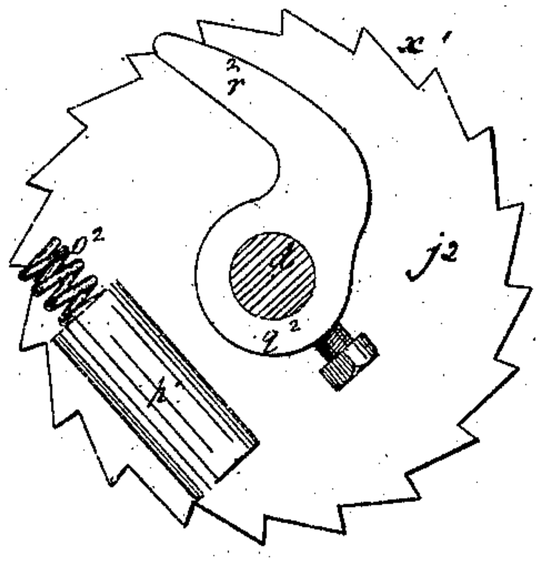


Fig. 9

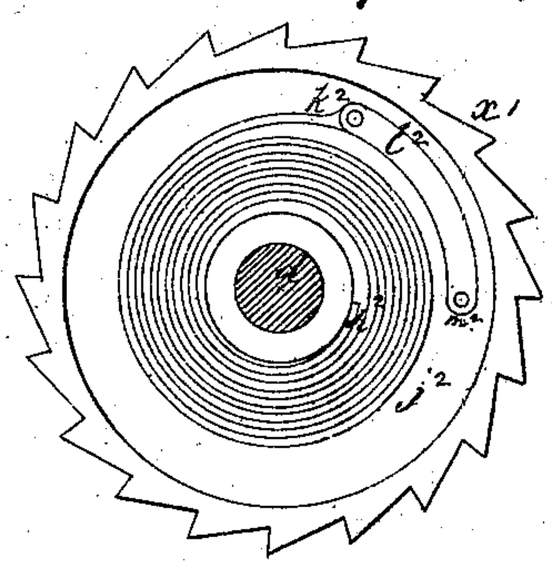


Fig. 10

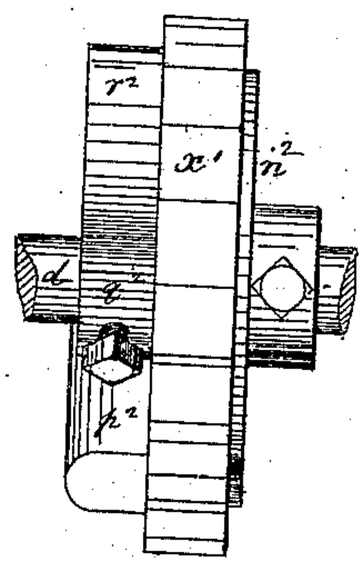
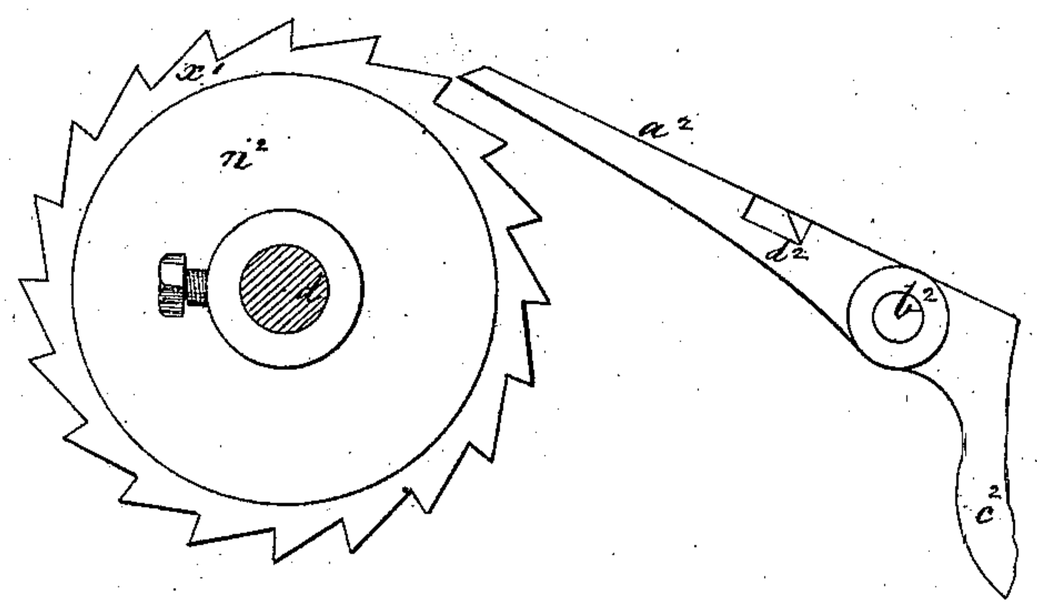


Fig. 11

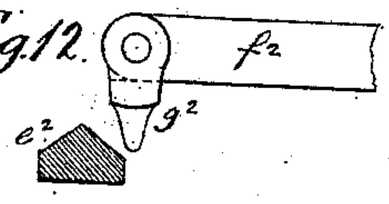


Witnesses,

E. Hughes. Patent Agent.
29 Blackfriars Street. Manchester.

G. Septimus Hughes. Patent Agent.
29 Blackfriars Street
Manchester.

Fig. 12.



Colin Mather
William Rossetter

C. MATHER & W. ROSSETTER.

WARPING MACHINE.

No. 104,329. Patented June 14, 1870.

Fig. 13

Fig. 14

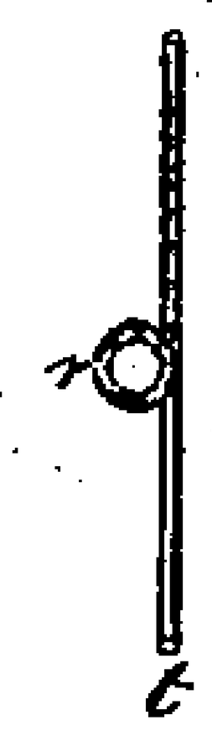


Fig. 15

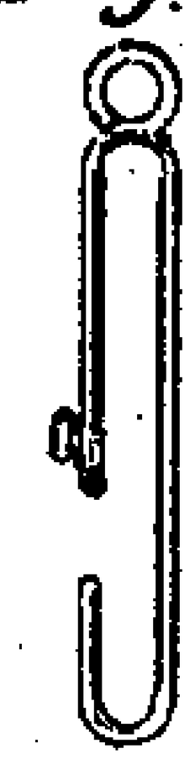


Fig. 16

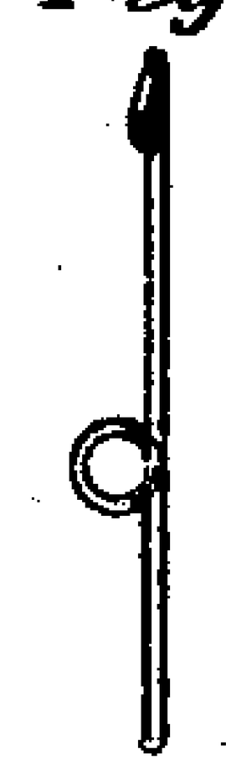


Fig. 17

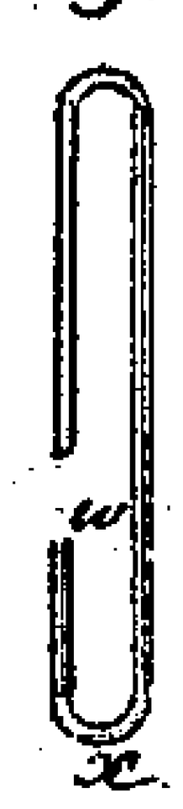


Fig. 18

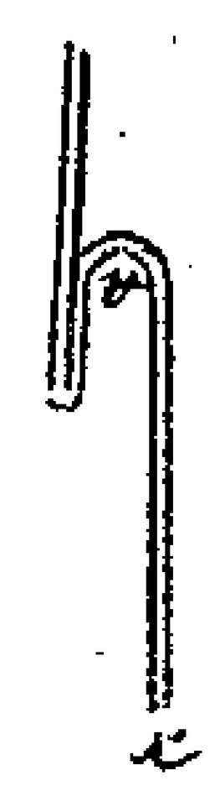


Fig. 19

Fig. 20.

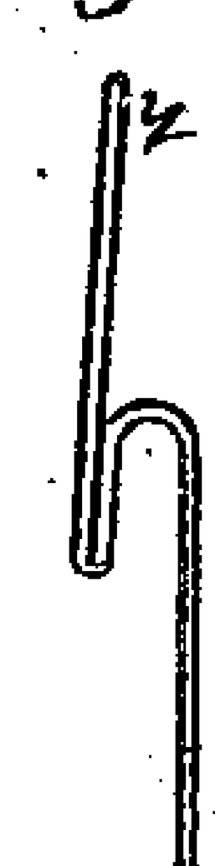


Fig. 21.

Fig. 22

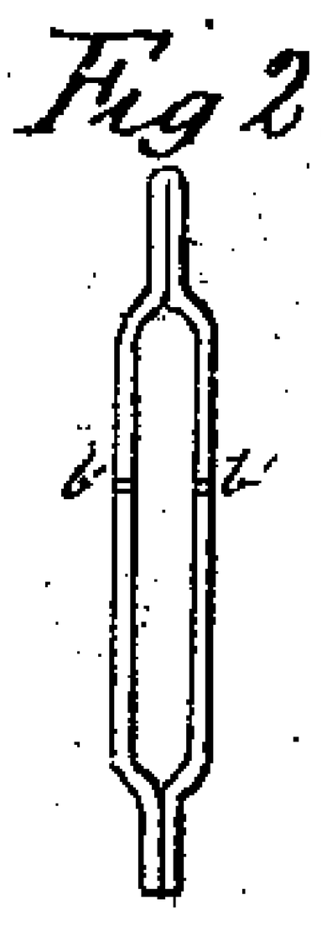


Fig. 23

Fig. 24.

Fig. 25

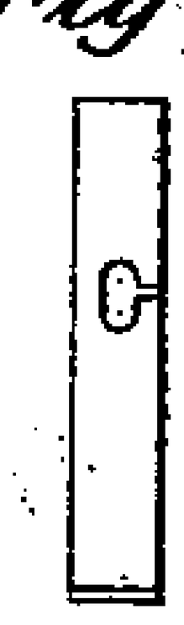


Fig. 26.

Witnesses

J. Hughes. Patent Agent
39. Blackfriars Street - Manchester

Hughes. Patent Agent
39 Blackfriars Street. Manchester

Colin Mather
William Rossetter

United States Patent Office.

COLIN MATHER AND WILLIAM ROSSETTER, OF SALFORD, ENGLAND.

Letters Patent No. 104,329, *dated June* 14, 1870.

IMPROVEMENT IN WARPING MACHINES.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that we, COLIN MATHER and WILLIAM ROSSETTER, of Salford, in the county of Lancaster and Kingdom of England, have invented new and useful Improvements in Warping or Beaming-Machines; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying five sheets of drawings and to the letters of reference marked thereon.

This invention relates to warping or beaming-machines having self-stopping motions for stopping the machine when there is a breakage or absence of one or more warp-threads, and consists in various improvements for enabling this object to be attained with greater efficiency and economy than heretofore.

In the machines at present employed, the warp-threads pass through the eyes of various forms of stop-pins or arms, and when the threads are entire they support the pins or arms, but when a thread is broken or absent, its corresponding pin or arm drops, and stops the movement of an oscillating bar, and causes the stoppage of the machine.

Our invention consists in the employment of an improved stop-motion for shifting the ordinary spring handle from its detent, and stopping the machine when there is breakage or absence of thread; and, also, in certain improvements in connection with the catch-wheel on the drum-shaft of the machine.

On the accompanying five sheets of drawings—

Figures 1 and 2, sheets 1 and 2, are front and end elevations of a warping or beaming-machine provided with our improvements.

Figures 3, 4, 5, 6, and 7, sheet 3, and Figures 8, 9, 10, 11, and 12, sheet 4, are detached views of some of the parts.

Figures 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, and 26, sheet 5, are views of our improved stop-pins.

Figs. 1 and 2 are drawn to a scale of two inches to the foot; figs. 3 and 4, full size; figs. 5 and 6, three inches to the foot; figs. 7, 8, 9, 10, 11, and 12, four inches to the foot, and the remaining figures full size; and in all the figures similar letters refer to similar parts.

a, figs. 1 and 2, represents the frame sides of the machine;

b, the warp-beam, on which the warp is wound;

c, the drum which gives revolving motion to the warp-beam;

d, the drum-shaft;

e, the fast-and-loose pulleys.

f, the back roller;

g, the front roller;

h, the back comb;

i, the front comb;

k, the strap fork;

l, the stopping and setting-on rods;

m, the spring handle;

n, the warp-threads;

o, the measuring apparatus; and

p, bobbins with yarn, for piecing broken ends.

One form of our improved stop-pins is shown in figs. 3, 4, 13, and 14, and to make it we take a piece of round steel wire, and bend or shape it as shown, the part *r* being used as an eye for the warp-thread to pass through, the part *s* passed over the bars, and *t* the projecting end for acting on the oscillating or reciprocating bars when there is breakage or absence of thread.

The pins are placed on one, two, or more flat bars, *u*, figs. 3 and 4, extending across the machine, and held fast to the frame sides, and it will be seen that, though the space in each pin is of such length that the pin can move up and down, the pin itself cannot be jerked or shifted out of its place by the action of the thread, and thus there is no possibility of the operative neglecting to piece the broken ends and making bad work, and when the machine is working the fluke is continuously cleared away, in consequence of the threads passing a little above or in contact with the tops of the bars.

Figs. 15 and 16 are end and front views of a stop-pin, having at the top a ring for enabling the pin to be handled with facility. In all other respects the pin is similar to that just described.

Figs. 17 and 18 are end and front views of another stop-pin, made of round wire, *v* being the part resting on the thread, *w* the part passed over the bar *u*, and *x* the arresting end; and

Figs. 19 and 20 are views of a similar pin, with the addition of a part, *y*, projecting upward for the convenience of handling; and

Fig. 21 is an end view of a pin of this description, open at the bottom, for enabling the pins to be taken off and placed on the bars, when rows of different-colored warp-threads are to be beamed.

In another arrangement of stop-pin we make it of flat steel wire, or sheet-steel, or other rolled or hammered metal, and bend or shape it as shown in the end and front views, figs. 22 and 23, there being a hole, *a'*, and slot *b'* at each side, the holes being used as eyes for the warp-thread to pass through, and the slots for enabling the operative to thread the eyes without the use of a reed-hook.

The pins are placed on the flat bars *u*, figs. 3 and 4, and the lower ends of the pins form the projections for arresting the oscillating or reciprocating bars.

These pins cannot be jerked off by the action of the thread, and the eyes are in such positions that the threads will be a little above or in contact with the tops of the bars, for the purpose of causing the fluke to be continuously cleared away.

The simplest form of stop-pin, made of flat wire or sheet metal, is shown in the end and front views, figs. 24 and 25, and although it is not so conveniently handled as some of those before described, it may in some cases be found advantageous to use it.

The bars *a* are held vertically or slightly angular to the frame sides of the machine, in any desired manner; but one mode we adopt is to fix to one end of each bar a screw, which is passed through a hole in a metal plate, c^1, held to one frame side, and the other end of each bar is pressed through a slot in another metal plate on the other frame side, and held by a pin, after which nuts are placed on the screws, and all screwed up tight.

The bars may be made square, if desired, and in all cases one or more steadying-plates, d^1, fig. 6, are used, as required.

We also use two or more wires for carrying the stop-pins, the wires being held by screws and nuts to metal plates held to the frame sides, and having one or more steadying-plates for each set of wires, to keep them steady.

In fig. 26 we show a stop-pin on two round wires, e^1, but the wires may be rectangular, if desired.

One set of our improved reciprocating bars, formed of metal plates, is shown at f^1, figs. 3, 4, and 5, the plates being brazed, soldered, or riveted to indented blocks g', fig. 5, which ride on two pairs of rollers, working on pins in stationary brackets, and the brackets are marked h^1, and one pair of rollers j^1.

The blocks g^1 may also be formed with end pieces to slide in guides, but in any case there are so many indentations and metal plates as there are rows of stop-pins.

The bars f^1 are also brazed, soldered, or riveted to to other blocks k^1, figs. 3 and 4, and each block has one or two projections, l^1, against which works a bowl, m^1, on a lever, o^1, fixed to the ordinary oscillating shaft, p^1, to one end of which is fixed the lever q^1, figs. 1, 2, and 7, working in connection with our improved stop motion.

To the worm r^1, on the back roller-shaft of the machine, we fix a crank-pin, to which is jointed the rod s^1, figs. 1, 2, and 7, having near its front end a recess fitting a pin on the lever q^1, and at its extreme end a hook, t^1, for acting on the ordinary spring handle *m;* and the lever q^1, shaft p^1, and reciprocating bars f^1 are worked in one direction by the crank and rod, and in the reverse direction by the spring u', or by a lever and weight.

When the machine is working, and there is no breakage or absence of threads, the bars f^1 reciprocate below the stop-pins, the crank giving the backward movement, and the spring or weight the forward one; but when a thread breaks or a thread is absent, its corresponding stop-pin falls, and arrests the motion of the reciprocating bars and lever q^1, thereby causing the recessed part of the rod s' to be shifted from the pin on the lever, and allow its hooked end t^1 to descend behind the top of the spring handle, which is pulled out of its detent when the rod moves back, and causes the stoppage of the machine.

The next part of our improvements relates to the catch-wheel, with its helical spring, used on the drum-shaft, when there is no pulley for reversing the motion of the drum and warp-beam.

Hitherto, when the machine was stopping, the motions of the drum and warp-beam were resisted by the helical spring only, and the momentum was often sufficient to wind up the spring too tight, and cause breakage. To remedy this defect, and also to regulate the length of the reversal of the warp-beam, we adapt to the catch-wheel a spring buffer, the spring of which is placed in and projects from a socket formed in a projection cast to the body of the wheel, and on the drum-shaft is fixed a boss and arm, by set-screws, at any required position, the boss acting as a bearing for the catch-wheel, and the arm for coming in contact with the spring in the socket.

The helical spring is placed in the interior of the catch-wheel, as usual, but instead of having its ends rigid, we joint one or both ends to arms or hinges held by pins or studs, to prevent the ends of the spring from breaking.

The catch-wheel, with our improvements, is shown in figs. 1, 2, 8, 9, 10, 11, and 12, fig. 8 being a view of one side, fig. 9 a view of the other side, and figs. 10 and 11 front and side views of the wheel connected to its holding-plate.

The wheel is formed with the ordinary ratchet-teeth, and is held, when required, by the catch a^2, which works on a stud, b^2, figs. 2 and 11, fixed to the frame side.

The catch has at the back a weighted arm, c^2, which keeps the front end out of gear with the teeth of the wheel, unless overpowered, and at the part d^2 there is a double incline, e^2, shown detached in fig. 12, and to the spring handle *m*, figs. 1 and 2, is fixed the arm f^2, carrying the knuckle-jointed finger g^2.

When the machine is working the weighted part of the catch keeps its other end out of the teeth of the ratchet-wheel, but when the spring handle moves inward, the finger g^2 acts upon the first incline, and causes the catch to hold the catch-wheel, and the moment the drum is reversed the catch is loosened from the teeth of the ratchet-wheel, and is lifted up by its weighted end.

At the end h^2 of the helical spring there is a projecting stud placed in a hole in the plate j^2, which forms the body of the wheel, and the other end k^2 is jointed to the arm l^2, having at its outer end a stud, m^2, which is placed in a hole in the holding-plate n^2 fixed to the drum-shaft *d*.

The spring of the spring buffer is shown at o^2. It is placed in a socket formed in the projection p^2, cast to the plate j^2, and on the drum-shaft *d* is fixed the boss and arm q^2 r^2, at any position required.

When there is breakage or absence of warp-thread, the spring handle *m* springs inward, and the front of the catch a^2 is lowered to come in contact with the ratchet-teeth, and hold the wheel firm, and then, as the drum-shaft continues turning by the momentum of the beam and drum, the holding-plate n^2 winds up the helical spring until the arm r^2 is pressed upon the buffer-spring o^2, and then the motions are reversed, according to the distance the helical spring is wound up, which distance is regulated, as required, by so fixing the arm r^2 on the drum-shaft *d* that more or less time shall elapse before the arm comes in contact with the buffer-spring.

Having now described the nature and particulars of our invention, and the manner in which the same is to be performed, we desire it to be understood that in warping or beaming-machines, having self-stopping motions,

We claim—

1. The rod s', spring u', reciprocating bar f^1, in combination with the spring *m*, swivel d^2, and catch a^2.

2. The knuckle-jointed finger g^2, on the spring *m*, in combination with the catch a^2, provided with double inclines e^2, and the weighted arm c^2, and spring buffer o^2 p^2, and arm q^2 r^2.

Done at Manchester this 4th day of March, A. D. 1870.

COLIN MATHER.
WILLIAM ROSSETTER.

Witnesses:
G. J. HUGHES,
Patent Agent, 39 Blackfriars Street, Manchester.
GEORGE SEPTIMUS HUGHES,
Patent Agent, 39 Blackfriars Street, Manchester.