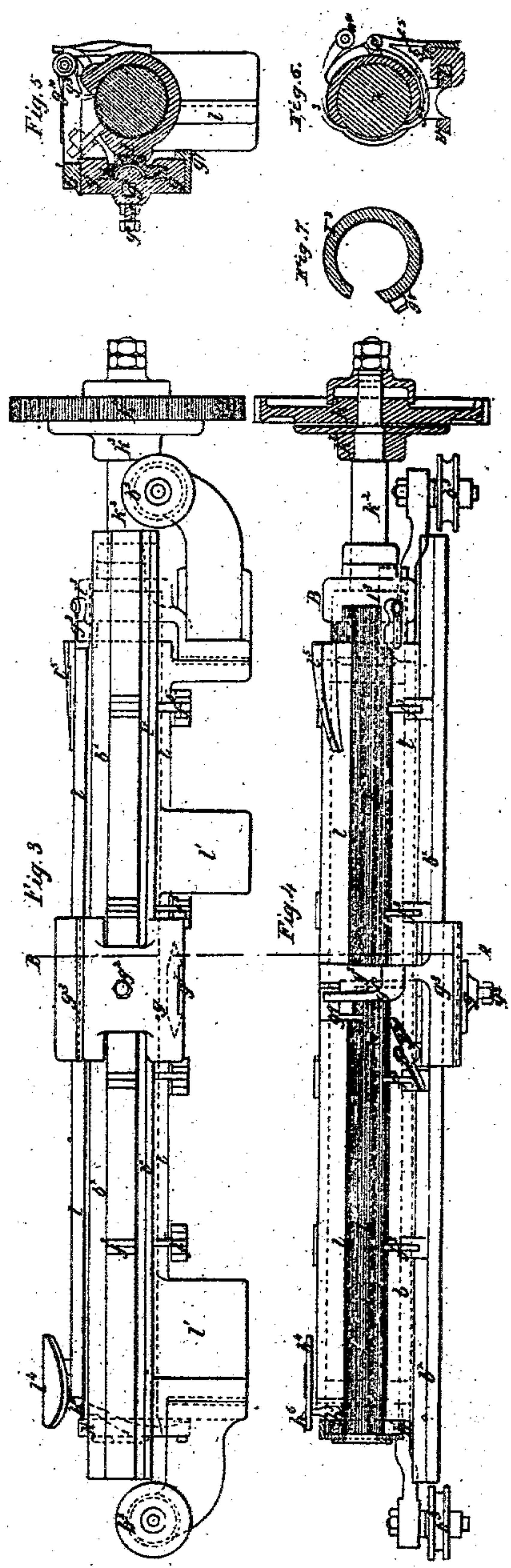
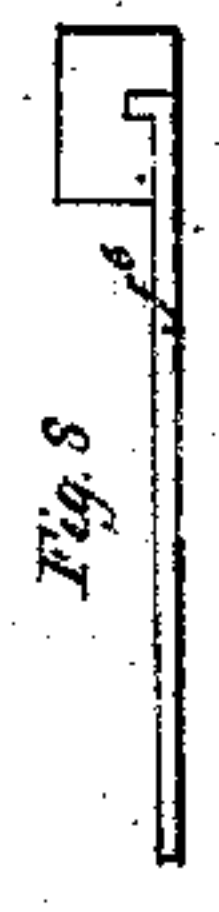
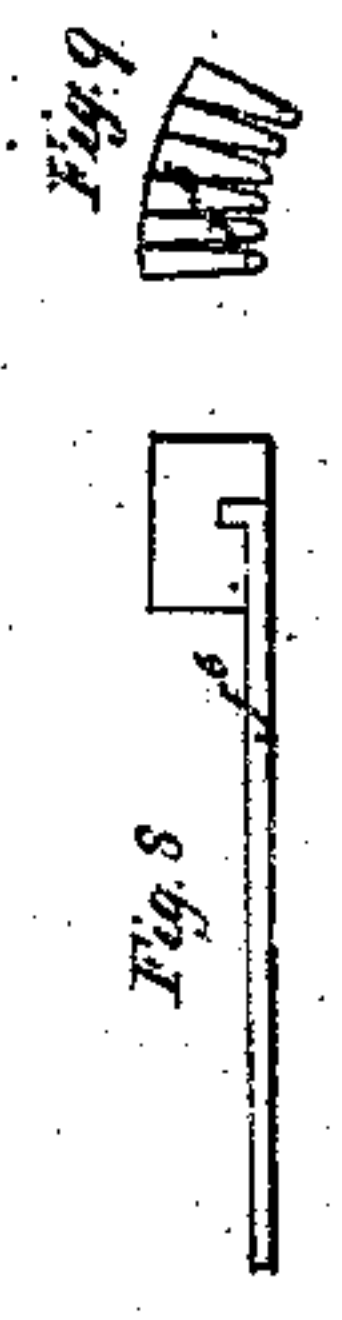
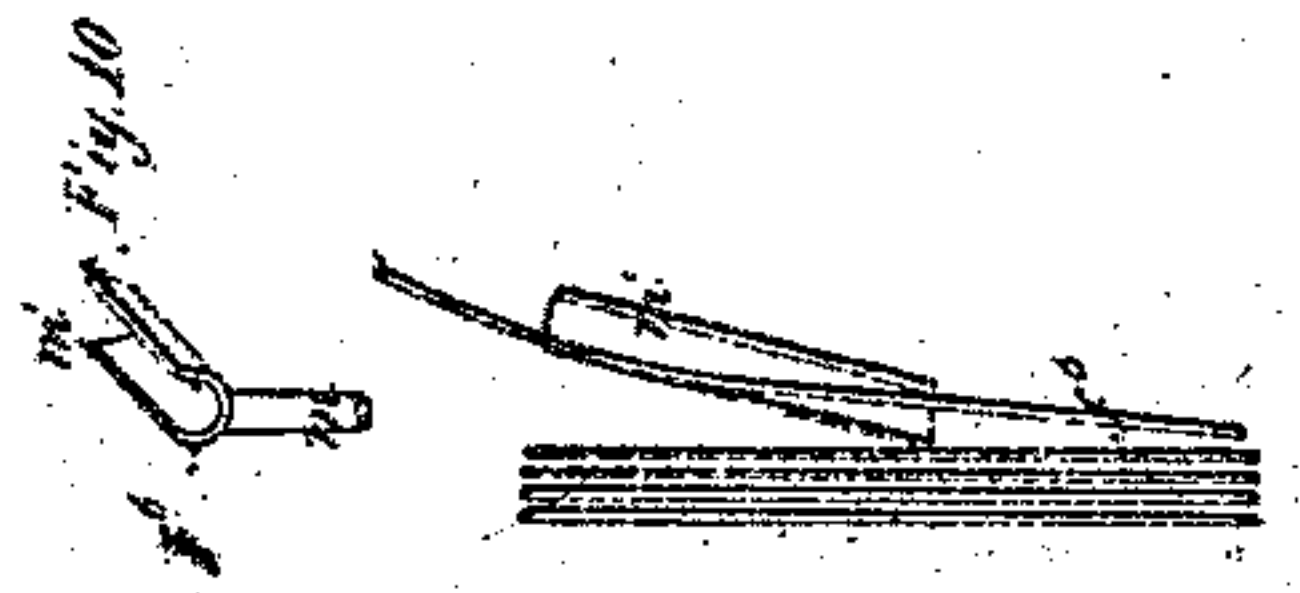
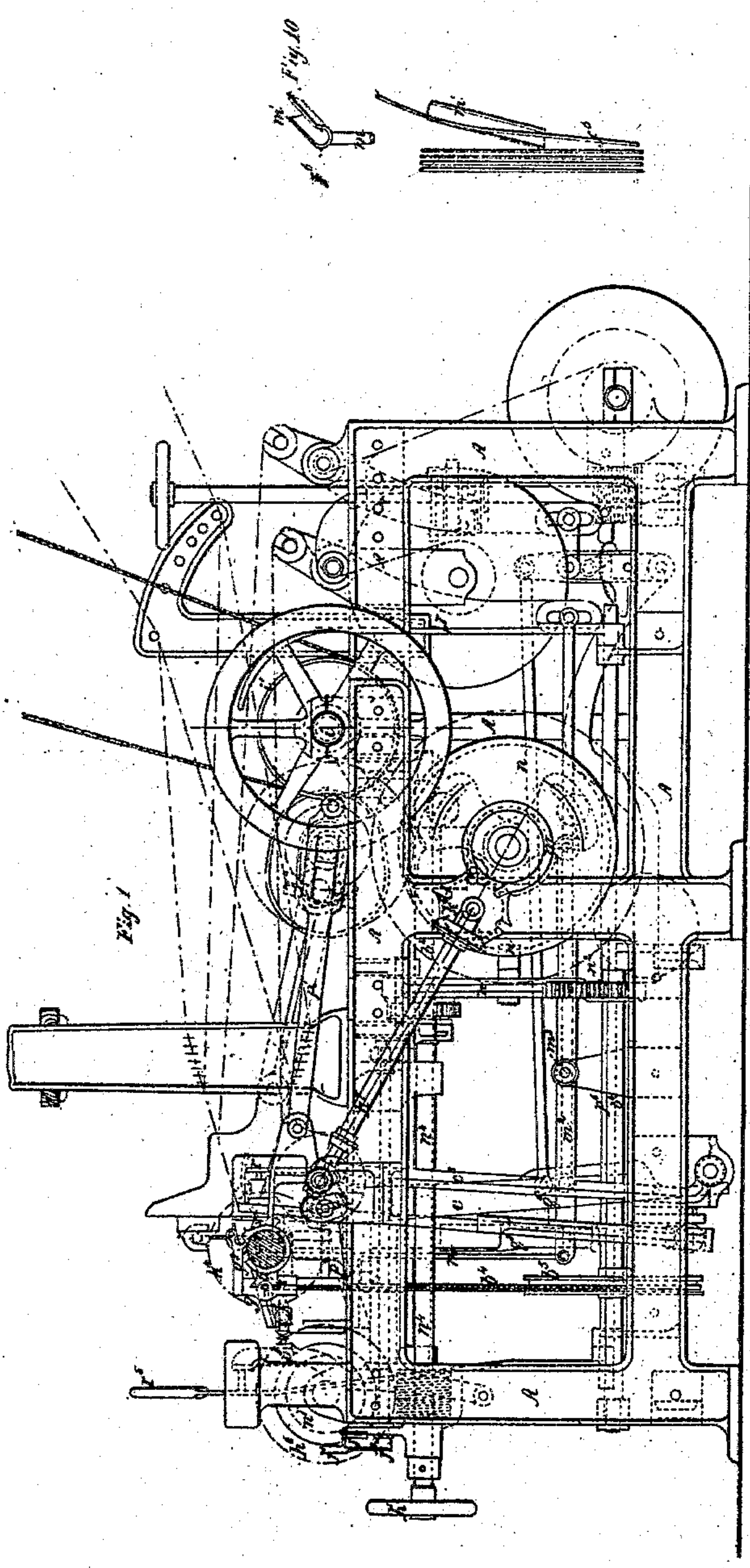


W. Weild
Weaving Pile Fabric.

Sheet 1, 2, 5 Sheets.

N^o 16,415.

Patented Jan. 13, 1857.



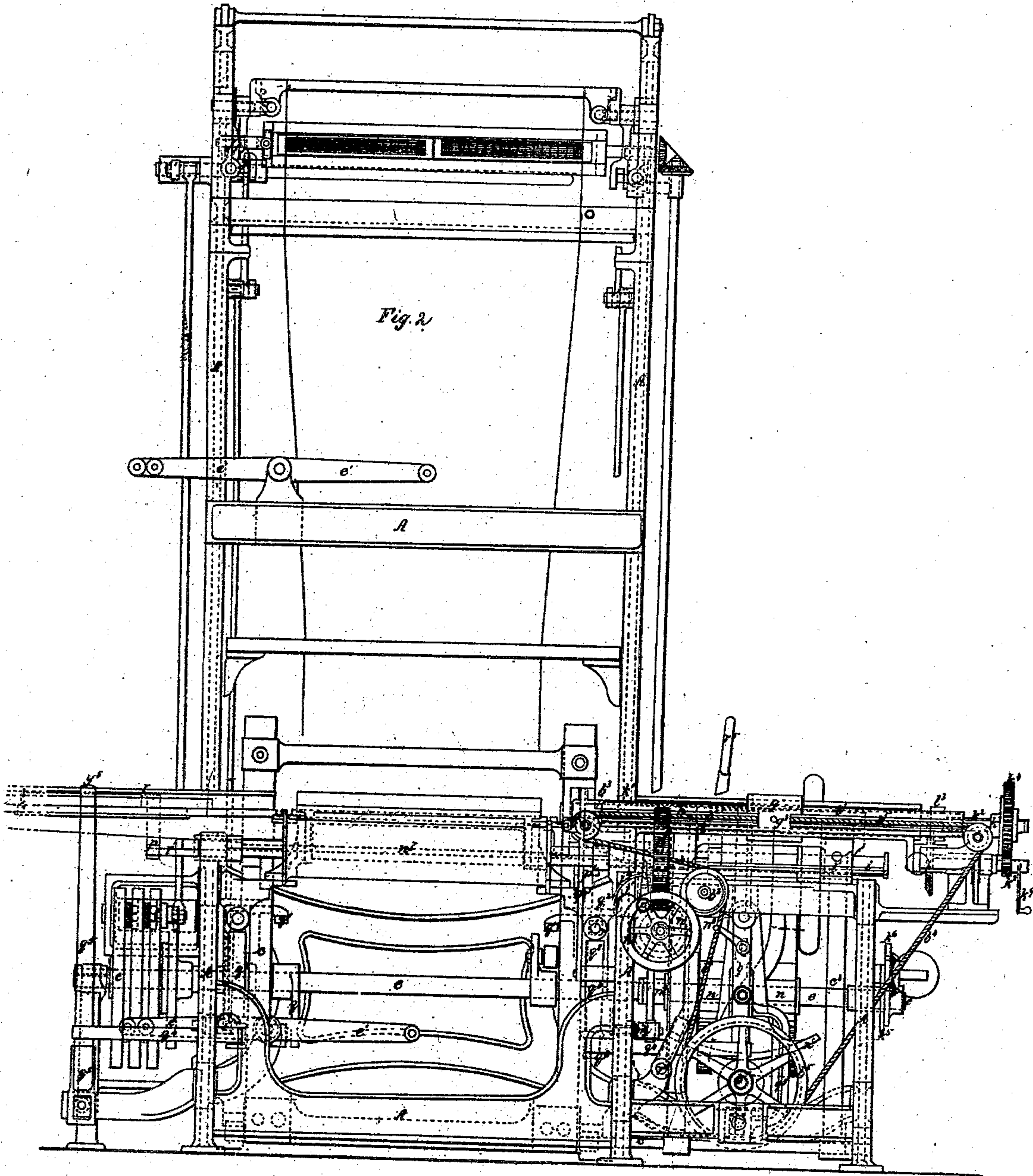
W. Weild.

Sheet 2, 2 Sheets

Weaving Pile Fabric.

N^o 16,415.

Patented Jan. 13, 1857.



UNITED STATES PATENT OFFICE.

WILLIAM WEILD, OF MANCHESTER, GREAT BRITAIN.

POWER-LOOM.

Specification of Letters Patent No. 16,415, dated January 13, 1857.

To all whom it may concern:

Be it known that I, WILLIAM WEILD, of the city of Manchester, in the county of Lancaster and Kingdom of Great Britain, have invented new and useful Improvements in Looms or Machinery for Weaving Pile Fabrics, &c.; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, and to the letters of reference marked thereon.

The nature of my invention consists in the application and arrangement of a roller or cylinder which is placed at one side of the loom, with its axis opposite to and in a line with the "fell" of the fabric and its end about nine inches from the edge of the fabric, which passes over a surface in going to the taking-up roller, corresponding to the level of the upper surface of the aforesaid roller or cylinder, which is grooved or fluted longitudinally to a pitch equal or nearly equal to the pile loops formed by the wires in the fabric, or wire being placed in each groove. Each wire carried by the grooved roller or cylinder as it comes opposite the fell of the fabric by the rotation of the roller or cylinder is pushed along its groove into and through the shed, when across the fabric the end of the wire still remains in its groove in the roller and when woven in the fabric it is allowed to remain still, a certain number of wires have been successively pushed into the shed, and have been woven in the fabric in like manner, when each wire is successively withdrawn from the fabric so that a certain number of wires always remain in the fabric, one wire being withdrawn from the fabric for each wire pushed into the shed, the revolving of the roller or cylinder returning the wires for reinsertion. The shuttle box or boxes are detached from the slay on the wire motion side and have a movement corresponding to that of the slay at the moment of picking the shuttle across the shed, but do not advance with the slay to the point of "beat up" as the fluted or grooved roller or cylinder would be in the way.

The following is a detailed description of my improvements.

Figure 1, Sheet 1, of the accompanying drawings is part of a side elevation of a loom, showing my invention applied, which is partly represented in section. Fig. 2 is a

front elevation of the same. Enlarged detached views of my invention are shown on Sheet 1. Fig. 3 is a front view; Fig. 4, a plan view, (part in section;) Fig. 5, a transverse sectional elevation on the line A and B, Figs. 3 and 4; Fig. 6, a transverse sectional elevation to show action of slide on the fingers retaining the wires last drawn from the fabric in their grooves; Fig. 7, a transverse section of the casing at the point B, Fig. 4.

The roller or cylinder k , as before stated, is grooved or fluted to about the pitch of the loops required in the fabric, and a wire (f^b) is placed in each groove, having one end formed as shown by Fig. 8, which is a full sized side view of one wire, and Fig. 9 which represents the end view of a few wires as they appear in the roller or cylinder k . The ends of the wires when placed in their grooves pass through holes formed in a hoop k' , (fixed in the end of the roller or cylinder) which holes are made to correspond with the grooves. The grooved roller (k) fits truly and so as to revolve freely in a casing l bored out to the diameter of the tops of the flutes. The casing (l) has projections (l') from it, by which it is bolted to the framing of the loom. The upper part of the casing is cut away to expose so much of the surface of the roller k as contains the number of wires required to be woven in the fabric. A groove l^2 is formed in the casing, as shown in Fig. 5, which is intended for the pieces at the ends of the wires to pass through and as a guide to them when they are pushed into the shed by the pusher, which also enters it. A space is made at the outer end of the grooved roller or cylinder k , by a detached section (l^3) of the casing which has a projecting part from it, by which it is bolted to the casing (l). This part (l^3) also forms a bearing for the axis k^2 of the roller k . The space formed as above mentioned is sufficiently wide to admit the pieces on the ends of the wires and allow them to be carried around by the revolving of the roller or cylinder k . A disk k^3 is keyed on the axis of the roller; against this a toothed wheel k^4 , comes to which motion is given to revolve the roller (k). Against the boss of the toothed wheel is a dished washer upon which screw nuts act. This arrangement is intended as a means of adjusting the grooves of the roller k to the pickers or pushers

when the wheel h^4 , is in gear, and to give way when an accident occurs.

The slide way or path (b^x) is fixed to or formed solid with the side of the casing l , and is made parallel to the grooves of the roller h . The rope which gives motion to the slide g , passes over pulleys b^3 , on studs fixed in brackets secured to each end of the casing l . The rope passes through a hole in the slide g , and is attached to it, by being pinched against the side of the hole in the slide, by a die piece g' , acted upon by a set screw g^2 . (See Fig. 5.) A bracket or holder g^3 is secured to the top of the slide g , upon this holder the pusher g^4 (for pushing the wire along its groove into the shed) is fixed, and another pusher g^5 , to swivel on a stud is also fixed upon it, to draw the wire out of the fabric. The wires are kept in their grooves when drawn from the fabric till covered by the edge of the casing l by fingers f^3 , which come against the tops of the flutes. These fingers are placed on fulcrums f^4 , attached to the casing l . (See Fig. 6.) They are pressed against the flutes of the roller h by springs. The fingers f^3 would be in the way of the pieces at the ends of the wires when being drawn out but they are each lifted from the roller h to allow the wire and pusher to pass by an incline piece g^7 , fixed to the under side of the slide g , which in passing comes against and presses down arms (f^5) from the fulcrum of the fingers f^3 and thus lifts them out of the way the spring pressing the fingers down on the flutes of the roller again when the incline (g^7) has passed. The pusher g^5 which draws out the wire is kept against the roller h by a small finger spring which allows the pusher to lift to pass over the piece on the end of the wire to be drawn out forcing down the pusher when it gets at the back of the piece at the end of the wire which is pushed along its groove when the slide moves back. A finger g^8 is placed on a stud at the detached end of the casing l^3 , is caused to pass against the pieces at the ends of the wires when pushed in to the space made for them, so as to keep the sides of them in the position shown by Fig. 9, the pressure being effected by a spring acting against the finger g^8 , which has its end beveled to leave a space between it and the end of the last wire for the next wire to be pushed into. When the slide g is at the outside end of the grooved roller h , the pusher for pushing the wire in the shed occupies the space cut out of the detached end part of the casing (l^3) and is opposite the groove (l^2) in the casing. While the slide is in this position the roller is moved a groove or flute to bring the piece at the end of the wire to be pushed in the shed opposite the groove (l^2) in the casing into and through which it is pushed when the slide moves forward

and it is left by the pusher against the hoop h' .

In the holder to which the pickers are secured a stud is fixed upon which a bent finger g^9 , is placed so as to oscillate. This bent finger is intended to pass into the space between the groove in the casing l^2 , and the grooved roller before the piece at the end of the wire, its purpose being to keep down the wire in its groove, and to draw it back when the loom is reversed. This finger is lifted out of the way when it arrives at one end of the casing, by an incline l^4 , fixed to the casing which acts upon a projection from the fulcrum of the finger and it is brought down again when the slide arrives at the other end of the casing, by another incline l^5 , fixed on the casing. To maintain the bent finger g^9 , in the position in which the inclines (l^4 and l^5) place it, at each end of the casing so as not to move by a slight effort, two flat places are formed on its boss, upon one of which flat places a spring g^{10} , (secured to the holder) presses, when the finger is down, and on the other when it is up. At the end of the fluted roller h nearest the fabric a finger h^3 , is placed on a stud h^{3x} , secured on the casing l . (See Fig. 6.) This finger h^3 , presses against the pieces on the ends of the wires to force the tops of them against each other as they have a tendency to turn out of the erect position when in the fabric. This finger (h^3) is pressed forward by a spring and is beveled to leave at one side of it a space (as shown in Fig. 4) between it and the end of the wire upon which one side of it passes to admit the piece on the end of the next wire which forces it back. It comes forward again when the roller or cylinder advances to bring forward the next wire. The ends of the wires when drawn back into the fluted roller, extend about two inches past the hoop h^2 . It will be seen that with the fluted roller in the position described that a wire pushed straight from the roller could not enter the shed being opposite and in a line with the fell of the fabric as the shed space would not be large enough. I therefore cause the wire to be diverted or bent from its straight line so as to present its point toward the widest part of the shed, and at the same time to cause it to bend upward to compensate for the deflection of its point in passing through the shed. When the wire has passed through the shed it is allowed to assume the straight line again. The bending of the wires above referred to does not exceed in amount, that which they will recover by their own elasticity.

The instrument by which the wires are directed is formed by a vertical rod m jointed at its lower end (see Fig. 1) to a lever which gives motion to it and carrying at its upper end, a small trough m' of thin

metal. The edge of this trough touches the side of the wire last pushed into the shed, so that the wire next pushed from the roller comes against the side of the trough, which is in an incline position, directing upward and to the widest part of the shed. This will be understood by examining Figs. 10 and 11. The former is an end elevation of the trough on the upper end of the rod, and the latter a plan view of it showing its position in relation to the wires. The rod m upon which the trough is fixed, is elevated to compensate for the increasing deflection of the point of the wire as it passes through the shed as before stated, but when the wire is pushed across, it is lowered, to bring the trough clear of the wires, so that the wire pushed in may assume the straight position and when it is beat up by the reed, the trough again rises, to be in the position ready to direct the next wire.

I have now described my improved combination and arrangement of mechanism and mode in which it acts, to insert the wires in the shed, withdraw them from the fabric and return them for reinsertion.

I shall now proceed to describe the means by which the mechanism is actuated and the arrangement of the ordinary working parts of the loom, some of which require modification in consequence of the peculiarities of the wire motion. In this description I shall refer to Sheet 1, Fig. 1, and Sheet 2, Fig. 2. The framing of the loom is marked A; first motion shaft i , driving pulleys i' , (fast and loose.) A pinion on first motion shaft drives a wheel on crank shaft and a pinion on this shaft drives a wheel on tappet shaft e , upon which is fixed the drum cam n that gives movement to the pusher slide of the wire motion. It acts upon an antifriction bowl in a toothed quadrant n' , which has its center of oscillation on a stud fixed to the cross frame. The quadrant n' gears with a toothed wheel n^2 , keyed on shaft b^2 , which shaft is placed in suitable bearings attached to the frame. On this shaft the pulley b^3 is fixed, to which the rope b^4 is attached, which gives movement to the slide g .

The taking up of the fabric as it is woven is accomplished from the oscillations of the quadrant by a pawl n^3 , placed directly on a stud or pin fixed in the quadrant which acts on a ratchet wheel on a shaft n^4 (in suitable bearings fixed to the side of the loom) having a worm n^5 upon it which gears with a worm wheel n^6 , on the axis of the taking up roller n^7 . A retaining pawl fixed on a stud in the framing also takes into the teeth of the ratchet. On the end of the shaft n^4 at the front of the loom a hand wheel n^8 is fixed to regulate or turn back the taking up roller. A shaft j is also placed in suitable bearings alongside the loom. On that end which comes to the front of the loom

a handle j' is fixed, which works against a retaining quadrant j^2 , attached to the framing. This handle (j') is for the purpose of lifting the pawls out of the taking up ratchet, which is accomplished by eccentric or cam slots formed in a piece fixed on the shaft j , with which the pawls are connected.

Intermittent movement is given to the fluted or grooved roller or cylinder, to move it one groove for every wire woven into the fabric, in the following manner: A disk k^5 having a pin in it is placed at the end of the tappet shaft e , which acts on a star wheel k^6 on a stud fixed to the framing, to which is secured a bevel wheel which gears with another wheel on an obliquely placed shaft k^7 , which is secured in bearings attached to the frame. On the upper end of the oblique shaft another bevel wheel is placed, that gears with one on a stud fixed on the framing. A pinion is attached to the bevel wheel last named, which gears with a pinion k^8 , that can slide on another stud fixed to the frame. This pinion gears with the wheel k^4 , on the axis (k^2) of the fluted or grooved roller or cylinder k .

The pinion k^8 is made movable on its stud, that it can be slid in and out of gear, so that the fluted or grooved roller or cylinder k may be turned backward and forward by hand when required. The pinion k^8 is held in gear by an arm k^9 , which takes into a groove in its boss, the arm being centered on the stud of the pinion with which the pinion k^8 gears. The lever m^2 which gives motion to the rod m , having the trough m' , fixed upon it for directing the wires into the shed, has its fulcrum m^3 on a stud fixed in a bracket secured to the frame; and the end of it carries an antifriction bowl which is acted upon by a cam m^4 , placed on the tappet shaft e . The shuttle box on the wire motion side cannot move with the slay to the fell of the cloth, the fluted or grooved roller k being in the way. It is therefore made to come opposite the shuttle race and to have a movement corresponding to that of the slay at the time of "picking." It is mounted on separate arms c^3 , the fulcrum or axis of oscillation c' coinciding with that of the slay as shown. Movement is given to the detached shuttle box by a double action cam p , on the end of the crank shaft which acts on an antifriction bowl p^2 , placed on a stud in the end of a connecting rod p' , which is jointed with the arms c^3 , carrying the shuttle box. A slot is formed on the connecting rod p' , that fits on a swivel die placed on the crank shaft. By this arrangement the rod is kept in position, the side action of the cam upon the bowl p^2 , is resisted, and a free reciprocation of the rod provided for.

The "picking" of the shuttle is obtained

from arms q on the tappet shaft, bowls, on them act upon bat wings q' , that are secured on shafts q^2 , free in bearings attached to the side of the loom. Arms q^3 , descending from these shafts, are connected by straps q^4 with the picking arms q^5 , arranged in the ordinary manner. The finger r acting against the "swells" of the shuttle box and the shafts r' upon which they are mounted are arranged in the usual manner, with this exception, the shaft of the shuttle box which is detached from the slay, has an arm from it which projects forward; so that when the shuttle is in the detached box the arm is lifted and holds up the "frog" finger r^2 , while it passes over the "frog." The frogs are fixed on the side frame, backed by india-rubber as a buffer. When struck by the fingers one of them acts against an upright lever r^3 , having its fulcrum r^4 on the frame which acts against a horizontal lever having its fulcrum attached to the frame. This lever forces the stop handle r^5 out of the notch, a spring acts upon it and causes the shaft r^6 , upon which it is placed, to move the strap guide r^7 , (which is keyed on the end of it) from the fast to the loose pulley. The tappets for working the warps are placed on the tappet shaft e , on the side opposite to that on which the wire motion is placed, e' being the heald levers.

I wish it to be understood that other combination and arrangements of mechanism than those described may be used to actuate or give movement to the slide g , and the fluted or grooved roller k and the guide trough m' , but as I make no claim to these

arrangements I do not restrict myself to the use of them.

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The Figs. 1 and 2 exhibit some of the ordinary parts of looms for weaving pile fabrics which have not been referred to, as they form no part of the invention claimed; those ordinary parts which have been mentioned and referred to will render the drawings more intelligible.

It will be seen from the preceding description that my invention combines the advantages of both the fast and loose wire system.

I claim as my invention when applied to looms or machinery for weaving pile fabrics &c.

1. The arrangement of the wires in grooves or flutes formed in a roller or cylinder, the wires on being pushed into the "shed" never wholly leaving the grooves in the roller or cylinder.

2. I also claim as a peculiarity and novelty in my invention the arrangement of the wires so that the one to be inserted in the shed is opposite or nearly opposite and in a line with the fell of the fabric or that point where the reed will leave the wire on beating-up; such wires when so arranged having to be bent out of the straight line to present the point toward the widest part of the shed, the whole combination and arrangement substantially as hereinbefore described.

70

W. WEILD.

Witnesses:

WM. WEBSTER,
H. W. DORE.