

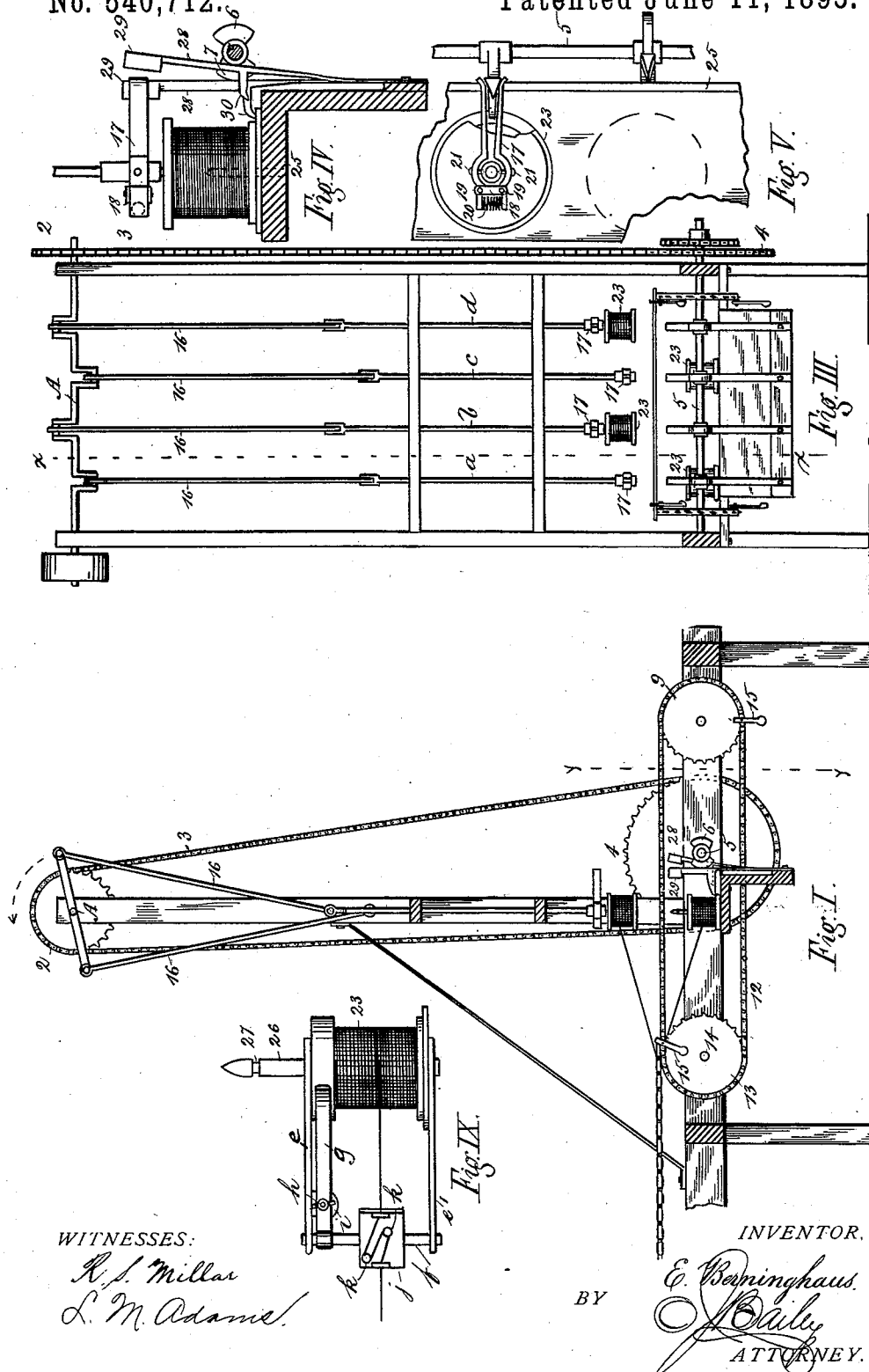
(No Model.)

2 Sheets—Sheet 1.

E. BERNINGHAUS.
LOOM FOR WEAVING WIRE AND SLAT FABRICS.

No. 540,712.

Patented June 11, 1895.



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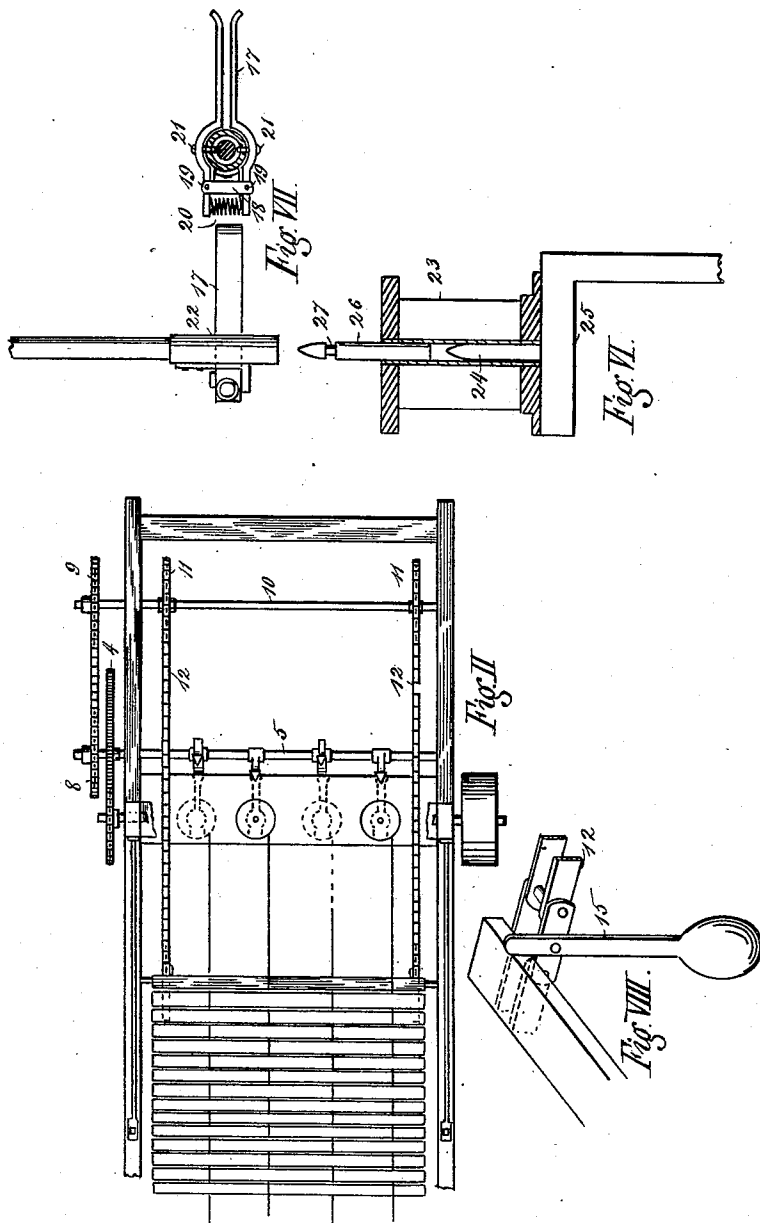
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WITNESSES:

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LOOM FOR WEAVING WIRE-AND-SLAT FABRICS.

SPECIFICATION forming part of Letters Patent No. 540,712, dated June 11, 1895.

Application filed September 28, 1894. Serial No. 524,368. (No model.)

To all whom it may concern:

Be it known that I, EUGENE BERNINGHAUS, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Looms for Weaving Fabrics Composed of Wire and Slats, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a longitudinal vertical section on line *x x* of Fig. 3 of my improved loom for weaving wire-and-slat fabrics. Fig. 2 is a top or plan view partly in section. Fig. 3 is a transverse section on line *y y* of Fig. 1; Fig. 4, a detail vertical section showing the action of the cams, the reciprocating cam-arms, and the grip for alternately arresting and releasing the spools which carry the wires forming the warp of the fabric; Fig. 5, a top view of the same; Fig. 6, a detail view in section of one of the spools and its adjuncts; Fig. 7, a detail of the grip mechanism and its attachment to the plunger; Fig. 8, a detail of the depending gravity-arms which force the slats into the intersections of the wires, and Fig. 9 a view of the device for regulating the tension of the wires.

The object of my invention is to construct a loom for weaving fabrics composed of wire and wooden slats.

The machine consists essentially of means for introducing the slats successively between the crossed wires, mechanism for shifting the alternating series of spools which carry the wires and regulating the tension of the same together with co-operating devices all of which will be hereinafter described.

It will be understood that in the operation of this invention, a certain correlation of movements or mechanical functions must be maintained, and with this end in view the main shaft A is provided with a sprocket pulley 2 which transmits motion through the chain belt 3 to a pulley 4 of twice the diameter of pulley 2. The larger pulley is attached to the cam shaft 5 provided with alternately acting cams 6 and 7, the operation of which will be hereinafter explained. On the outer extremity of the cam shaft is placed a sprocket pulley 8 of the same diameter as the pulley 2 on the crank shaft. A chain belt from this

pulley leads to a similar pulley 9 on a second transverse shaft 10, on which is secured pulleys 11 carrying belts 12 which form the carrier for the slats. The rear end of the carrier runs upon rollers 13 on the shaft 14. The slat carrier is provided at proper intervals with depending gravity arms 15 pivoted to the links of the chain as clearly shown in Figs. 8 and 1. The upper projections of these arms carry the slat into the intersection of the wires and automatically disengage by yielding backwardly as the slat is forced into the intersections, after which they resume their pendent positions.

Observing that the mechanism is to operate in relatively timed movements, its operation will now be described, first stating that the woven fabric may be wound upon any convenient reel, which forms no part of the invention.

The main shaft A is provided with a series of U shaped cranks pivotally connected with depending pitman rods 16 which operate the plunger bars *a, b, c, d*, the lower ends of which are tubular and carry a series of grips or clutches 17 consisting of a pair of arms bent laterally near their centers to conform to the lower ends of the plungers which they embrace. The said arms are pivoted on a plate 18, swing laterally on pivots 19 and are kept normally closed by coiled springs 20. They are also provided with inwardly projecting studs 21 which extend through apertures in the side of the plungers as shown in Fig. 7. The spools 23 are formed with sockets in their lower ends to receive vertical spikes 24 fixed in the transverse table or bar 25. A spindle 26 having a tapering point, projects upwardly from the spools and is encircled near its head by a groove 27.

It will be observed that when the plunger descends and receives the spindle, the arms of the grip will be expanded by the tapering point of the spindle acting on the inner ends of the studs 21, until the latter engage the annular groove 27. The arms of the grip will then collapse and the plunger and grip will be united.

When the slat is laid on the carrier and conveyed toward the wire intersections between the upper and lower series of spools, two of the plungers *b* and *d* are elevated and

the spools thereon are upheld by their respective grips while the alternate spools of the series belonging to the plungers *a* and *c*, being for the time disengaged, are resting upon the table 25. The shaft *A* being revolved, the spools *b* and *d* descend and laying down their respective wires upon the recently introduced slat, rest upon the table 25. These spools must be disengaged from the clutches during the time of one revolution of the crank shaft. This is effected by means of the before mentioned cams attached to the transverse shaft 5 acting upon arms 28 provided at their upper ends with wedges 29 which are actuated by the said arms. The introduction of the wedges separates the arms of the grips, the locking studs are withdrawn from the groove 27 in the spindle, and the plungers and grips are released and free to rise. In order to insure the retention of the spools at this juncture the arms 28 are provided with fingers 30 which engage a recess in the lower flange of the spool. It will be seen that the arms 28 have spring shanks attached to the depending flange of the table 25 and that the arms normally incline outwardly except when forced inwardly by the cams.

The descent and lodgment upon the table of the first mentioned series of spools is succeeded in the course of revolution by the descent of the plungers *a* and *c* which engage and retain the spools, which during the preceding revolution of the crank shaft, had remained upon the table. These are now engaged and being drawn up complete the crossing of the wires thereby incorporating the slat and forming a new intersection for the succeeding slat which at a prearranged stage in the operation passes forward and takes its place in the fabric.

As the cam shaft revolves at just half the speed of the crank shaft and as any particular spool or spools must be picked up by the grip at alternate revolutions of the crank shaft, it follows that the grip must be kept free from engagement with the spool while it remains upon the table. In order to accomplish this, the respective cam or cams must be so adjusted as to impinge against the arm for a time sufficient to hold the wedge between the arms of the grip and to detain the finger 30 upon the lower flange of the spool. The grip being thus released from the spool will be free to ascend. During the succeeding revolution of the crank shaft and the half revolution of the cam shaft the position of the cam will be reversed, the action of the spring will simultaneously withdraw the wedge 29 from the

grip and the finger 30 from the lower flange of the spool, which is thus set free for re-engagement when the grip descends.

The arrangement as above described is made necessary by the requirement that the passage way for the slats must be entirely unobstructed at the moment when they are introduced. This clearance could not be effected except by the periodic detachment of certain spools and the elevation of their respective plungers a position approximately shown in Fig. 3.

In practice it may be desirable to have the spools provided with a frictional device, a simple form of which is shown in Fig. 9, in which the spool is secured in a yoke composed of bars *e* and *e'* united by a vertical stem *f*. A friction spring *g* attached to the stem bears against the head of the spool. The tension of said spring is regulated by a screw *h* threaded into a lug *i*. A plate *j* is loosely swiveled to the stem and is provided with a series of studs *k* over which the wire is looped. Frictional tension is thus provided and the plate glides up or down as the wire is unwound from the top or bottom of the spool.

What I claim as new is—

A machine for the purpose described, embracing a series of vertically operating spool plungers being in connection with a cranked shaft adapted to transmit motion through a chain belt to a cam shaft which operates mechanism to alternately release and detain the spools, said chain belt also imparting motion through an auxiliary belt to an endless slat carrier which conveys the slats in succession into the intersections of the wires; said spool plungers being provided with grip mechanism adapted to be released by wedges actuated automatically by cams at alternating revolutions of the crank shaft, and alternately engaging and drawing up said spools; the said mechanism being so timed and adjusted in its movements as to present an open passage for the slat to be laid transversely upon the carrier, the said slat being embraced within the wires which are crossed by the vertical movements of the spools carried by the said plungers, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand, this 12th day of September, 1894, in the presence of witnesses.

EUGENE BERNINGHAUS.

Witnesses:

GEO. W. HARDACRE,
G. F. OSLER.