(No Model.) 2 Sheets—Sheet 1.

A. MELZER.

LOOM FOR WEAVING NETTED FABRICS.

No. 263,795. Patented Sept. 5, 1882.

Fig. 1.

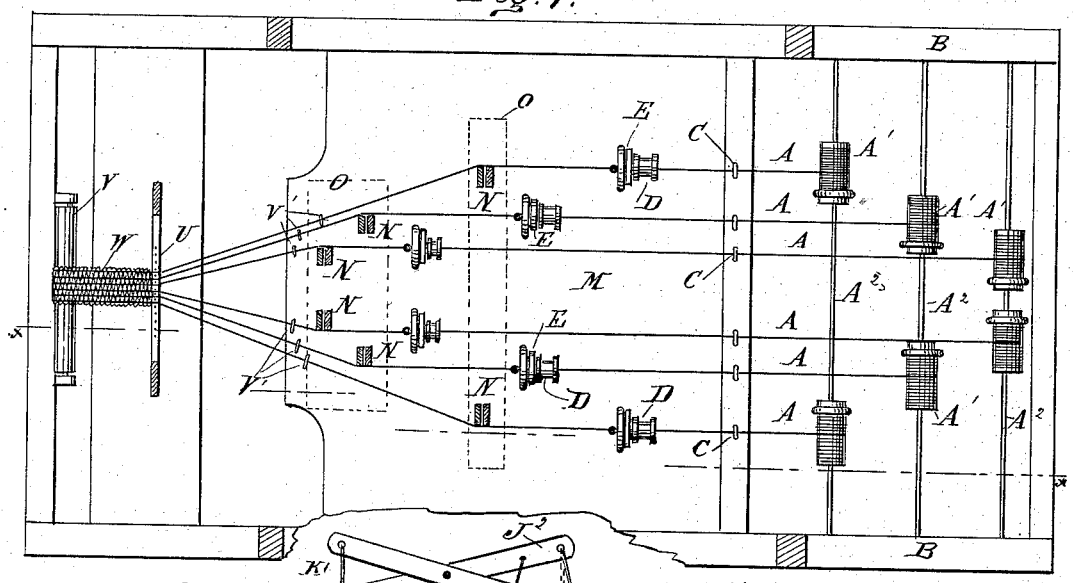
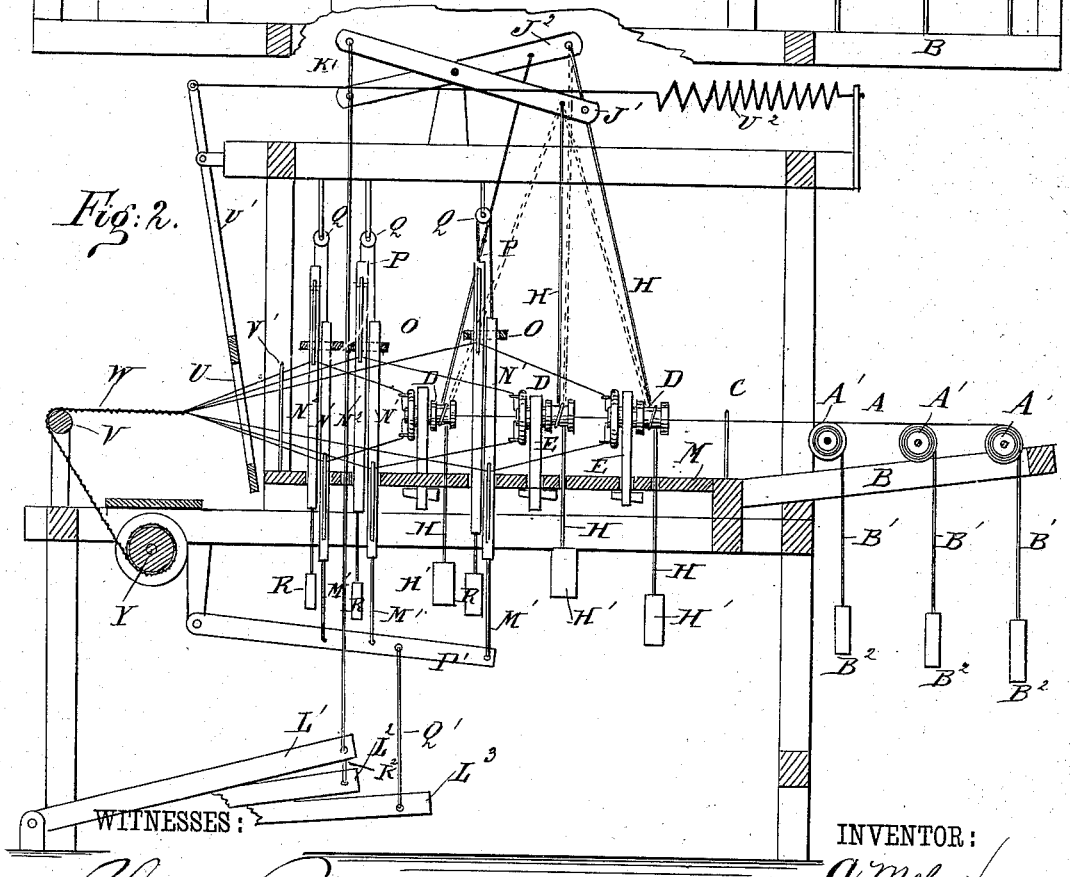


Fig. 2.



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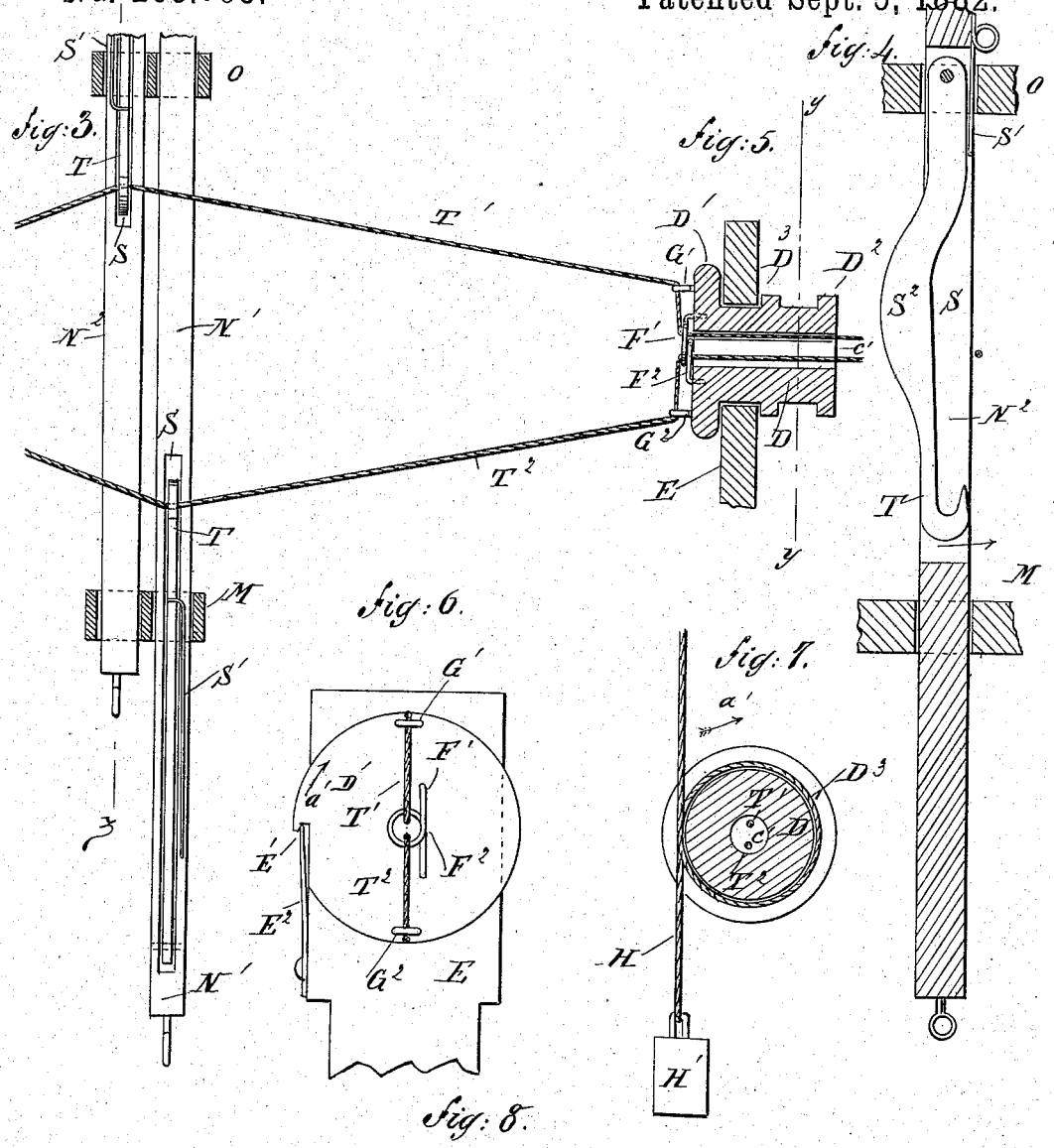

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UNITED STATES PATENT OFFICE.

ALEXANDER MELZER, OF NEW YORK, N. Y.

LOOM FOR WEAVING NETTED FABRICS.

SPECIFICATION forming part of Letters Patent No. 263,795, dated September 5, 1882.

Application filed September 7, 1881. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER MELZER, of the city, county, and State of New York, have invented a new and Improved Loom for Weaving Netted Fabrics, of which the following is a specification.

The object of my invention is to provide a new and improved loom which can be adjusted to be adapted for weaving netted fabrics of any desired pattern.

The invention consists in a loom provided with a loosely-mounted twister for each pair of warp-threads, the warp-threads passing longitudinally through the twister and through opposite eyes at edges of one end of the twister, whereby the warp-threads will be twisted when the spool is rotated. Around each twister a cord is coiled having a weight attached to its lower end and having its upper end attached to a pivoted lever connected with a treadle, whereby all the twisters connected with this treadle will be revolved when the treadle is depressed, and all the corresponding warp-threads will be twisted, the combination of the twisters and treadles being varied as the design may require.

The invention further consists in a separate pair of heddles for each pair of warp-threads, which heddles are formed of two vertically-sliding and longitudinally-slotted bars connected by a cord passing over a pulley of the loom-frame, one of the bars being connected with a pivoted lever connected with a treadle, the other bar being provided with a weight for drawing it downward. In the slot of each sliding bar a hook provided with a bend or swelling in its shank is pivoted and is pressed into the slot by a spring. The hook of one sliding heddle-bar is pivoted in the upper end of the slot, and the hook of the other bar is pivoted in the lower end of the slot in the said bar, so that when the heddle-operating treadle is depressed the hooks will be forced outward by the swelled portion of the hooks striking the edges of apertures of the platform or guide-frame, and will catch the warp-threads and separate them.

The invention further consists in the arrangement and construction of parts and details, as will be more fully described hereinafter, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional plan view of my improved loom for weaving netted fabrics. Fig. 2 is a longitudinal sectional elevation of the same on the line *x x* of Fig. 1. Fig. 3 is a side elevation of the heddles. Fig. 4 is a longitudinal sectional elevation of one of the heddle-bars on the line *z z* of Fig. 3. Fig. 5 is a longitudinal sectional elevation of a twister. Fig. 6 is a front end elevation of the same. Fig. 7 is a cross-sectional elevation of the same on the line *y y* of Fig. 5, showing also the cord and weight by which it is rotated. Fig. 8 is a plan view of a sample of a certain pattern of the netted fabrics made with my improved loom.

Each pair of warp-threads T' T^2 is wound on one of a series of spools, A′, loosely mounted on transverse rods or shafts A^2 of the loom-frame B. A cord, B′, is attached to and wound several times around each spool, and has a weight, B^2, at its lower end, and thus keeps the warps taut. From the spools A′ the pairs A of warp-threads pass through guides C, and from these guides each pair A is passed longitudinally through the central longitudinal aperture, *c*′, of a separate twister, D, loosely mounted in a standard, E, and provided with a flange, D′, at the end farther from the spools A′. Each twister D is further provided with a circular rib, D^2, at the end toward the spools A′, and with a circular rib, D^3, resting against the standard E, the twister being held in the aperture in the standard E by the flange D′ and the rib D^3, as shown in Fig. 5. The end of the twister D farther from the spools A′ (which shall be known as the "front" end) is provided with two central wire loops or eyes, F' F^2, through which the threads T' T^2 pass, one thread passing from the center of the twister through an eye or loop, G′, near the circumference of the front or flanged end of the twister, and the other thread passing through an eye or loop, G^2, near the circumference of the front or flanged end of the twister D and diametrically opposite the loop G′. The flange D′ is provided with a notch, E′, in its edge, and a spring, E^2, attached to the standard E,

rests against the edge of this flange, as Fig. 6 shows. A cord, H, is coiled one or more times around the twister D, between the ribs D^2D^3, and a weight, H′, is suspended from the lower end of this cord H, the upper end of this cord being attached to one end of a lever, J′, pivoted on the top of the frame B of the loom. The other end of this lever is connected by a cord, K′, with a treadle, L′. One or more cords, H, may be attached to the lever J′, the remaining cords H being attached to a like lever, J^2, connected by a cord, K^2, with a treadle, L^2. More treadles L′ L^2 and levers J′ J^2, &c., may be provided, and the several cords H may be connected with the various levers J′ J^2, &c., as the pattern of the netted fabric may require. As shown in Figs. 1 and 2, there are six twisters D, three being connected with the lever J′ and three with the lever J^2. The several standards E rest on and are secured on a platform, M, resting on the loom-frame B. From the twisters D the threads T′ T^2 pass to the heddles N. Each pair of heddles consists of two vertically-sliding bars, N′ N^2, guided by the apertured platform M and an apertured frame, O, these bars N′ N^2 being both suspended from a cord, P, passing over a pulley, Q, suspended from the upper part of the frame B. One bar—for instance, N′—of each pair of heddles is connected by a wire or cord, M′, with a lever, P′, pivoted to the frame, and having its free end connected by a cord, Q′, with a treadle, L^3. The other bar, N^2, of each pair of heddles has a weight, R, suspended from its lower end. Each bar N′ or N^2 is provided with a longitudinal slot, S, in which a heddle-hook, T, is pivoted, this hook being pressed into the slot S by a spring, S′, attached to the bar N′ or N^2. The shank of the hook T is provided with a bend or swelling, S^2, extending in a direction opposite to that in which the hook extends. The hook T of one bar—for instance, N^2—is pivoted at the upper end of the bar, and the point of the hook projects upward, and the hook T of the other bar, N′, is pivoted at the lower end of the bar, and the point of the hook projects downward. Each pair A of warp-threads has a separate pair of heddles, N, constructed as described, and the threads rest against the edges of the bars N′ N^2, as shown in Fig. 1, from which edges the hooks T will project when the loom is operated, as will be fully set forth hereinafter. After passing the heddles N the threads T′ T^2 pass through guides V′ and through a batten or reed, U, attached to the lower end of a lever, U′, pivoted to the top of the frame B, and having its upper end drawn to the rear of the frame B by a spiral or other spring, U^2, whereby the batten is forced to the front of the loom-frame. The completed fabric W passes over a roller, V, and is wound on a beam, Y.

The operation is as follows: I will first describe the operation of the twisters D, then that of the heddles N, and then the various modifications in the combinations of the twisters D. If the treadle L′ or L^2 is depressed, the front end of the corresponding lever, J′ or J^2, will be lowered and the rear end will be raised, and consequently all the cords H attached to the lever that is operated will be pulled upward, and as these cords pass around the twisters D the corresponding twisters will be revolved in the direction of the arrow *a′*, Figs. 6 and 7, the weights H′ being raised accordingly. When a twister has made one revolution in the direction of the arrow *a′* the spring E^2 snaps into the notch E′ again. When the treadle L′ or L^2 is released the weights H′ will pull the cords H downward again, and would rotate the twisters in the reverse direction to that indicated by the arrow *a′*; but as each twister is held by its spring E^2 such reverse movement of the spool is prevented, and the cords H, which are drawn downward by the weights H′, slide or slip over the surface of the twisters D, thereby lowering the rear end and raising the front end of the lever J′ and J^2 and raising the corresponding treadle, L′ or L^2. Every time one of the treadles L′ or L^2 is depressed the above operation is repeated. When the treadles L′ or L^2 are operated the threads T′ T^2 of the warps are not to be separated by the heddles. Every time a twister D is rotated the threads T′ T^2 will receive one twist, for the threads T′ T^2 pass through diametrically-opposite eyes G′ G^2 on the twisters D, and as the ends of the threads are held firmly (at the end of the completed part of the fabric) it is evident that a rotation of a twister D will cause twisting of the corresponding threads T′ T^2. These threads will, however, not become so tightly twisted in the rear of the twister—that is, between the twister and spool—but what the tension of the said threads will be sufficient to cause them to pass through the said twister in the operation of the loom.

In the case shown three and three twisters are combined; but, if desired, each twister may be operated independently. Two and two may be combined, or two and four, or three and two, or four and two, or one and five—that is, the twisters may be combined in any desired manner, so that a certain number of them will be revolved simultaneously, according to the pattern desired. As has been stated, the threads T′ T^2 rest against the edge of their corresponding pair of heddles, which draws them apart when desired. If the treadle L^3 is depressed, as shown in Fig. 2, the heddle-bars N′ are lowered and the bars N^2 are raised, and the threads T′ T^2 are separated. If the treadle L^3 is released, the weights R will pull the bars N^2 downward and the bars N′ will be raised, as the bars N′ and N^2 are connected by the cord P passing over the pulley Q. When the treadle L^3 is at rest the bar N^2 is in the position shown in Fig. 4 in relation to the apertured guide-plate O, the spring S′ pressing the hook T into the slot S; but when the treadle L^3 is depressed and the bar N^2 is raised the swelled part S^2 of the hook T strikes the edge of the aperture of the guide-frame O, and the hook T is pressed out of the slot S, catches

the thread T′ or T², and raises it. The hook T of the bar N′, which is lowered, is pressed outward by striking the edge of the aperture in the platform M, and catches the other thread and passes it down, as shown in Fig. 3. When the treadle L³ is released the bars N′ N² return to their original position, (by the action of the weight R,) the hooks T are pressed inward by their springs S′, and the threads T′ T² are released. The above operation of the heddles is repeated every time the treadle L³ is operated. The platform M and the frame O are at such a distance apart that the swelled part of the hook T of the bar N′ does not come in contact with the aperture in the platform M until the hook has passed the upper thread, T′, and the swelled part of the hook T of the bar N² does not come in contact with the aperture of the frame O until the hook has passed the lower thread, T², whereby the hooks are caused to engage with their proper threads of each pair of warps.

To make the netted fabric the operation is as follows: The twisters D having been combined according to the desired pattern, the operator first pushes back the reed U, then depresses and releases the treadle L′ or L², (according to the pattern desired,) whereby the corresponding threads, T′ T², are twisted; then the treadle L³ is depressed for the purpose of separating the threads T′ T²; then the shuttle is passed through between the separated threads T′ T², the reed N is released and drives the weft home, the reed is again pushed back, &c. The weft may consist of a single or multiple thread of one or more colors and of various materials.

In the specimen of netted fabric shown the first, third, and fifth pairs of warps are twisted at the same time, and the second, fourth, and sixth pairs are twisted next time. If this is the case, it is evident that the weft cannot cross the warp on a straight line, but must form a waving line, as it is held by alternate pairs of warps; or, in other words, if the weft is passed through the warp, and then the first, third, and fifth pairs of warps are twisted, the weft will be held by these warps, and the next time it will be held by the second, fourth, and sixth pairs of warps, &c.; but, as has been stated, the arrangement of the warps may be modified as may be desired. If a pair of warps are twisted two or more times before passing the weft through it, it is evident that the serpentine lines of the weft will be more distinct than if the warps are twisted once only.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the twister D, provided with the flanges D² D³ and the treadle L′, of the cord H, coiled around the said twister, the weight H′, the centrally-pivoted lever J′, and the cord K′, substantially as and for the purpose set forth.

2. The combination, with the twister D, provided with the notch E′, the standard E, and the treadle L′, of the spring E², the cord H, the weight H′, the centrally-pivoted lever J′, and the cord K′, substantially as and for the purpose set forth.

3. The combination, with the apertured platform and frame, of the vertically-reciprocating heddle-bars, hooks pivoted in said bars, and mechanism for operating said heddle-bars, substantially as and for the purpose set forth.

4. The combination, with the treadle L³, the cord Q′, the lever P′, the cord M′, and the pulley Q, of the reciprocating bars N′ N², the cord P, and the weight R, substantially as and for the purpose set forth.

5. The combination, with the apertured platform M, the apertured frame O, the treadle L³, the cord Q′, the lever P′, the cord M′, the cord P, and the pulley Q, of the reciprocating bars N′ N², the pivoted hooks T, the springs S′, and the weight R, substantially as and for the purpose set forth.

6. The combination, with the apertured platform M, the apertured frame O, and the operating mechanism, of the slotted reciprocating bars N′ N², the pivoted hooks T, provided with the swelling S², and the springs S′, substantially as and for the purpose set forth.

7. The combination, with the heddle-bars N′ N², of the cord P, the pulley Q, the guide-frames M O, the lever P′, the cord M′, the weight R, the connecting rod or cord Q′, and the treadle L³, substantially as herein shown and described, and for the purpose set forth.

8. The combination, with the reed U, of the heddle-bars N′ N², the cord P, the pulley Q, the cord M′, the lever P′, the cord Q′, the treadle L³, and the weights R, substantially as herein shown and described, and for the purpose set forth.

ALEXANDER MELZER.

Witnesses:
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GEO. D. WALKER.