(No Model.)

J. H. MERRILL.

SEWING MACHINE.

No. 273,754. Patented Mar. 13, 1883.

Fig. 8.

Fig. 9.

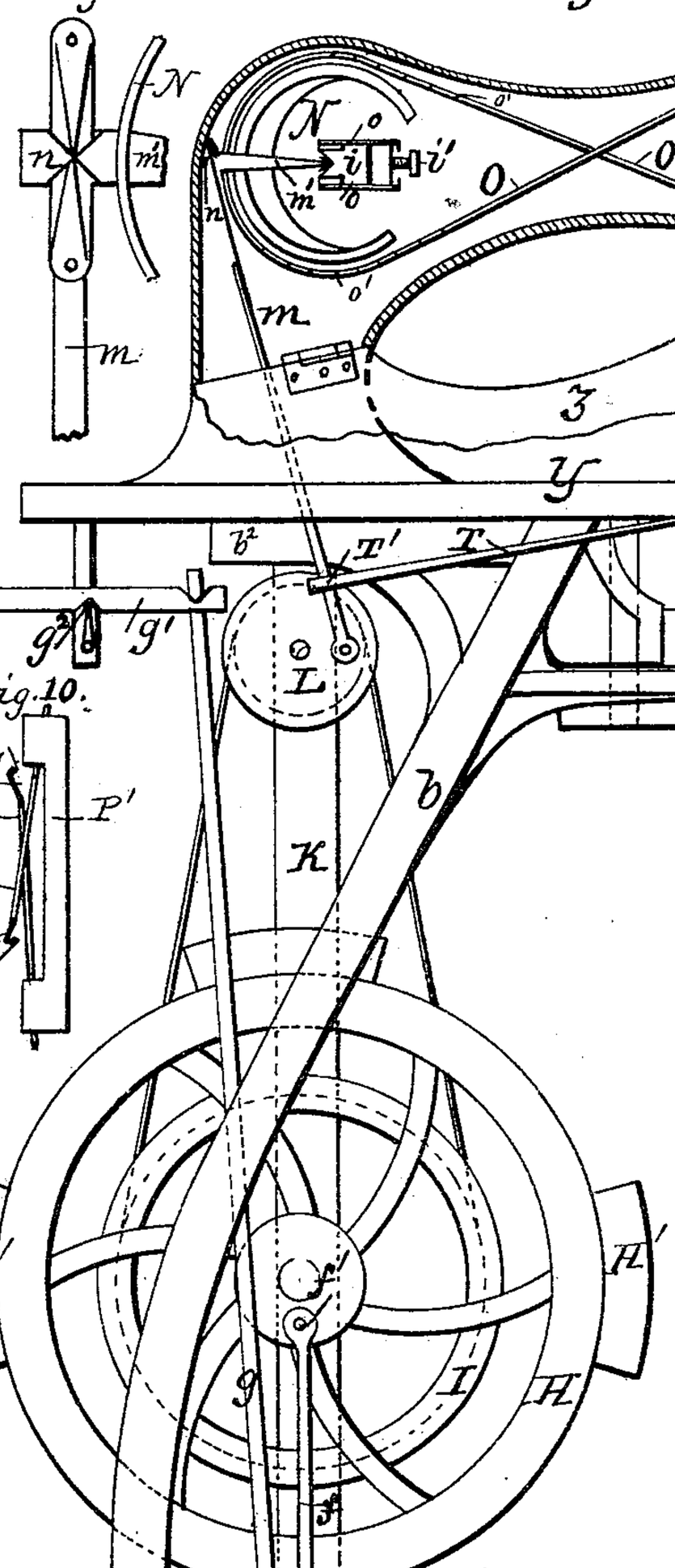

Fig. 1.

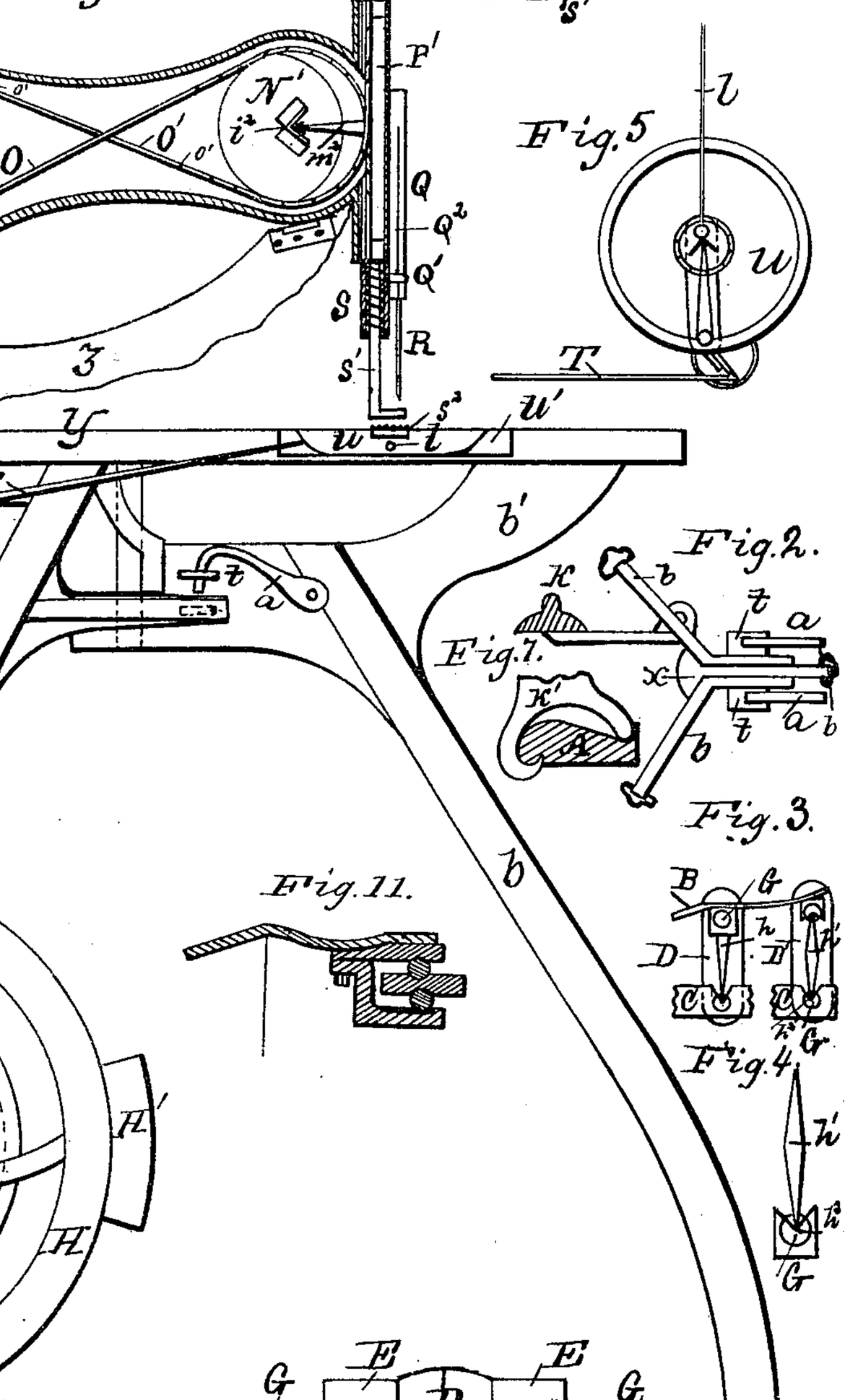

Fig. 6

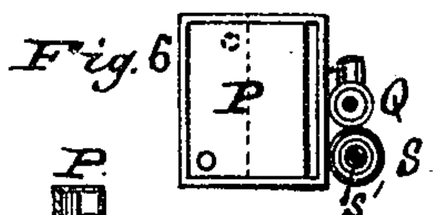

Fig. 5

Fig. 10.

Fig. 11.

Fig. 2.

Fig. 7.

Fig. 3.

Fig. 4.

Witnesses
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UNITED STATES PATENT OFFICE.

JOHN H. MERRILL, OF WASHINGTON, DISTRICT OF COLUMBIA.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 273,754, dated March 13, 1883.

Application filed July 15, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. MERRILL, of Washington, in the District of Columbia, have invented an Improved Sewing-Machine; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

The first feature of my invention consists in uniting the parts of the machine by a method of interlocking and bracing, as hereinafter specified, whereby screws, bolts, and other fastening pieces are dispensed with, and complete portability is attained in the most compact way. By this means, also, great rapidity, facility, and consequent economy of construction are secured, little skill and time being required in making and fitting the parts.

The second main feature of my invention consists in an improved method of mounting the working parts of the machine on anti-friction bearings, whereby much power is saved, the machine running very easy, and no oil, except for four journals, is used for lubrication, there being no friction-surfaces.

My invention also includes several special improvements additional or subsequent to the main features above specified.

In the accompanying drawings, Figure 1 represents a side elevation of my improved sewing-machine, the inclosing-case for the upper works of the machine being shown in vertical section; Figs. 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11, views in detail of various parts of the machine.

Like letters designate corresponding parts in all of the figures.

First, in the construction and connection of the frame-work of the machine, whereby I dispense with bolts, screws, and other pieces, and even with glue and other means of permanently uniting parts, so that both cheapness and convenience in putting together and taking apart again are secured, I make use of a lock-joint for connecting and rigidly bracing the parts together, as now to be described. Thus, beginning with the foundation, a base, A, of suitable form, is provided, and to this is locked the legs *b b*, (three or four in number,) substantially as shown in Fig. 1, by means of hook projections on the lower end taking under fixed pins or projections on the base, while on the opposite side of each leg is a bearing to rest on the base and hold the leg firm when brought into position, as represented. When all the legs are thus locked rigidly to the base they are locked together near the top by the means shown or the equivalent thereof. This means, as shown in Figs. 1 and 2, whereby two back legs are locked to a single front leg, consists of a flange, *x*, extending back from the front leg, to which projecting arms or flanges on the back legs are connected by eyes or staples *t t*, projecting through the flange *x*, and secured respectively by hasps *a a*. By simply disengaging these two hasps this supporting-frame is taken apart, and no other means of uniting the parts is necessary. The table Y is supported on these legs by means of tenons on the upper end of the legs entering holes or mortises in the under side of the table. The lower end of the standard K, on which the driving-wheel H is mounted, is fastened to the base A in a manner similar to the legs *b b*, though the hook and bearing have a somewhat different form, as shown in Fig. 7 and by dotted lines in Fig. 1. The upper end of this standard also is held in a hole or mortise in the under side of the table. The sewing-machine arm is made hollow to inclose the parts which operate the needle. A door, Z, letting down from one side, enables access to be got to the inside of this arm, as represented in Fig. 1.

Next, my anti-friction knife-edge or V-shaped bearings for the movable parts of the machine, to dispense with revolving journals, or shafts, cams, eccentrics, &c., commonly used, are constructed and applied substantially as follows: Beginning with the treadle, the treadle-lever C has its vibrating end resting on a V-shaped or knife-edge bearing, *e*, of the pitman *f*, which communicates the motion to the driving-wheel H. This bearing is of hardened steel, as are all of the similar bearings in the machine, whereby great durability is attained, and almost no friction is produced in the operation of the parts. The other end of the treadle-lever C rests on a vibrating V-shaped bearing, *e'*, the lower end of which has a similar form, resting in a V-shaped groove, like the counterpart of all these bearings in the machine. The treadle B is mounted on a similar principle, as shown in Figs. 1, 3, and 4. The treadle-bar B has two feet, B' B', terminating in V-shaped

bearings, which rest and rock in V-shaped notches B^2 B^2 of the base-support. The base and the treadle bar are respectively provided with parallel projecting pins G G, over which connecting-straps D D fit, and thereby hold the bearings in place, preventing all displacement, without essentially interfering with the free movement of the treadle. The back end of the treadle rests on another bar, which also is supported by two rocking bars or standards, *h' h'*, with V-shaped bearings at both ends, the lower bearings resting in corresponding grooves in the treadle-lever C, these bearings also being held in place by straps D D on pins G G. Thus the treadle is supported on four rocking bearings, so that it will without friction vibrate forward and backward as well as up and down, making the movement very easy and effectual. A movement up and down of an inch and a half given to the treadle-lever is sufficient to turn the driving-wheel H. The treadle is applied to work at right angles to the treadle-lever and at any distance from its ends, so that the power is regulated at pleasure. Upon the movable end of the treadle-lever C a connecting-rod, *g*, rests by a V-shaped bearing, while its upper end reaches up to and rests by another V-shaped bearing on the rear end of a hand-lever, *g'*, which is mounted on a V-shaped bearing, g^2, supported by the table, as shown in Fig. 1, whereby the treadle-lever and also the driving-wheel may be operated by hand.

A belt runs from a belt-wheel, I, on the driving-wheel H or its shaft to a crank-wheel, L, which operates a pitman, *m*, whereby motion is communicated to the needle-bar. The same principle of the anti-friction V-shaped bearings is applied in this movement as follows: In the needle-arm are mounted two rocking segments, N N, one near the rear end of the arm and the other close to the needle-bar carrier P. Each forms part of a circle in outline, and from their general shape they may be called "crescents." Each is mounted by means of a radial V-shaped bearing, $m' m^2$, and rocks in a fixed V-shaped groove, i i^2. A cross-band, O, goes round these two crescents, the horns of which are turned toward each other, and holds them in place. One of the grooved bearings, *i*, is adjustable by a set-screw, *i'*, in ways *o o* to keep the band taut. By the vibration of the rear crescent, N, the band O being affixed to it at one point, the other crescent, N', is vibrated on its bearing, and with it the needle-bar carrier P, to the upper and lower ends of which, respectively, the two ends of the band are secured after passing around the periphery of the said crescent, as shown in Figs. 4 and 10, the said carrier moving straight up and down in proper guides. The pitman *m*, which communicates the vibratory motion to the back crescent, N, is connected therewith by a flexible end, *n*, which has two V-shaped bearings resting in opposite corresponding grooves in a projection on the crescent, as shown most clearly in Fig. 9. Motion is also communicated forward laterally from the pitman *m* through a connecting-rod, T, connected with the said pitman at T', Fig. 1, to a vibratory wheel or disk, *u*, Figs. 1 and 6, for vibrating the shuttle *u'* and moving the feed-bar S^2. The construction and operation of the shuttle and feed-bar are not here described, as they form no part of my invention. The connecting-rod T is connected with the wheel or disk *u* by V-shaped bearings in substantially the same way as the pitman *m* is connected with its crescent H. And thus the principle of the anti-friction bearings is applied through the movements of the machine to all the vibratory or oscillating parts thereof.

The band O may be a simple band of suitable material, preferably of thin steel; but I make an improved band or flat chain for the purpose of improved construction, as shown in Fig. 8, by which the same anti-friction is applied to this part of the operative machine. It is made up of zigzag hook-links, the hooks forming sharp V-shaped edges and grooves *o' o'*, as shown, whereby friction is avoided and perfect flexibility is obtained.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the hook projections on one part, the cross-pins or eye-bars on the adjacent part, and the contiguous bearing-surfaces on both parts, to form a lock-joint for connecting the said parts, substantially as and for the purpose herein specified.

2. The operative vibratory parts of the machine, mounted on and connected by V-shaped bearings, substantially as and for the purpose herein specified.

3. The treadle provided with four legs or supports terminating in V-shaped feet or edges, which rock in suitable bearings, in combination with the treadle-lever, substantially as and for the purpose herein specified.

4. The vibratory circle-segments H H and connecting-band O, in combination with the driving-pitman *m* and needle-bar carrier P, for communicating a reciprocating movement from the pitman to the said carrier, substantially as and for the purpose herein specified.

5. The band O, made of zigzag links, substantially as and for the purpose herein specified.

6. The combination of the rod T with the pitman *m*, to which it is pivoted, for the purpose of producing a reciprocating movement of the shuttle and feed mechanisms by the lateral motion of the said pitman, substantially as herein specified.

7. The connecting-rod *g* and hand-lever *g'*, in combination with the treadle-lever C, substantially as and for the purpose herein specified.

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Witnesses:
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