

EBEN W. KEYES & CHARLES K. BRADFORD.

Improvement in Treadle Motions.

No. 120,200.

Patented Oct. 24, 1871.

Fig. 1.

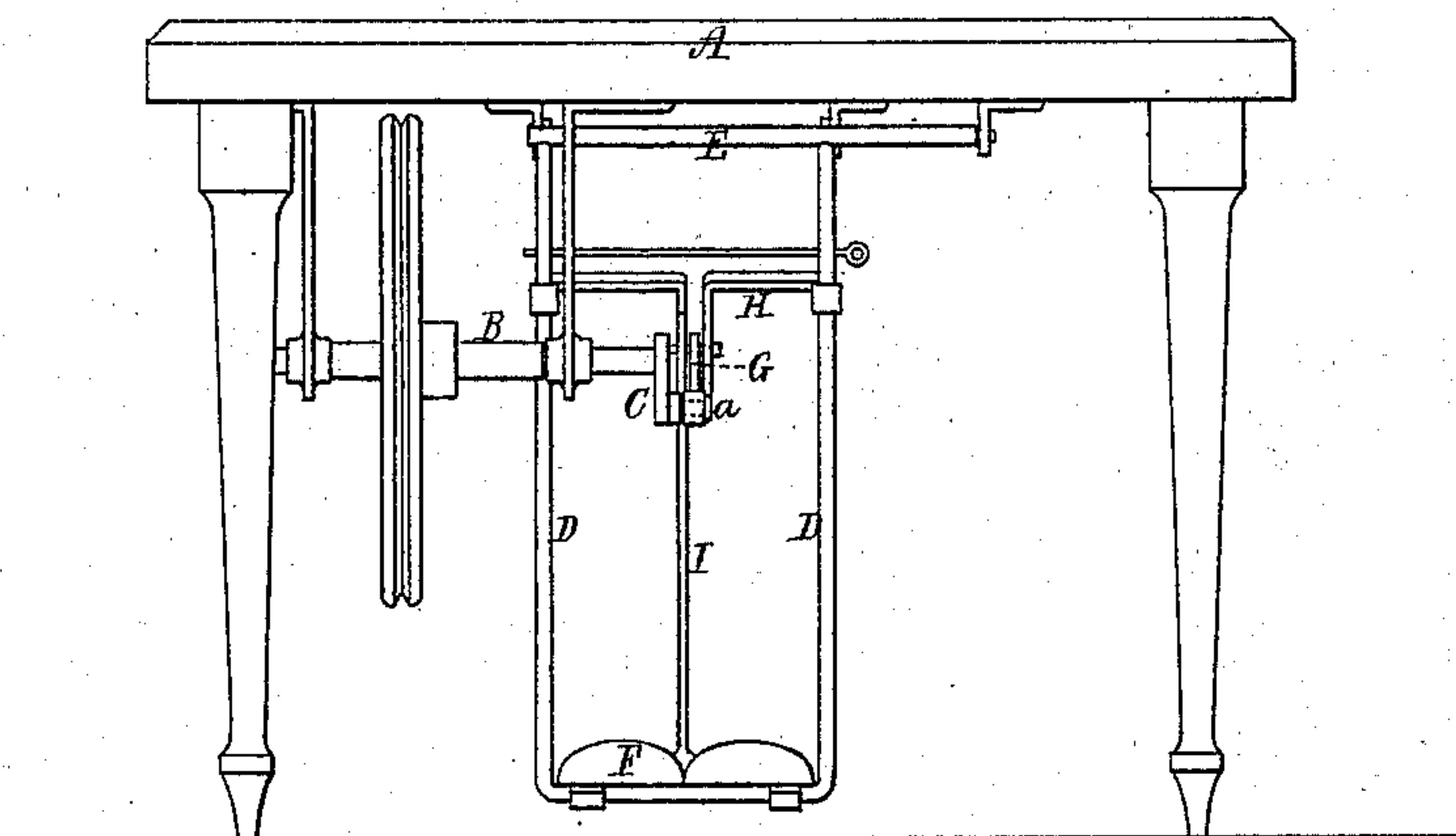


Fig. 2.

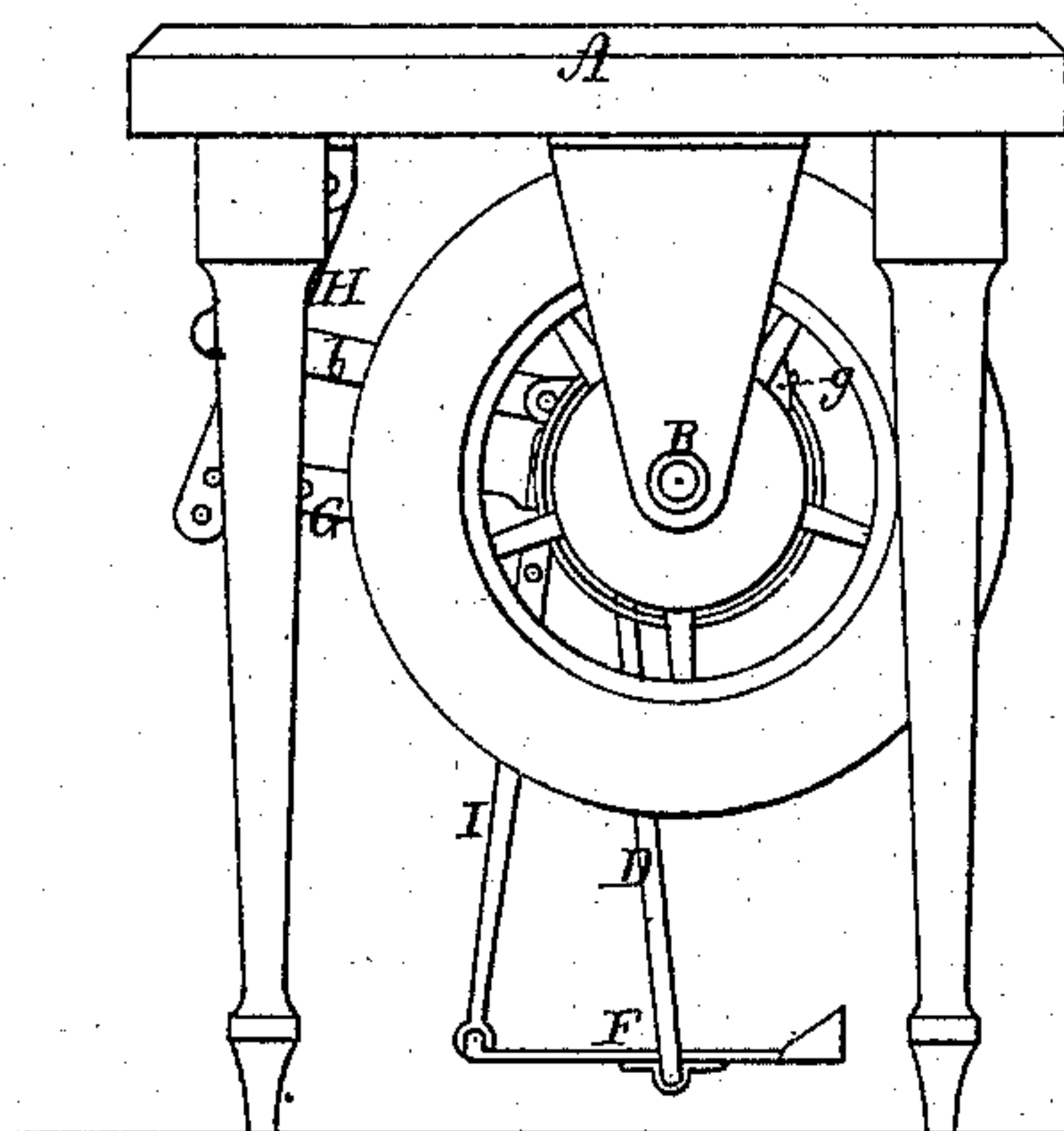
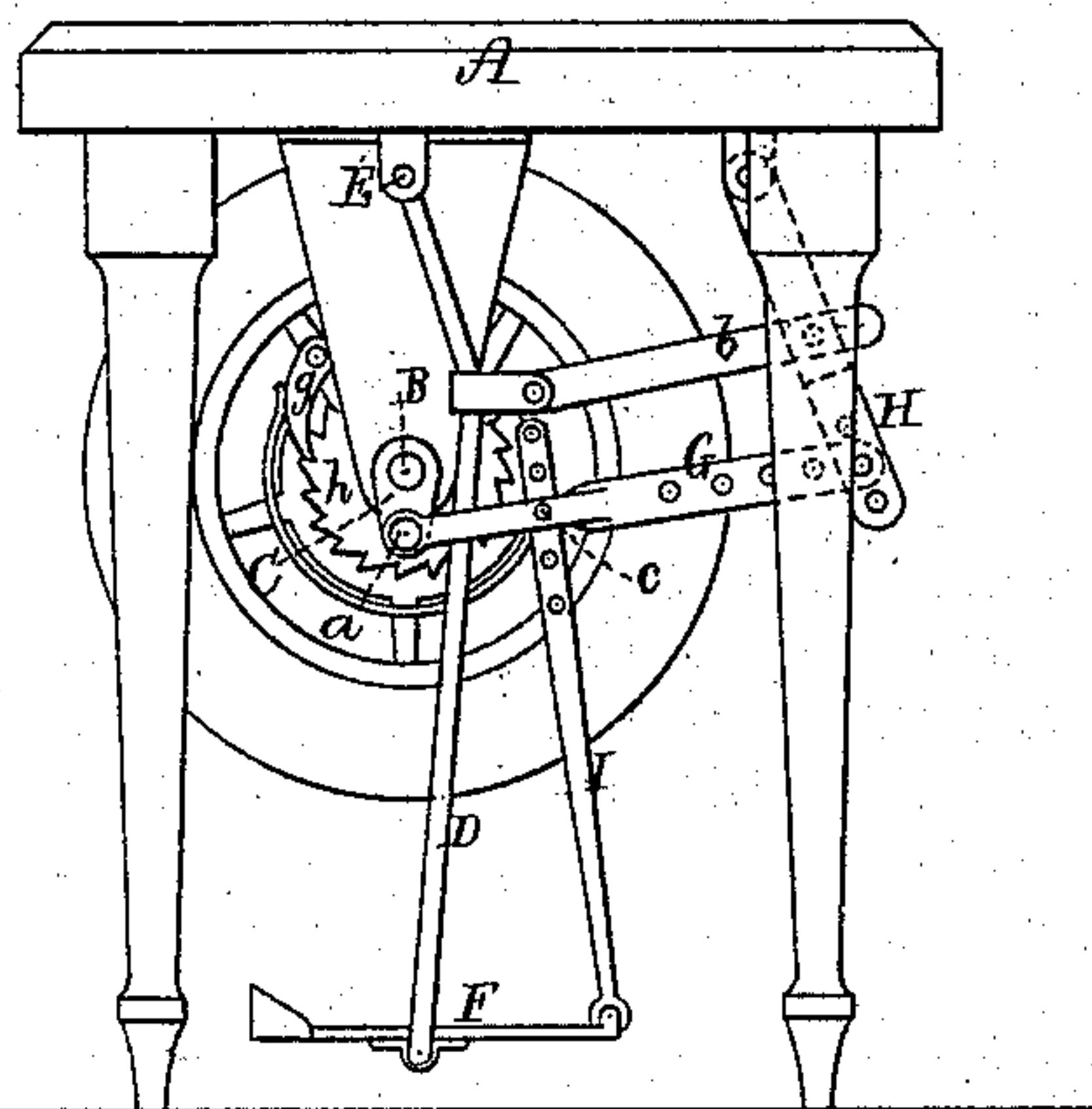


Fig. 3.



Witnesses.

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by their Attorney,
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UNITED STATES PATENT OFFICE.

EBEN W. KEYES, OF CHARLESTOWN, AND CHARLES K. BRADFORD, OF BOSTON,
MASSACHUSETTS.

IMPROVEMENT IN TREADLE-MOTIONS.

Specification forming part of Letters Patent No. 120,200, dated October 24, 1871.

To all whom it may concern:

Be it known that we, EBEN W. KEYES, of Charlestown, in the county of Middlesex, and CHARLES K. BRADFORD, of Boston, county of Suffolk and State of Massachusetts, have made an invention of certain new and useful Improvements in Treadle-Motions; and do hereby declare the following to be a full, clear, and exact description thereof, due reference being had to the accompanying drawing making part of this specification, and in which—

Figure 1 is a side elevation. Figs. 2 and 3 are end elevations of a sewing-machine table containing our improvements.

These improvements are based upon a treadle-motion shown in Letters Patent of the United States No. 112,720, and issued to one of us, EBEN W. KEYES, on the 14th day of March, 1871. The main features in this patent treadle is a vibratory frame which drives the crank, to the lower end of which frame the foot-rest is rigidly attached, and it has been found in practice that this induces an unnatural and cramped position of the feet and limbs of the operator, which soon incapacitates them for further work. We have in this invention retained the principle of driving the crank mainly by a vibratory bar or frame; but we have pivoted the foot-rest to this bar or frame, and have so combined with the two a duplicate arrangement of connecting-rods and a swinging pivot as to obtain a compound motion—that is to say, a vibratory motion of the main driving-bar or frame, whereby (as in the KEYES patent above named) we obtain a great leverage over the crank and a greater range of movement of the operator's limbs, as well as an oscillating motion of the foot-rest or pedal, such as will accommodate it to the position which the feet of the operator would naturally assume in the swinging motion which follows the vibration of the main frame. Our present invention further presents the advantage of avoiding the dead-point of the crank, and thus equalizing the power usually lost at such a period in the rotations of the crank, as in this invention the vibratory frame and the foot-rest each exert a power upon the crank at different points in its revolutions, yet so move or swing in unison as to obtain a free, easy, and uniformly-pleasing motion. As a secondary feature in these improvements we have combined with the balance-

wheel and driving-shaft a ratchet-wheel and pawl under such an arrangement that should the proper vibrations of the treadle be reversed and an attempt made to drive the machine in the wrong direction, the pawl will slip over the ratchet without rotating the shaft; while driven in the right direction the pawl takes into the ratchet and rotates the wheel.

The drawing accompanying this specification represents at A a sewing-machine table, to the under side of which and somewhat to the left of its center a driving-shaft, B, is mounted in suitable hangers depending from the table, a crank, C, being affixed to the inner extremity of the shaft in the ordinary manner. In carrying our invention into effect we employ an upright frame or lever, D, which is suspended from a rocker-shaft, E, applied to the under side of the table, or otherwise so suspend the frame that it vibrates freely upon its point of suspension. To the lower arm or bend of the frame or lever D we pivot at its center a horizontal oscillating foot-rest or pedal, F, after the method now universally adopted in various sewing-machines. To the wrist *a* of the crank C we pivot one end of a horizontal connecting-rod, G, the remote end of such rod being in turn pivoted to the lower part of a second but much shorter vibratory arm or frame, H, suspended from the under side of the table in like manner as the frame D before named, the two frames or levers D and H being united by horizontal connecting-rods *b b* attached to them in such manner as to cause them to vibrate in unison. To the rear edge of the foot rest F we pivot the lower extremity of an upright pitman, I, the upper edge of which is in turn pivoted to the horizontal connecting-rod G before named; this pivot, which is shown at *c* in the drawing, being situated near to the wrist of the crank C, and being changeable with respect to the connecting-rod in order that the power of the pitman upon the crank may be varied should occasion require; the pivot of the connecting-rod being also adjustable for a like reason. The vibrations of the frame D through the agency of the connecting-rod G and intermediate connections exert a direct force upon the crank C to drive the shaft and balance-wheel, while the foot-rest through the agency of its pitman I, acting upon the connecting-rod C, exerts a minor power upon the crank at such time as it is pass-

ing what would be a dead-point to the primary frame, this frame in turn exerting a direct power upon the crank at the dead-point of the foot-rest. By this means we avoid the loss resulting from the dead-point in ordinary crank-motions, and by a uniform distribution of the driving element throughout the circle of revolution of the crank obtain a uniform and equable motion, while at the same time the oscillations of the foot-rest and the vibrations of the frame D so nearly correspond to the movements of the feet and limbs of the operator that, taken in connection with great power obtained over the crank by the long leverage of the said frame D, comparatively little fatigue results to said operator. The balance-wheel is mounted loosely upon the driving-shaft, the connection between the two being a spring-pawl, *g*, pivoted to the wheel and taking into the teeth of a ratchet-wheel, *h*, affixed to or making part of the hub of the wheel, the pawl and ratchet being so arranged with respect to the shaft, wheel, and sewing-machine that upon an attempt to reverse the proper motion of the machine the pawl slips over the ratchet and the wheel remains stationary, the

sound caused by the slip of the pawl over the ratchet-teeth giving instant notice to the operator that he is turning the treadle in the wrong direction.

The treadle and shaft being driven in the right direction, the ratchet engages with the pawl and drives it and the wheel and sewing-machine.

We claim—

1. In combination, the vibratory lever or frame D, suspended substantially as explained, the treadle F pivoted to this frame; and finally the two rods or pitmen I and G, and the swinging pivot or frame H, the whole being combined and operating in respect to each other and the crank and driving-shaft as to produce results herein stated.

2. In combination with a compound driving-motion, such as is herein explained, the pawl *g* and ratchet *h*, for purposes stated.

EBEN W. KEYES.

CHAS. K. BRADFORD.

Witnesses:

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