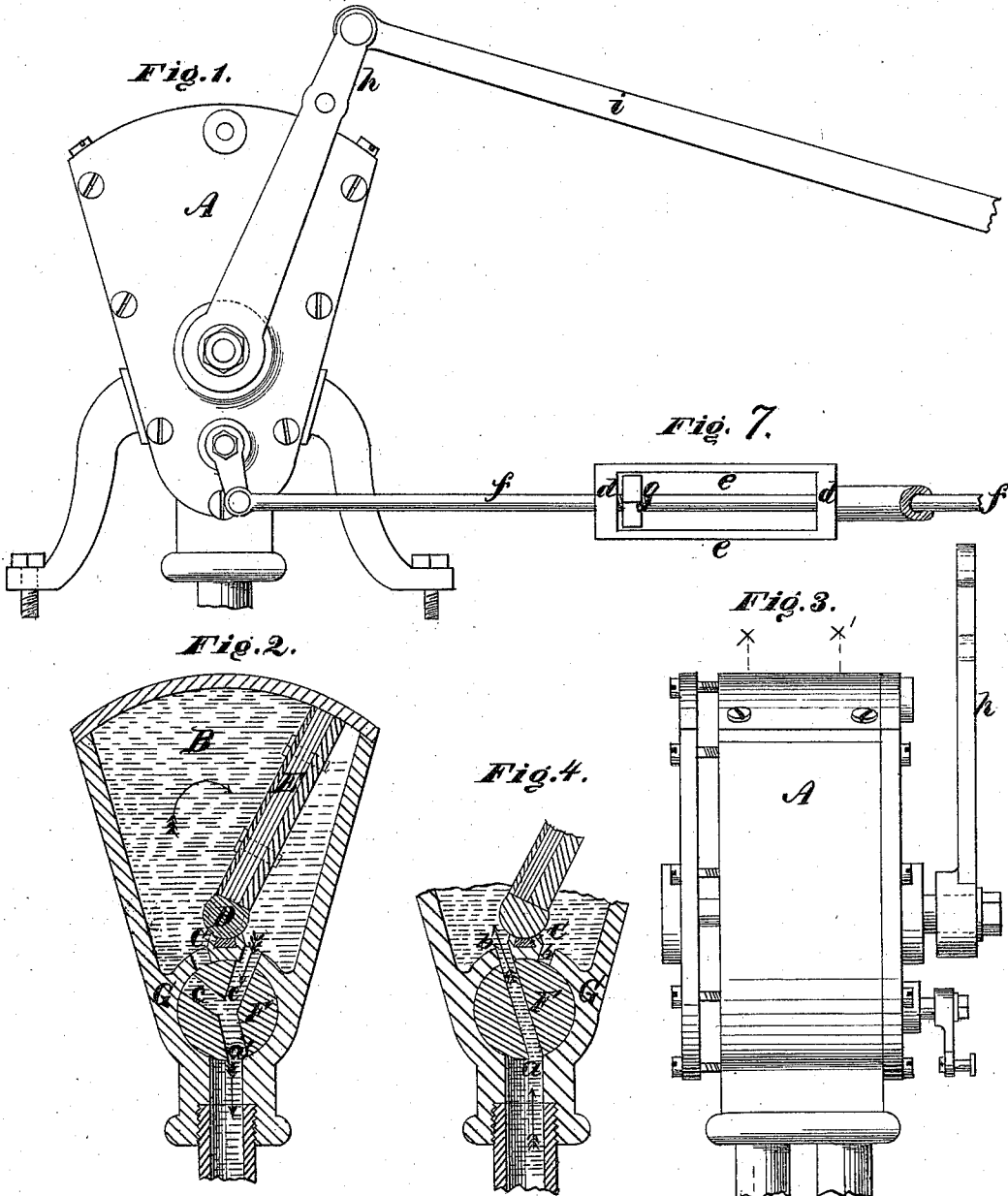


R. H. ATWELL.

Motors for Driving Sewing-Machines.

No. 142,551.

Patented September 9, 1873.



Witnesses.

C. W. Wild.

L. B. McKew.

Inventor.

R. H. Atwell

2 Sheets--Sheet 2.

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Fig. 5

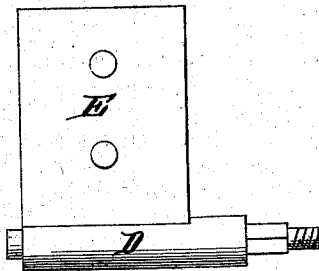
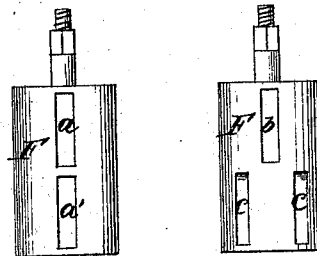


Fig. 6



Witnesses.

F. W. Wild
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Inventor.

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UNITED STATES PATENT OFFICE.

RICHARD H. ATWELL, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN MOTORS FOR DRIVING SEWING-MACHINES.

Specification forming part of Letters Patent No. **142,551**, dated September 9, 1873; application filed June 14, 1871.

To all whom it may concern:

Be it known that I, RICHARD H. ATWELL, of the city of Baltimore, of the State of Maryland, have invented a new and useful Improvement in Motors for Driving Sewing-Machines and for other purposes; and do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which are made a part of this specification.

This motor consists, essentially, of a box or piston-chamber containing an oscillating piston, which imparts its motion to the central shaft, whereby, by means of a lever, the said shaft, through a connecting-rod or other means, actuates a fly-wheel or its equivalent, which, at the completion of each stroke of the piston, reverses an oscillating valve, so as to cause a fluid under pressure—gas, water, or steam—to alternately enter and discharge from the piston-chamber at the opposite sides of the piston, the arrangement being one producing continuous motion.

Figure 1 is a front elevation of my improved motor, showing the outline of one form of it, with a rod and apparatus, Fig. 7, for working the valve in cases hereinafter stated. Fig. 2 is a section showing the interior of the instrument on the line X X in Fig. 3, which is the discharging end of the valve system. Fig. 3 is a side elevation of my motor, the legs or supports being removed, showing the relative position of the exterior parts, including both supply and discharge pipes. Fig. 4 is a vertical section on the line X' X', Fig. 3, showing the supply end of the valve system. Fig. 5 is the oscillating piston E and its shaft D. Fig. 6 is the valve, (in two figures,) showing the opening for the supply in one end and the opening for the discharge in the opposite end thereof, and also a position which may be given to these openings at their point of connection with the piston-chamber after having passed through the diameter of the valve, and one of said openings having been divided into two in order to reach opposite sides of the piston properly. Fig. 7 exhibits a mode of taking up or neutralizing the excess of the motion of the fly-wheel crank over the motion required to work the valve from the said crank.

Similar letters of reference indicate corre-

sponding parts in the several figures, and arrows show the direction of the currents.

A, Fig. 1, is a box, a segment of a cylinder in form, whose interior forms the piston-chamber B, Fig. 2. C, Fig. 2, is a groove or other bed for packing between the opposite sides of the piston E under and about the central piston-shaft D. F, Fig. 2, is a cylindrical valve oscillating within a valve-box, G. The valve F, Figs. 2 and 4, has two openings, *a*, Fig. 4, showing the point of supply, and *a'*, Fig. 2, showing the discharge. These two openings are never closed by the action of the valve. One or both of these openings *a* and *a'* are, as the case may require, divided in passing through the diameter of the valve into two or more, so that, at the completion of any movement of the valve, a supply-opening shall be presented into the piston-chamber B, Fig. 2, on one side of the piston E, and simultaneously a discharge-opening shall be present on the opposite side thereof, this movement meantime closing all other openings except to and from the instrument. *b b*, Fig. 4, show the supply-openings through the valve-box and through the valve into the piston-chamber B, and *c c*, Fig. 2, show the discharge-openings.

It is obvious that if the openings of the valve-box into the piston chamber, and those of the valve into the same, were reversed in position, the effect would be the same. As this valve oscillates, when its movement is completed a supply-opening is made on one side of the piston and a discharge-opening made on the opposite side of it. The exterior projecting stem of the valve is furnished with a crank or trigger, or other equivalent device, to operate the valve and reverse the current.

A compound valve-rod passes from the crank-pin of the fly-wheel, or its equivalent, to the valve-trigger, the said rod, (see Fig. 7,) having somewhere in its length the means to take up or neutralize the excess of motion of the crank of the fly-wheel greater than can be used to operate the valve. *d d*, Fig. 7, are two circular collars firmly secured, one at each end of two or more bars, *e e*. Through one of these collars is a hole for the rod *f*, Fig. 7, to pass freely through. To the other collar is firmly secured, in a similar hole, a tube, in the bore of which the rod *f* also passes freely, and suf-

ficiently far to serve as a guide for both rod and tube. The completion of the free end of the tube is borne in a proper manner by the crank-pin of the fly-wheel, or the ends of the compound valve-rod may be reversed. Between the bars *e e*, Fig. 7, and the collars *d d*, Fig. 7, is firmly secured, upon the rod *f*, a nut or hub, *g*, on either side of which I place a thin rubber gasket as a cushion. When in operation this hub must move the net excess of distance to be taken up or neutralized, and make alternate contact with each collar, and thus move the valve-trigger the proper distance. *h*, in Fig. 1, is the working-lever, firmly secured to the piston-shaft, and *i* is a portion of the connecting-rod passing to and working the fly-wheel. The angle at which this connecting-rod *i* and the valve-rod, Fig. 7, move when operating secures to the valve a completed movement instantly after the fly-wheel has

passed its "dead-centers," thus yielding to the piston the most effective force possible, and preventing every backward movement of the engine-piston. By reversal of the valve-trigger on its fastening only can an opposite direction be given to the fly-wheel in revolving, as shown in Fig. 1.

Having thus described my invention, I have to say that I do not claim the piston, piston-chamber, and valve and valve-box, as I already have a patent on them, dated March 24, 1868.

I claim—

A combination of piston-chamber, piston, valve, valve-box, piston-shaft, lever, connecting-rod, and valve-gear, to produce a motor, substantially as and for the purpose specified.

R. H. ATWELL.

Witnesses:

FRED. W. WILD,
L. M. MCKNEW.