Wilkins & Sangster,

Motor.

No. 99992. Patented Feb. 15. 1870.

Fig 1

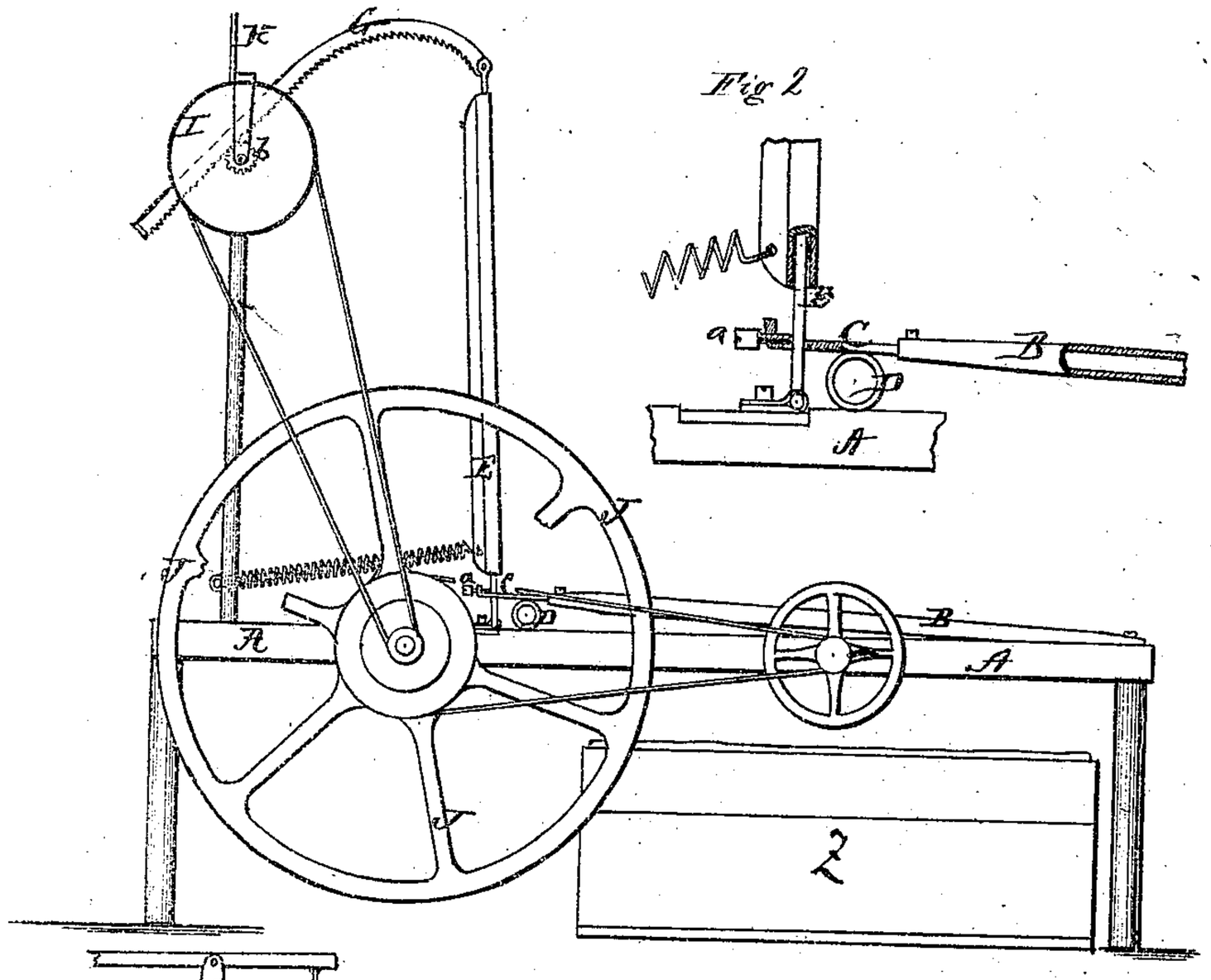


Fig 2

Fig 3.

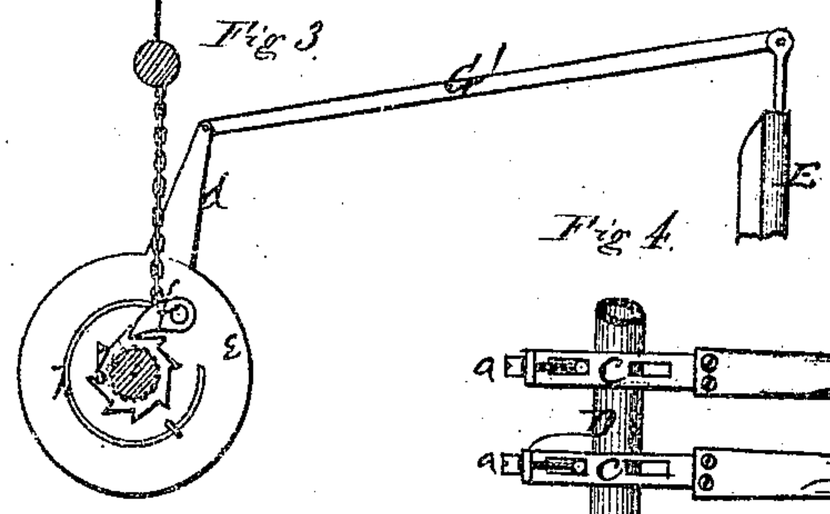
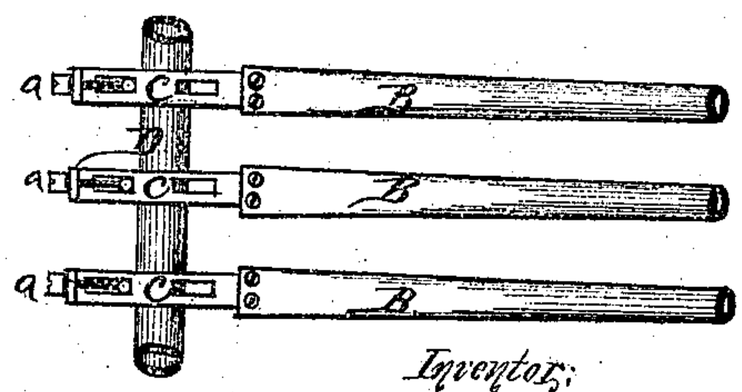


Fig 4.



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HORATIO WILKINS AND WILLIAM H. SANGSTER, OF PARIS, KENTUCKY.

Letters Patent No. 99,992, *dated February* 15, 1870.

IMPROVEMENT IN MOTIVE-POWER APPARATUS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, HORATIO WILKINS and WILLIAM H. SANGSTER, of Paris, in the county of Bourbon, and in the State of Kentucky, have invented certain new and useful Improvements in Motive-Power; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon making a part of this specification.

The nature of our invention consists in a new and improved motive-power, operated and controlled exclusively by the contraction and expansion of metals.

In order to enable others skilled in the art to which our invention appertains to make and use the same, we will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a side elevation of our machine;

Figure 2 is an enlarged section of the machine;

Figure 3 is a side view of a modification of a portion of the machine; and

Figure 4 is a plan view of a portion of the machine.

A represents the bed or frame of the machine, having a series of horizontal pipes or rods, B B, placed upon it, said pipes or rods being made of metal that is capable of ready expansion and contraction.

The pipes B B are at one end firmly secured to the frame A, while at the other end each one has a slotted bar, C, secured to it, the bars C C resting upon a bar or tube, D.

Through the slots in the bars C C pass upright levers E E, which are hinged or pivoted at their lower ends to the frame A, and adjusted in the slotted bars C C by means of set-screws *a a*.

At the upper ends of the levers E E are pivoted curved levers G G, which are toothed on the under side and are passed through a guide-plate, H.

Each one of the toothed levers G G passes through a separate vertical slot in the guide-plate H and rests upon a pinion, *b*, all of said pinions being mounted upon a common shaft, at one end of which is a pulley, I, connected by a belt with a pulley on the same shaft as the fly-wheel J, and this latter shaft is, by another pulley and belt, connected with the machinery to be operated upon.

It will now be seen that if heat is applied to either one of the tubes or pipes B it will expand, causing the lever E to lean forward and bringing the toothed lever G further down; then, as the heat is removed from said tube, it contracts, drawing the levers E and G backward again; but during the motion the teeth of the lever G catch on the pinion *b*, turning the shaft on which the pinion is placed. This expansion and contraction being carried on alternately throughout all the tubes B B, it will readily be seen that we produce a continuous rotary motion of any desired force and speed.

Instead of using the toothed lever G, we may employ a straight arm, G′, as shown in fig. 3, connecting the upper end of the lever E with an arm, *d*, projecting from a collar, *e*, placed loosely upon the main shaft, and this collar provided with a pawl, *f*, and spring *h* to gear with the pinion *b* upon the shaft to turn the same. By this means we apply the expansion and contraction of any kind of metal as a power to propel machinery, whether the expanding and contracting metal be made solid or in hollow tubes.

There are also various ways of expanding the power rods or tubes B B; for instance, such as using them as flues, dampening or shutting off the draft from each flue, as required to produce proper motion. Also, various ways of contracting the tubes, such as a blower or pump to compress air into a chamber, thereby being able to blow with great power into the tubes if required, either constant or at intervals, using flexible tubing attached to a reverse action moved by our motion; or the expansion and contraction may be produced by a movable furnace, Z, placed under the tubes or rods B B.

The natural contraction secures an even, powerful motion, and when driving the heaviest kind of machinery if all the strain upon it is thrown off at once it still keeps up the same steady motion, unlike steam-power, which would be impeded to such an extent as to tear the machine to pieces.

To stop the machine we have a lever so arranged as to disconnect every ratchet from the driving-shaft, as shown in fig. 3, the expansion and contraction continuing without turning a wheel. The machine may be reversed by the same or other suitable means.

Having thus fully described our invention,

What we claim as new, and desire to secure by Letters Patent, is—

1. The employment of a series of metal tubes or rods with a suitable heating apparatus beneath them, whereby contraction and expansion of said tubes or rods is had, which causes the operation of suitable mechanism for a motive-power, substantially as set forth.

2. The tubes or rods B B with slotted plates C C, levers E E, and set-screws *a a*, all substantially as and for the purposes herein set forth.

3. The combination of the tubes or rods B B, levers E E, toothed levers G G, or their equivalents, and pinions *b b*, all of which are on one shaft, substantially as and for the purposes herein set forth.

In testimony that we claim the foregoing, we have hereunto set our hands this 31st day of January, 1870.

H. WILKINS.

WILLIAM H. SANGSTER.

Witnesses:

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