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C. S. DEAN.

CLEANER OR SCRAPER FOR BOILER TUBES OR FLUES.

(Application filed May 5, 1899.)

(No Model.)

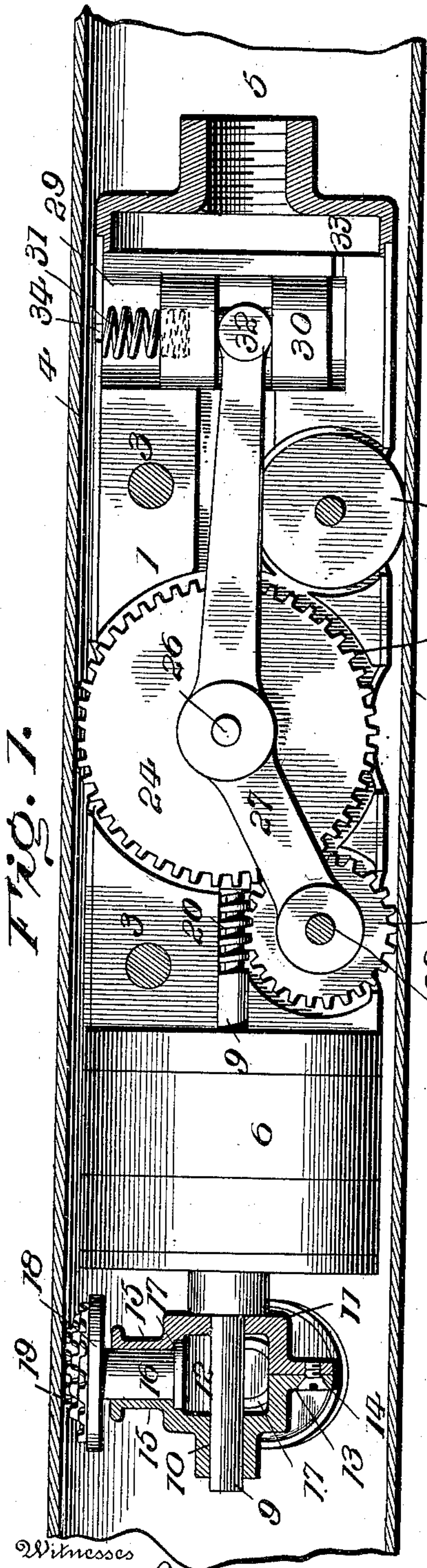
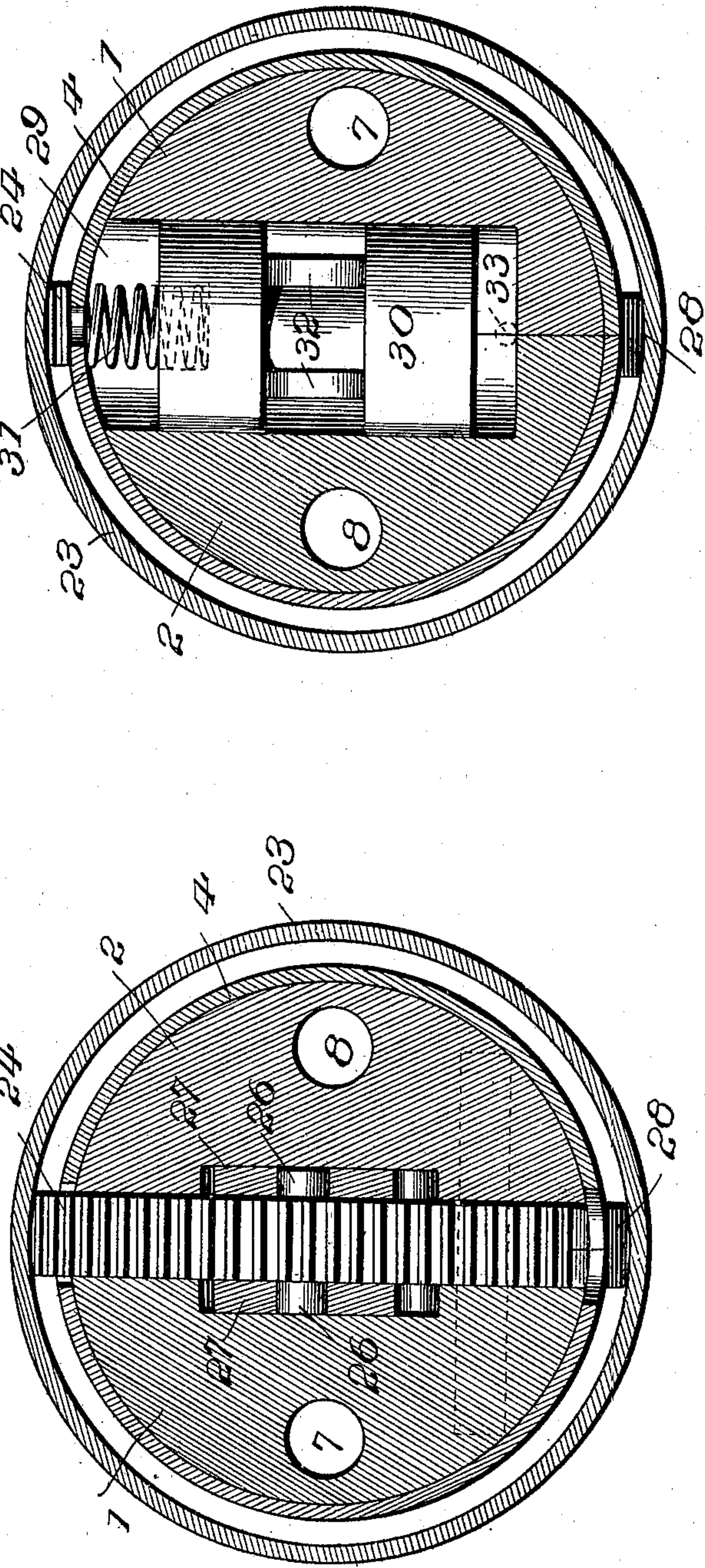


Fig. 7



Witnesses

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CLEANER OR SCRAPER FOR BOILER TUBES OR FLUES.

SPECIFICATION forming part of Letters Patent No. 647,131, dated April 10, 1900.

Application filed May 5, 1899. Serial No. 715,735. (No model.)

To all whom it may concern:

Be it known that I, CYRUS S. DEAN, a subject of the Queen of Great Britain, residing at Fort Erie, county of Welland, Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Cleaners or Scrapers for Boiler Tubes or Flues; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to steam or air propelled cleaners or scrapers for use in boiler tubes or flues.

One object of the present invention is to provide improved mechanism adapted to automatically propel or advance the cleaner or scraper along the tube or flue at a suitable speed while operating therein, thus obviating the necessity of advancing the scraper by hand, as generally done at the present time. Stated more particularly, it is my object to provide propelling means operated by the steam or air motor or engine employed to rotate the scraper, which will be thrown into operative engagement with the tube or flue by the steam or air pressure when the same is supplied to the motor, so that whenever the latter is working its motion will be utilized to steadily advance the device in an automatic manner; but when the steam or air pressure is cut off the propelling mechanism will be retracted from operative engagement with the tube or flue and the rapid and easy shifting of the device from one part of the tube to another part can be had.

Another object of my invention is to provide a novel form of scraper or cleaner which will operate in an automatic manner, so as to act on the tube or flue when in rotation and to be retracted from engagement therewith when not in motion, thus facilitating its shifting by hand to the part of the tube or flue where it is to be used.

Having the foregoing objects and others in view, my invention consists of certain improved mechanisms, devices, and combinations and adaptations of parts, fully set forth in the following description and recited in the appended claims.

In the accompanying drawings, Figure 1 is a view of the machine in a boiler-tube, one-half of the casing or body being removed and certain parts being shown in section; Fig. 2, a cross-section taken at the large propelling-wheel, the latter and the idler being shown in full lines; and Fig. 3, a cross-section taken at the piston, with the latter and certain other parts shown in full lines.

The body of the device is formed in the halves 1 and 2, which are united by cross-bolts 3 and are located within a cylindrical shell 4, having a coupling 5 for connection to the steam or air pipe or hose used in operating the device. At the other end of the shell and body is a suitable steam or air motor 6 of a size to permit its entry into the tube or flue. Ports 7 and 8, running through the respective halves of the body in a longitudinal direction, carry the steam or air from the coupling 5 to the motor. This motor has a shaft 9, which carries the scraper on its outer end. The body of the scraper consists of duplicate halves 10 and 11, hollow at their center 12 and suitably secured to the shaft. They have flanges 13, fastened together by screws 14 at different points. The sections 10 and 11 have a plurality of semicylindrical bosses 15, which together form tubular guides for the cylindrical stems 16 of the scrapers. On the inner ends of these stems are heads 17, which limit the outward throw of said scrapers and are free to move inwardly into the space 12. The heads 18 on the outer ends of the stems have rounded faces provided with successive tiers of teeth or projections 19 and are preferably of chilled metal, for obvious reasons. The slidable mounting of the stems allows them to move freely inwardly when not in use, so that they offer no impediment to the shifting of the device by hand in the tube or flue or when introducing it therein. When the engine is in operation, the rapid rotation of its shaft causes the scrapers to be thrown outwardly by centrifugal force and maintained in active contact with the tube or flue being scraped or cleaned. The more rapid the rotation of the shaft, the stronger will be the active contact of the scrapers up to certain limits. The scrapers being free to rotate on their own axes, the different parts

of the scraper-heads are kept constantly in use as the machine advances and a most perfect cleaning of the tube is obtained.

The inner end of shaft 9 is received in an opening between the parts 1 and 2 and provided with a worm 20. A gear 21, journaled on a pin 22, meshes with the worm, being located in a space provided in the halves of the body and having a portion of its periphery projecting, so as to be adapted to bear against the interior of the tube or flue, as shown at 23. A larger gear 24, meshing with gear 21, lies in an enlarged space 25 in the halves of the body and is provided with stub-shafts 26, which are journaled in duplicate levers 27, adapted for movement in suitable chambers in the sections 1 and 2 and having one end pivoted on the shaft or pin 22. The gear 24 is thus made free for movement in space 25, so that the projecting portion of its periphery can be held against the tube or flue or withdrawn from contact therewith. A suitably-journaled idler 28 is located on the opposite side of gear 24 from gear 21. This idler prevents the end of the machine at which it is located from being tilted or forced down when the gear 24 is urged against the boiler-tube and keeps the machine in proper position to insure the parallelism of its sides with the interior surface of the tube or flue.

The halves of the body are provided with semicylindrical chambers which together form the steam or air cylinder 29. A double-headed piston 30 is located in this cylinder and is normally held near the inner end thereof by a coil-spring 31, interposed between it and the shell 4. The rounded ends 32 of the levers 27 are received between the piston-heads on opposite sides of the stem connecting them. A steam or air supply port is provided at 33 and an exhaust-port at 34, the pistons being loose enough in the cylinder to allow sufficient steam or air to leak past to the exhaust to insure the maintenance of only the proper pressure on the pistons.

When the steam or air is being supplied to the motor, a sufficient pressure is had on the piston 30 to hold the propelling-gear 24 tightly against the boiler-tube and by reactionary pressure to hold gear 21 and idler 28 against the tube also. Consequently as long as the engine operates the propelling-gears will urge the machine along the tube or flue in an automatic manner; but as soon as the steam or air is cut off the spring 31 presses back the piston, and gear 24 is drawn out of operative contact with the tube, so that the machine can be introduced in the tube, or slid along therein, or removed, as desired, without any difficulty.

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

1. Means for operating in boiler tubes or flues, comprising a self-contained motor adapted for entry and movement in the tube or flue, and a propeller or feeder carried by

the motor and positively connected to and operated by the movable mechanism thereof, said feeder engaging with the tube or flue surface and automatically propelling the motor through the tube.

2. Means for operating in boiler tubes or flues, comprising a self-contained motor adapted for entry and movement in the tube or flue, a scraper or cleaner carried by the motor and operated thereby, and a propeller or feeder carried by the motor and positively connected to and operated by the movable mechanism thereof, said feeder engaging with the tube or flue surface and automatically propelling the motor and cleaner through the tube or flue.

3. Means for operating in boiler tubes or flues, comprising a self-contained steam or air motor adapted for entry and movement in the tube or flue, a normally-inactive movable propeller or feeder carried by the motor and operated by it which is adapted for projection against the tube or flue surface and for maintenance thereagainst by steam or air pressure, and means for supplying steam or air to the motor to set it in motion and to the propeller to project and hold it in contact with the tube or flue surface, whereby it can propel the motor and itself through the tube or flue.

4. The combination with a motor or engine adapted for entry in a flue or tube, of a shiftable propelling-wheel rotated by said motor and normally out of active contact with the tube and means for shifting said wheel to cause it to contact with the surface of the tube or flue for the purpose of propelling the device.

5. The combination with a steam or air motor or engine adapted for entry in a flue or tube, of a shiftable propelling-wheel rotated by said motor, and means operated by the steam or air supply adapted to hold the wheel in operative contact with the surface of the tube or flue during the operation of the motor.

6. The combination with a self-contained motor or engine adapted for entry in a flue or tube, of propelling-wheels operated by said motor positioned to operatively engage the interior surface of the tube or flue at points approximately opposite.

7. The combination with a self-contained motor or engine adapted for entry in a flue or tube, of propelling-wheels adapted for operation by said motor and positioned to operatively engage the interior surface of the tube or flue at opposite sides, one of said wheels being shiftable, and means for holding said wheel in contact with the tube or flue and for retracting it.

8. The combination with a self-contained motor or engine adapted for entry in a tube or flue, of a propelling-wheel adapted to bear against one side of the tube or flue and operated by the motor, and wheels adapted to bear against the opposite side of the tube or

flue and positioned one in advance and the other in the rear of the propelling-wheel first named.

9. In a device of the class described the combination with a motor or engine adapted for entry in a tube or flue, of a propelling-wheel geared to the motor and adapted to bear against the tube or flue, a shiftable propelling-wheel geared to the aforesaid wheel and adapted to bear against the opposite side of the tube or flue, and an idler bearing against the tube or flue.

10. In a device of the class described the combination with a steam or air motor or engine adapted to enter and move in a boiler tube or flue, of a propelling-wheel operated by said motor adapted to bear on the surface of the tube or flue, a lever to which the propelling-wheel is journaled, and a steam or air operated piston controlling said lever.

11. In a device of the class described the combination with a steam or air motor or engine adapted for entry and movement in a boiler tube or flue, of a propelling-wheel operated by said motor adapted to bear on the surface of the tube or flue, a lever to which the propelling-wheel is journaled, a steam or air operated piston controlling said lever and adapted to cause the propelling-wheel to contact with the surface of the tube or flue when acted on by steam or air pressure, and a spring adapted to return the piston to normal position when relieved of steam or air pressure, thereby causing the retraction of the propelling-wheel from active contact with the tube or flue.

12. In a device of the class described the combination with a motor or engine, of a propelling-wheel operated by the motor having

a relatively-stationary axis, a lever pivoted on said axis, a second propelling-wheel geared to the first propelling-wheel and journaled to the lever and means for shifting the lever.

13. In a device of the class described the combination with a casing or body having a steam or air cylinder, and a steam or air motor or engine, of a propelling-wheel geared to the engine, duplicate levers having their pivotal points in the line of the axis of the propelling-wheel and located on opposite sides thereof, a second propelling-wheel meshing with the first-named wheel and located between and journaled to the levers, and a double-headed piston in the steam or air cylinder which receives the ends of the levers between its heads on opposite sides of its stem.

14. A flue or tube scraper comprising a body made in halves which are detachably connected together and have hollowed central portions and semitubular radially-disposed portions matching each other when the halves are fitted together, and stems slidable freely and unobstructedly in both directions in the tubular portions, said stems having limited heads on their inner ends which lie in the hollowed central portion and cleaning-heads on the outer ends of the stems, said stems being thrown outwardly by centrifugal force when the device is rotated and dropping back in the body by gravity when it is not in use.

In testimony whereof I affix my signature in presence of two witnesses.

CYRUS S. DEAN.

Witnesses:

J. E. PRICE,

A. E. NEWTON.