

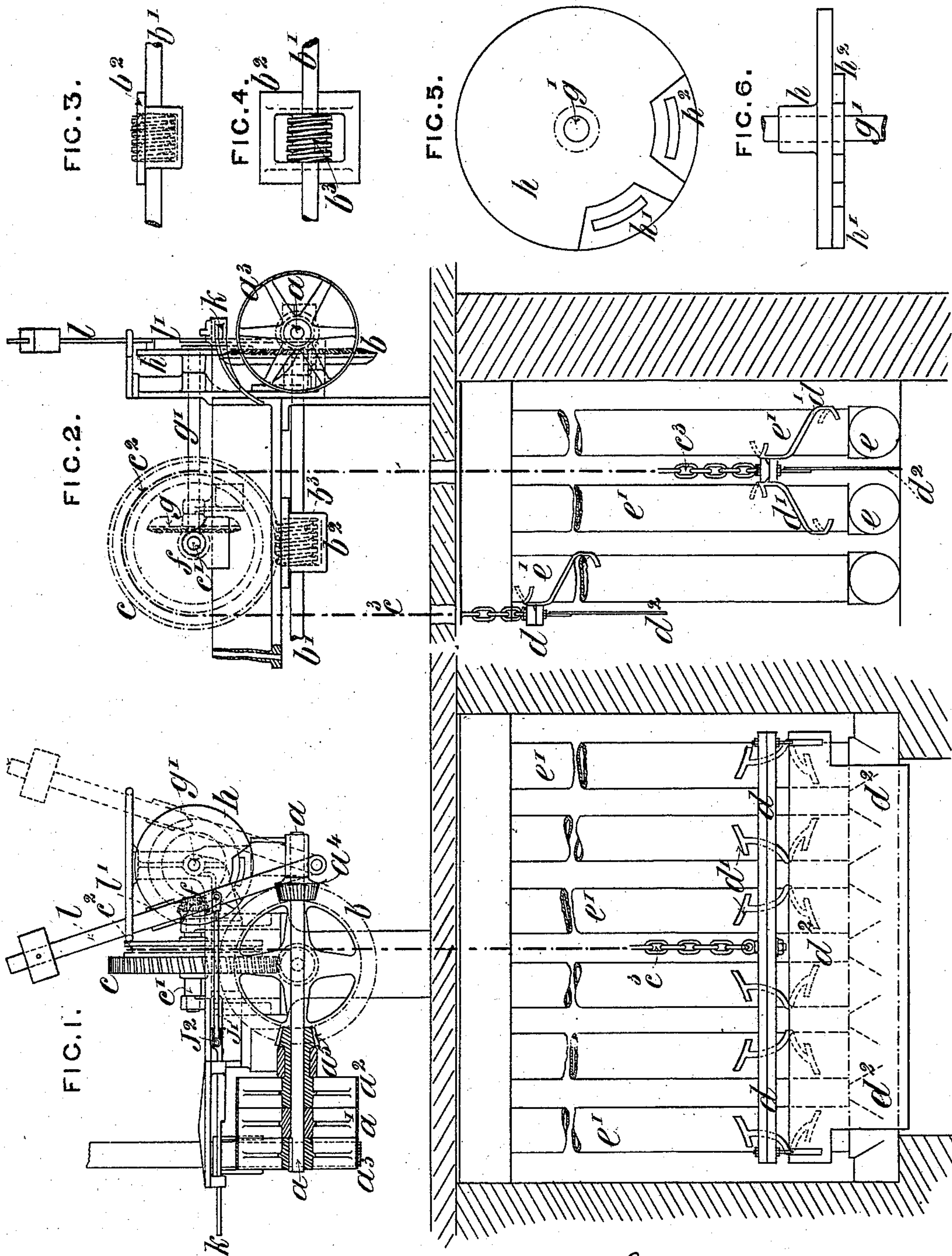
(No Model.)

A. LOWCOCK & J. TAYLOR.

CLEANER FOR STEAM BOILERS.

No. 287,038.

Patented Oct. 23, 1883.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## CLEANER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 287,038, dated October 23, 1883.

Application filed May 23, 1883. (No model.) Patented in England July 12, 1882, No. 3,306,

*To all whom it may concern:*

Be it known that we, ARTHUR LOWCOCK, of Shrewsbury, Shropshire, engineer, and JOHN TAYLOR, of Salford, in the county of Lancaster, engineer and millwright, have invented certain new and useful Improvements in Cleaners for Steam-Boilers, (for which we have obtained a patent in Great Britain, No. 3,306, bearing date July 12, 1882,) of which the following is a specification.

Our invention relates to those fuel-economizers in which movable scrapers are employed to prevent the accumulation of soot; and the objects of our invention are, first, to construct a reliable and simple reversing motion for the scrapers and other portions of the apparatus; secondly, to hold the worms in boxes which take the end-thrust, and also form bearings for the worm-shaft, and contain a supply of oil in which the worms run; and, thirdly, to attach vertical plates to the under side of the lifting-bars, in order to prevent the accumulation of soot between the lower horizontal pipes or tubes of the economizer. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation, and Fig. 2 is a side elevation, of our improved machinery for raising and lowering the scrapers of a fuel-economizer. Fig. 3 is a side view, and Fig. 4 a plan, of a worm and worm-box. Figs. 5 and 6 are two views, on an enlarged scale, of the disk with its adjustable cams or plates connected with the reversing motion.

Similar letters refer to similar parts throughout the several views.

$a$  is the counter-shaft, driven in either direction by a single belt. On the counter-shaft  $a$  is the loose pulley  $a'$  and two pulleys,  $a^2$   $a^3$ , also a bevel-gear,  $a^4$ , which is secured to the shaft  $a$ , and gears into a bevel-wheel,  $b$ , keyed to the worm-shaft  $b'$ . The shaft  $a$  also carries a bevel-gear,  $a^5$ , which is keyed or cast on the boss of the pulley  $a^2$ . The worm-shaft  $b'$  is supported at each end in bearings in the frame, and in the middle by the worm-box  $b^2$ , which holds the worm  $b^3$ . The worm-box  $b^2$  has bear-

ings at each side for the worm-shaft  $b'$ , and is faced to form surfaces for the ends of the worm to bear against. The worm-box  $b^2$  also holds a supply of oil or other lubricant. The worm  $b^3$  gears into and drives the worm-wheel  $c$ , (on the stud  $c'$ ,) to which is secured a wheel,  $c^2$ , carrying the chain  $c^3$ , for actuating the lifting-bars  $d$  and scrapers  $d'$ . Sheets of iron  $d^2$  are fixed to the under side of the lifting-bars  $d$ , and descend (when the chain  $c^3$  is actuated) into the spaces between the bottom horizontal tubes,  $e$ , and thus prevent the accumulation of soot at that point.  $e'$  are the vertical tubes. On the stud  $c'$  is secured a bevel-gear,  $f$ , which gears into and drives a bevel-wheel,  $g$ , keyed to the shaft  $g'$ . At the other end of the shaft  $g'$  is secured the disk  $h$ . (Shown enlarged in Figs. 5 and 6.) On the face of the disk  $h$  are two adjustable cams or plates,  $h'$   $h^2$ , which alternately come into contact (during each partial revolution of the disk  $h$ ) with a catch or striking-plate,  $l'$ , fixed to an upright weighted lever,  $l$ , pivoted at its lower end to the frame, and moves with it over the center of the disk  $h$ . To the lever  $l$  is jointed one end of a bar,  $j$ . A stud,  $j^2$ , is secured to the other end of the bar  $j$ , and enters and is free to traverse a slot in the strap fork-lever  $k$ . The strap fork-lever  $k$  is supported in two bearings on the bracket  $k'$ .

When the driving-belt is on the fast pulley  $a^3$ , which is secured to the counter-shaft  $a$ , motion is communicated by the bevel-gear  $a^4$  to the bevel-wheel  $b$ , worm-shaft  $b'$ , worm  $b^3$ , worm-wheel  $c$ , chain-wheel  $c^2$ , and thus to the chain  $c^3$ , which raises or lowers the lifting-bars  $d$  and scrapers  $d'$ . By means of the bevel-gear  $f$  the stud  $c'$  (on which the worm-wheel  $c^2$  is mounted) also drives the bevel-wheel  $g$ , shaft  $g'$ , and disk  $h$  in the direction shown by the arrow in Fig. 1. The cam  $h'$  on the disk  $h$  comes into contact with the striking-plate  $l'$  on the weighted lever  $l$ , and carries it forward with the rod  $j$  and stud  $j^2$ , which moves freely in a slot in the strap fork-lever  $k$ . By the time the weighted lever  $l$  has passed the vertical position the stud  $j^2$  has traversed the length of the

slot in  $k$ , and as  $l$  falls forward the stud  $j^2$ , acting on the lever  $k$ , draws it and the strap-fork forward, and so moves the belt from the fast pulley  $a^3$  over the loose pulley  $a'$  onto the pulley  $a^2$ , to which is secured the small bevel-gear  $a^5$ . The bevel-gear  $a^5$  drives the bevel-wheel  $b$  in the opposite direction to that already described, and thus reverses the motion of the machinery, and causes the scrapers and the rest of the apparatus to move in the opposite direction.

Any number of worm-boxes, worms, and worm-wheels may be used.

The belt-shifting devices may form the subject-matter of another application.

What we claim as our invention, and desire to secure by Letters Patent of the United States, is—

The sheets of metal  $d^2$ , secured to the under sides of the lifting-bars  $d$ , substantially as shown, and for the purpose specified.

The foregoing specification of our improvements in scrapers and in machinery for raising and lowering scrapers for cleansing flues and tubes of boilers, economizers, and heating apparatus signed by us this 8th day of May, 1883.

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