

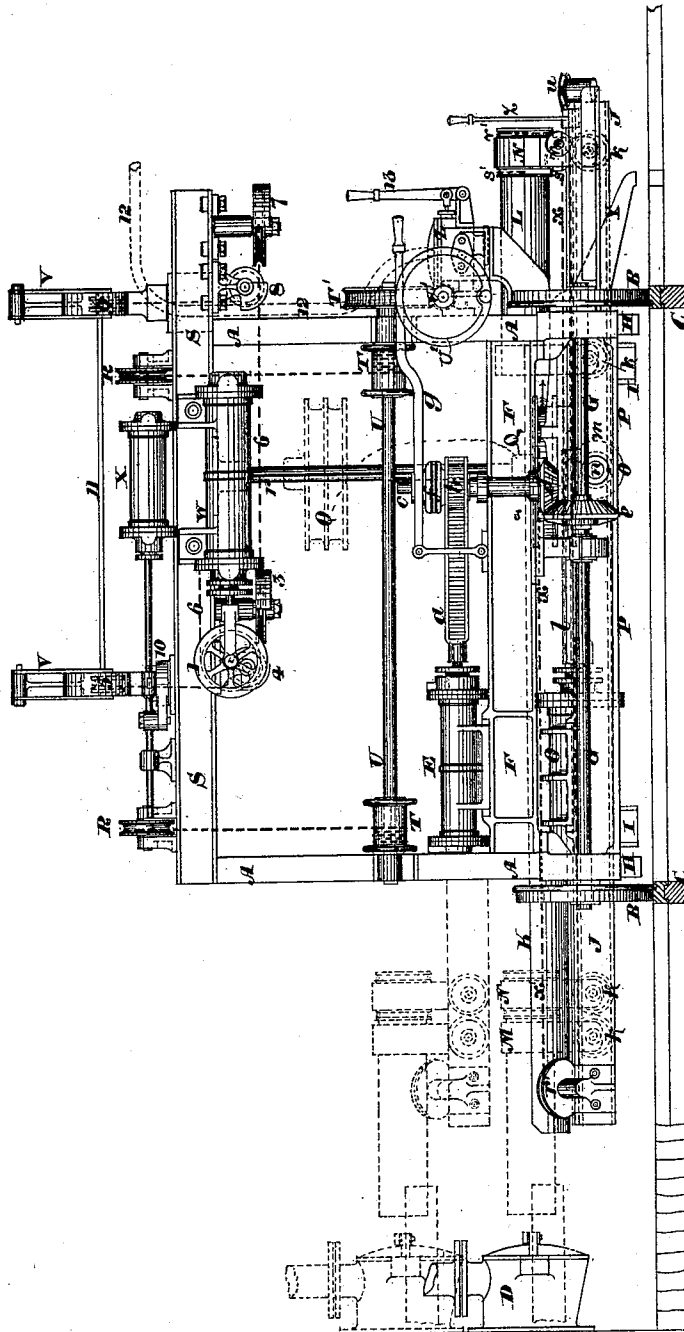
W. FOULIS.

MACHINE FOR CHARGING RETORTS.

No. 177,326.

Patented May 16, 1876.

FIG. 1.



Witnesses:
David Drysdale, Auctioneer
David Fulton, Witness.

Inventor:
William Foulis
Charles S. Whitman
att'y.

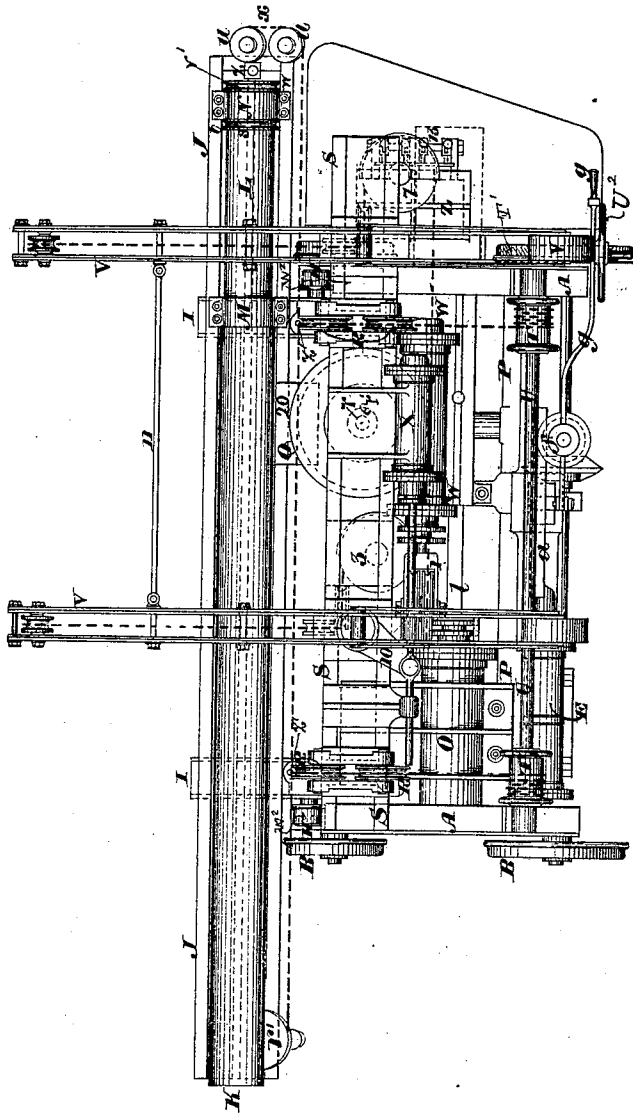
W. FOULIS.

MACHINE FOR CHARGING RETORTS.

No. 177,326.

Patented May 16, 1876.

FIG. 2.



Witnesses:

David Briggsdale, Austin Wilson
David Fulton, Witness.

Inventor:

William Foulis
Charles S. Whitman atty

W. FOULIS.

MACHINE FOR CHARGING RETORTS.

No. 177,326.

Patented May 16, 1876.

FIG. 4.

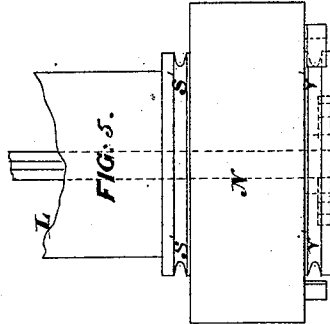
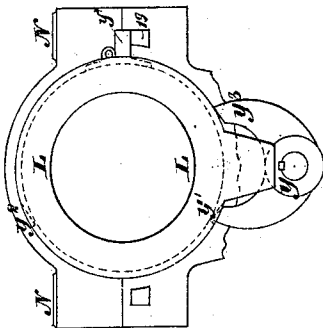
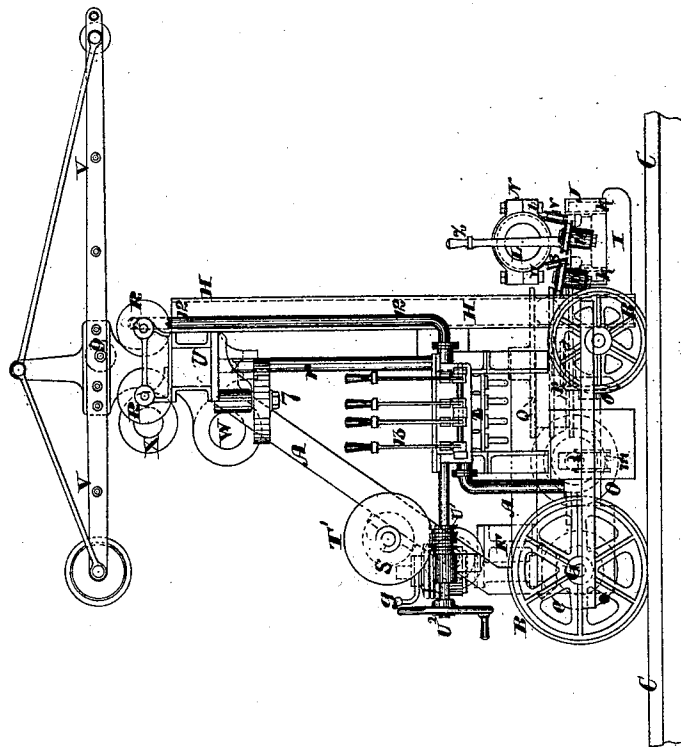


FIG. 3.



Witnesses:

David Raymond Austin Watson

and John H. Watson.

Inventor:

William Foulis

Chas. S. Whitman
attorney

UNITED STATES PATENT OFFICE.

WILLIAM FOULIS, OF GLASGOW, NORTH BRITAIN.

IMPROVEMENT IN MACHINES FOR CHARGING RETORTS.

Specification forming part of Letters Patent No. **177,326**, dated May 16, 1876; application filed March 25, 1875.

To all whom it may concern:

Be it known that I, WILLIAM FOULIS, of Glasgow, in the county of Lanark, North Britain, civil engineer, have invented Improvements in Charging Retorts, and in the machinery or apparatus employed therefor, of which the following is a specification:

My invention relates to that class of machines which are made use of for charging retorts; and the nature thereof consists in certain modifications in the details of the construction of the same, hereinafter shown and described.

The figure on Sheet 1 of the drawings hereunto appended is a side elevation, the figure on Sheet 2 a plan, and Figure 1, Sheet 3, an elevation, of the rear end of the charging-machine, as constructed in accordance with this invention.

As shown by these figures, the mechanism consists of a framing, A, supported on wheels B, by which it is traversed upon the rails C in front of the retort-mouths D. The traversing of the machine is effected by the hydraulic ram and cylinder E, supported on a girder or frame, F, extending between the end frames A at one side of the machine. The ram or plunger of the hydraulic cylinder E is attached to a rack, *a*, which gears into a spur-pinion, *b*, situate loosely on a vertical shaft, *c*, supported in a sleeve carried by the girder or frame F. On the lower end of the shaft *c* a bevel-pinion, *d*, is fixed, which gears into a corresponding bevel-wheel, *e*, keyed on the shaft G, whereon a pair of the carrying-wheels B are situated. When it is desired to traverse the machine along the rails from one retort to another the clutch *f*, sliding on a feather formed on the upper end of the shaft *c*, is pushed by the lever *g* into gear with the clutch-box formed on the pinion *b*, so that the pinion *b* is geared with the shaft *c*, and water being then admitted to the cylinder E the shaft *c* is rotated, and from it the motion is communicated to the carrying-wheels B through the shaft G. Before reversing the motion of the ram within the cylinder E—that is, before returning the rack *a* to the position shown on the drawings—the pinion *b* is thrown out of gear with the shaft *c* by raising the clutch *f* from contact with the pinion.

One side of each end frame A is made vertical, as shown at Fig. 1, Sheet 3, and to each vertical face is fixed a hollow channel or guide, H. In proximity to the hollow channels or guides H bearers or saddles I are placed, on which a framing, J, carrying the charging mechanism is supported, which mechanism consists of a scoop, K, in which the materials to be charged into the retorts are placed. The scoop K is attached to a circular bar or block, L, of metal, fitted in bearings M and N, in which it is capable of turning round, so as to invert and “right” the scoop at the required times. The bearings M and N are each provided at their lower ends with wheels or rollers *k*, which run upon the framing J, when the scoop K and block L are traversed thereon to and from the retorts D. The horizontal movement of the scoop K and block L is effected by a hydraulic cylinder, O, supported on two frames or girders, P, attached to the lower parts of the end frames A. The piston or plunger of the hydraulic cylinder O is attached to a rack, *l*, which gears into and rotates a spur-pinion, *m*, Fig. 1, Sheet 3, fixed on a cross-shaft, *n*, on which a bevel-pinion, *o*, is also fixed, gearing into another bevel-pinion, *p*, on the lower extremity of a vertical shaft, *r*, whereon a drum, Q, is also placed. On the drum Q a chain or rope is wound, one end of which is passed toward the forward end of the machine, and carried round a grooved roller, *r'*, carried on the frame J, thence round another grooved roller, U, centered on a stud projecting from one side of the rearward bearing N, from whence the chain or rope passes over or into a groove, *v'*, in the block L to that side of the block marked *t*, Fig. 1, Sheet 3, whereat that end of the chain or rope is attached to an eye or ring. The opposite end of the chain or rope is carried from the drum Q to the rearward end of the apparatus, whereat it is passed round grooved rollers *u*, thence under and round a grooved roller, *s*, and over the groove *s'* of the block L to that side of the block L marked *w*, Fig. 1, Sheet 3, whereat that end of the chain or rope is also fixed to an eye or ring. When it is desired to move the scoop with the charge of material into the retort water is admitted to the forward end of the cylinder O. The piston of

said cylinder is thereby moved rearward, and rotates the shaft n through the intervention of the rack l and pinion m . From the shaft n the rotatory motion is communicated, through the bevel-gearing $o p$, to the shaft r , whereby the drum Q is rotated in the direction of the arrow on Sheet 1, and is so caused to wind on the forward hauling portion x' of the rope or chain, which draws the scoop K and block L into the position indicated in dotted lines on Sheet 1, at which position of the scoop the piston of the cylinder O has nearly completed its rearward stroke. A double stop or pawl, the construction of which is seen on an enlarged scale at y , Figs. 2 and 3, Sheet 3, enters a notch, y' , formed in the periphery near the rearward end of the block L to keep the block and scoop K in the position shown while being moved toward or into the retort.

The pawl or stop y , which is situated on a shaft extending throughout or nearly throughout the length of the framing J , is capable of moving along a feather on the shaft, as the scoop is traversed toward and from the retorts D , and it is held in its position in the notch y' while moving forward by a bracket or projection formed on or attached to the rearward end of the block L , bearing against one side of the pawl, or other equivalent mechanism may be employed for that purpose. When the scoop K has arrived at the position shown in dotted lines on Sheet 1, the pawl y is released from the notch y' by turning the shaft on which it is situated through the lever z , which, being effected, the piston or plunger of the cylinder O , on performing the remainder of its rearward stroke, further rotates the drum Q in the direction of the arrow, and the scoop K and block L being released from the pawl y , are, by the continued hauling action of the portion x' of the chain or rope, turned over or inverted, so as to deposit the charge in the retort. The extent of rotatory motion imparted to the scoop K and block L is regulated by a stop, y^4 , at one side of the block, coming in contact with the projection 19, situated at one side of the bearing N . When the charge has been so deposited within the retort the pawl or claw y^3 is, by the aid of the lever z , pushed into the notch y^2 , so as to retain the scoop in its inverted position. Water is then admitted to the rearward end of the cylinder O , which, by moving the piston or plunger of the cylinder O forward, produces an action of the hauling mechanism the reverse of that hereinbefore described, and also causes the hauling-chain, after having returned the scoop and block to their extreme rearward position (the claw y^3 of the stop or pawl being there released from the notch y^2), to right the scoop K and block L —that is to say, to turn them into position for the scoop K to receive another charge. The charging mechanism is raised and lowered to the level of any retort or row of retorts in a series by attaching to the bearers or saddles I , on which the mechanism is supported, eyes or rings, at

the position marked z' , Sheet 2, or at any other convenient position. To each of the eyes or rings one end of a chain or rope is attached, and from thence the said chains or ropes are carried upward and over guide-pulleys R , supported in brackets on a cross-beam or girder, S . From the pulleys R the chains or ropes pass to drums T , fixed on a shaft, U , supported in bearings on the frames A , and on these drums T one end of the chains or ropes is fixed, so that the ropes or chains may be wound up or unwound therefrom. On one end of the shaft U a worm-wheel, T' , is fixed and geared with a tangent screw, U^1 , on a shaft situate at right angles to the shaft U . When it is desired to raise or lower the charging mechanism the tangent screw U^1 is rotated by a hand-wheel, U^2 , placed on the axis thereof, as shown, whereby the wheel T' and drums T , situated on the shaft U , are correspondingly rotated, and, winding or unwinding the chains or ropes onto or off from the drums T , raises or lowers the charging mechanism. The charging mechanism is guided in ascending and descending by rollers W^2 , placed on studs fixed to the sides of the bearers or saddles I , and situated in the hollow portions of the channels or guides H , as more particularly seen in plan at Sheet 2 of the drawings. In raising and lowering the charging mechanism the chain or rope drum Q is correspondingly raised and lowered on the shaft r by a bracket, 20, fixed to the frame J .

To enable the drum Q to rotate with the shaft r a feather, r' , is placed in the boss or eye on the drum, which enters a groove extending throughout the whole or a portion of the length of the shaft r .

It is preferred to attach the scoop K to the block L by means of a T-headed catch formed on the scoop, entering a correspondingly-shaped groove or opening in the block L , or the scoop and block may be attached together by a dovetail joint. By this means the employment of tray or other apparatus to charge the scoop is obviated, as, when the scoop has deposited its charge in the retort, it may be disconnected from the block, removed, and recharged, or another charged scoop substituted therefor.

To remove the scoops when empty and disconnected, and to raise and return them to position for being reconnected to the block when again charged, cranes V are provided. The cranes V are supported on the framing of the machine, and are capable of turning through an arc. The scoops are raised and lowered by a hydraulic cylinder, W , attached to the girder or frame.

To the piston-rod of the cylinder W two pulleys, 1, are attached. One of the ends of two chains, 6, are fixed to the cylinder W , as shown, from which point the chains are carried round the pulleys 1. One of the chains 6, after so passing round a pulley, 1, is conducted round a pulley, 3, thence under and round a pulley, 4, to a pulley, 5, from whence it is led to and

hangs down over another pulley at the outer end of one crane, V. The second chain 6, after passing round the other pulley 1, is conducted to the rearward end of the machine, whereat it passes round the pulley 7, thence under and round the pulley 8 to the pulley 9, from whence it is conducted to and also hangs over the pulley at the outer end of the other crane V.

When it is desired to raise a scoop charged with material the hanging ends of the chains 6 are attached to it. Water is then admitted to the rearward end of the cylinder W, thereby causing the piston to move forward and hoist the scoop up by the chains 6. Similarly, when it is desired to lower an empty scoop, water is admitted to the front end of the cylinder W.

In order to bring the outer ends of the cranes V immediately over the position occupied by the scoop, a hydraulic cylinder, X, is employed, the piston-rod of which is attached to a crank, 10, situated on the axis of one crane, V. Both cranes are connected together by a rod or link, 11, as shown, so that when water is admitted to the forward end of the cylinder X, and the crank thereby moved rearward, the cranes are simultaneously turned over the position occupied by the scoop when attached to the machine. Similarly, when water is admitted to the rearward end of the cylinder X, the cranes V are caused to assume the position shown on the drawings.

Water under pressure for operating the pistons of the hydraulic cylinders E, O, W, and X, and apparatus connected therewith, is conducted through an inlet-pipe, 12, to a valve-box, Z, placed at the rearward end of the machine. In the box valves are placed, in open-

ing and closing which, by the levers 13, water is admitted through pipes (not shown on the drawings) to the different cylinders, the discharge of water from which is conducted away from the apparatus by the spout Y.

I claim—

1. The mechanism for traversing the scoop, consisting of the hauling-chain, the scoop K, the circular bar or block L, provided with grooves r' and s' , the bearings M and N, the cylinder o, the rack l, the spur-pinion m, the shaft n, the bevel-pinions o and p, the shaft r, the drum Q, and the grooved rollers r' , s, and u, all combined as described.

2. The mechanism whereby the charging apparatus is raised and lowered, consisting of the saddles I, provided with eyes or rings, the guide-pulleys R upon the girders S, the drums T on the shaft U, the worm-wheel T', the tangent screw U¹, the hand-wheel U², the frame I, provided with a bracket, 20, and the drum Q, all combined as described.

3. The combination of the cranes V, provided with pulleys, the cylinder W, to the piston-rod of which pulleys are attached, the chains 6, the pulleys 1, 3, 4, 5, 7, 8, and 9, as and for the purposes described.

4. The cranes V, cylinder X, crank 10, and link 11, all combined as and for the purposes described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM FOULIS. [L. s.]

Witnesses:

DAVID DRYSDALE AUSTON,
DAVID FULTON.