A. MORRISON.

TUBE CLEANING APPARATUS.

APPLICATION FILED SEPT. 10, 1909.

954,002. Patented Apr. 5, 1910.

Fig. 1.

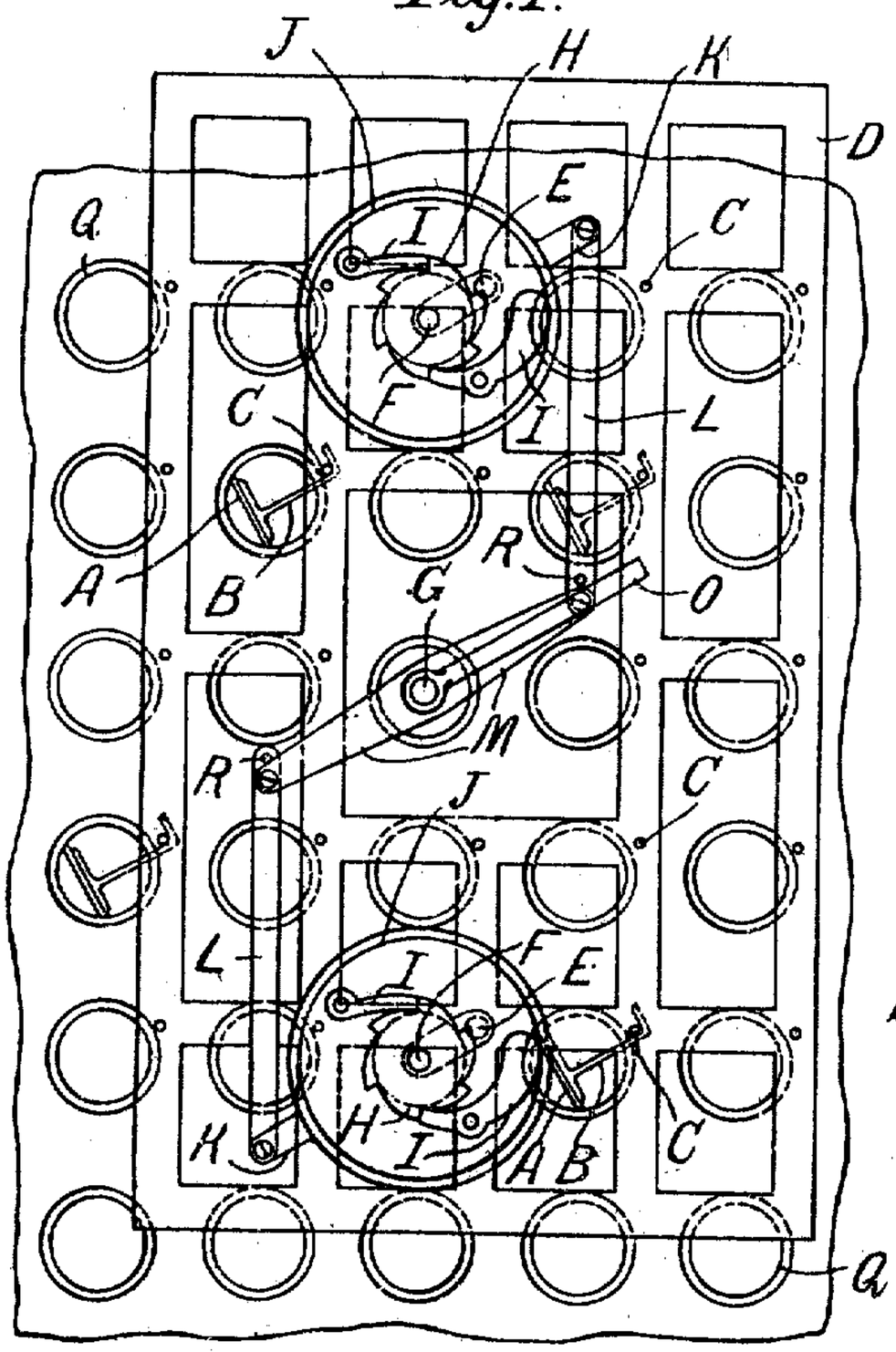
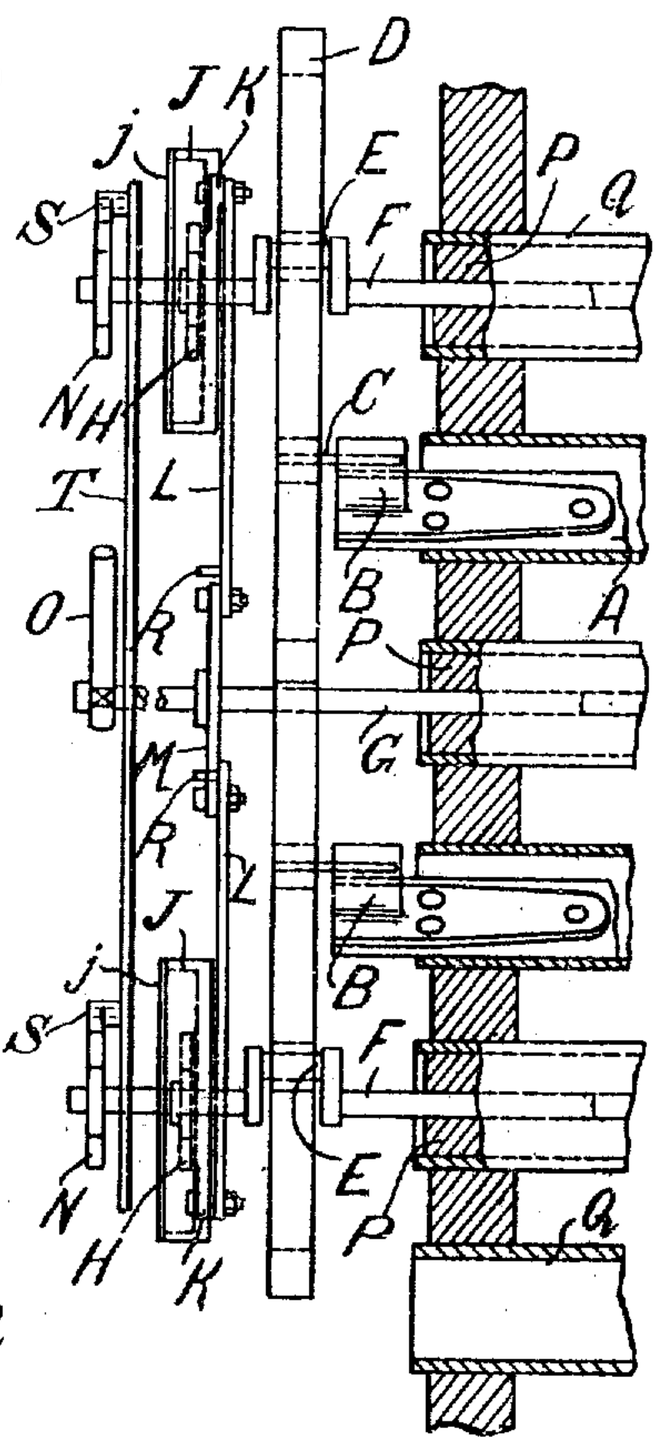


Fig. 2.



WITNESSES.

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TUBE-CLEANING APPARATUS.

954,002. Specification of Letters Patent. Patented Apr. 5, 1910.

Application filed September 10, 1909. Serial No. 517,055.

To all whom it may concern:

Be it known that I, ALEXANDER MORRISON, a subject of the King of the United Kingdom of Great Britain and Ireland, and residing at Glasgow, Scotland, have invented a certain new and useful Improvement in Tube-Cleaning Apparatus, of which the following is a specification.

This invention relates to tube cleaning apparatus the novelty whereof consists in the particular ratchet gearing hereinafter described for driving the same.

In the accompanying drawings Figures 1 and 2 are elevations at right angles to each other showing the ratchet gearing as applied to tube cleaning apparatus adapted for multi-tubular steam generators or the like.

As shown, each of the scrapers A is operatively connected by an arm B secured thereto and a pin C to a frame D mounted within the smoke-box and preferably carried by two or more eccentrics or on the crank portion E of two or more spindles F at different points of the frame D, said eccentrics or the spindles F being adapted to be driven from a main shaft G in the following manner. Keyed to each eccentric shaft or crank spindle F is a ratchet wheel H the teeth of which are adapted to be engaged by a pawl or pawls I which in the construction shown, and as preferred, are carried by a wheel-shaped casing J which is provided with a cover *j* and is loose on the eccentric shaft or on the spindle F and is connected by an arm K integral with the casing and a connecting rod or rods L, or other members which will exert a pulling action, to a lever M, on the main shaft G adapted to receive an oscillating motion from a suitable handle O or the like. When the main shaft G is oscillated in one direction, the casing J is moved through a certain angle, and the pawl or pawls I feed the ratchet wheel or wheels H and therewith the shaft or shafts or spindle or spindles F on which the frame D is carried so as to impart an orbital motion to the frame. When the main shaft G is oscillated in the other direction, the casing J is again moved through an angle in the direction opposite to its former movement, but the pawls I slip over the teeth of the ratchet wheels H so that the shaft or shafts or spindle or spindles F will not be affected by the return movement of the main shaft G, the backward movement of the pawls being such that on their return they more than pass the point of the next tooth on the ratchet wheel to be engaged thereby so that they may not fail to become correctly engaged. Pins or catches R are preferably provided on the rods L to prevent the operating handle being driven beyond determined limits.

Retaining pawls S pivoted to a fixed bar T serve to engage with ratchet wheels N on the forwardly projecting ends of the spindles F which run in bearings in the bar T; the action of said pawls being to prevent the frame D from dropping backward or forward between the lifts of the operating handle O.

The main shaft G and the spindles F are supported in bushings P fitted within certain of the generator tubes Q.

Having now described my invention what I claim and desire to secure by Letters Patent of the United States is:—

1. In tube cleaning apparatus, in combination, a frame, cleaning devices carried by said frame, a spindle on which said frame is mounted eccentrically, a ratchet wheel fixed on said spindle, a pawl adapted to engage said ratchet wheel, a main shaft adapted to be oscillated, means connecting the main shaft with the pawl including a tension rod, and a projection on said rod for preventing excessive movement of the main shaft.

2. In tube cleaning apparatus, in combination, a frame, cleaning devices carried by said frame, a spindle on which said frame is mounted eccentrically, a ratchet wheel fixed on said spindle, a casing loose on said spindle, a pawl carried by said casing, a main shaft, a lever on the main shaft, and means connecting said casing with said lever.

3. In tube cleaning apparatus, in combination, a frame, cleaning devices carried by said frame, a spindle on which said frame is mounted eccentrically, a ratchet wheel fixed on said spindle, a pawl adapted to engage said ratchet wheel, a main shaft adapted to be oscillated, means connecting the main shaft with the pawl including a tension member, and means for preventing excessive movement of the main shaft.

4. In tube cleaning apparatus, in combination, a frame, cleaning devices carried by

said frame, a spindle on which said frame is mounted eccentrically, a ratchet wheel on said spindle, a pawl adapted to engage said ratchet wheel, a main shaft, a lever on the main shaft, and connections including a tension member between said pawl and said lever.

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

ALEXANDER MORRISON.

Witnesses:

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