(No Model.) 3 Sheets—Sheet 1.

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LATHE.

No. 317,209. Patented May 5, 1885.

Fig. 1

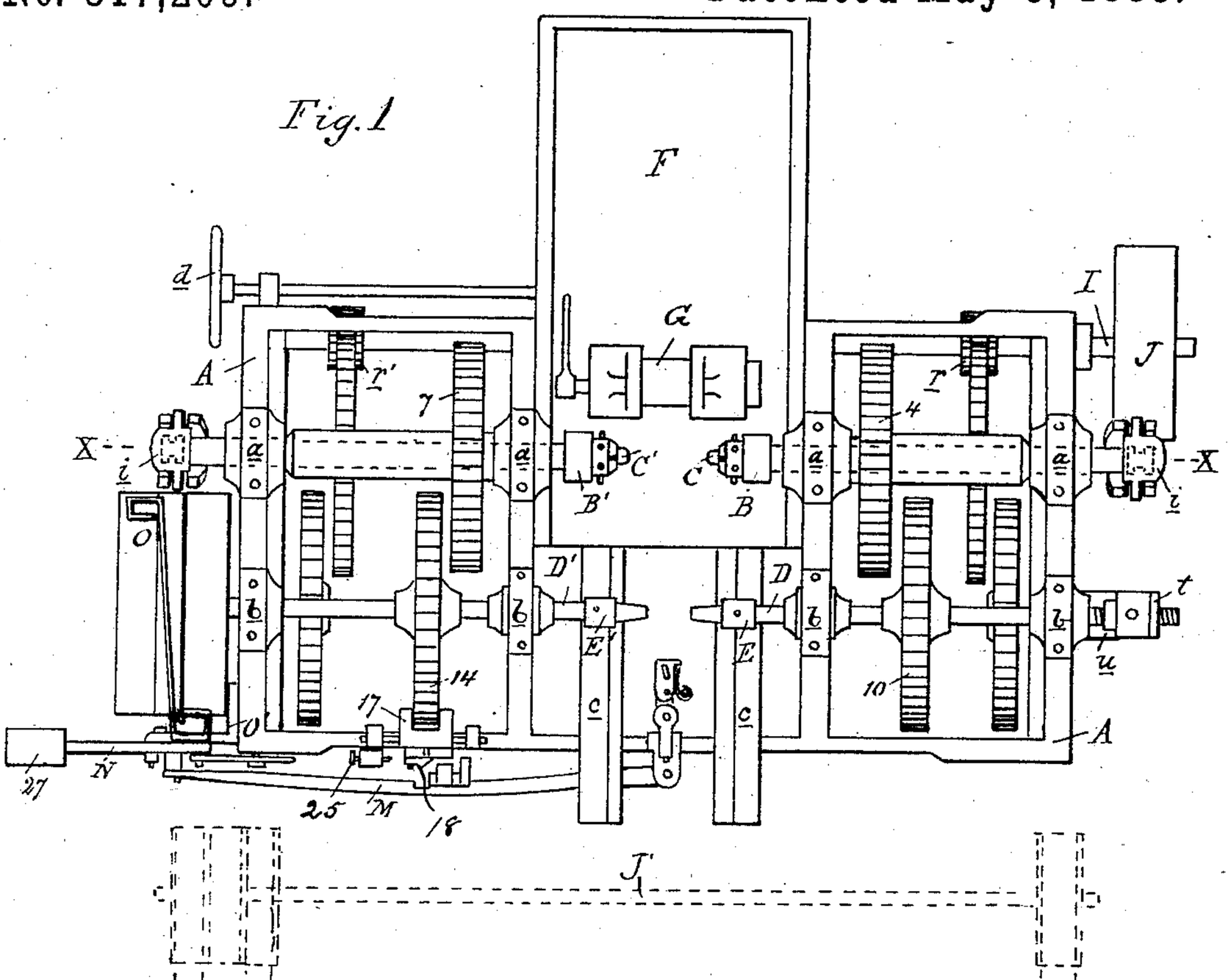

Fig. 2

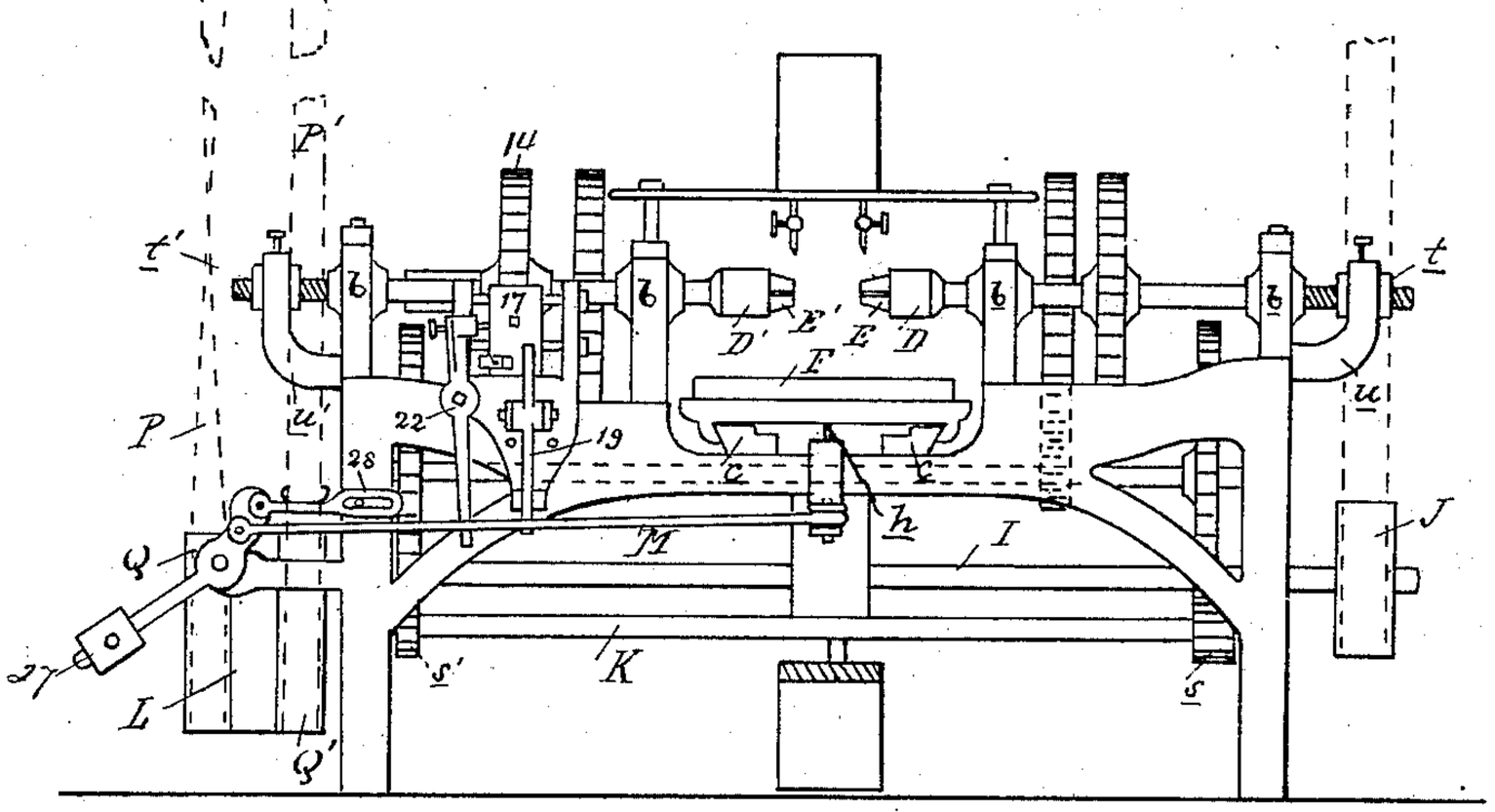

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Fig. 3

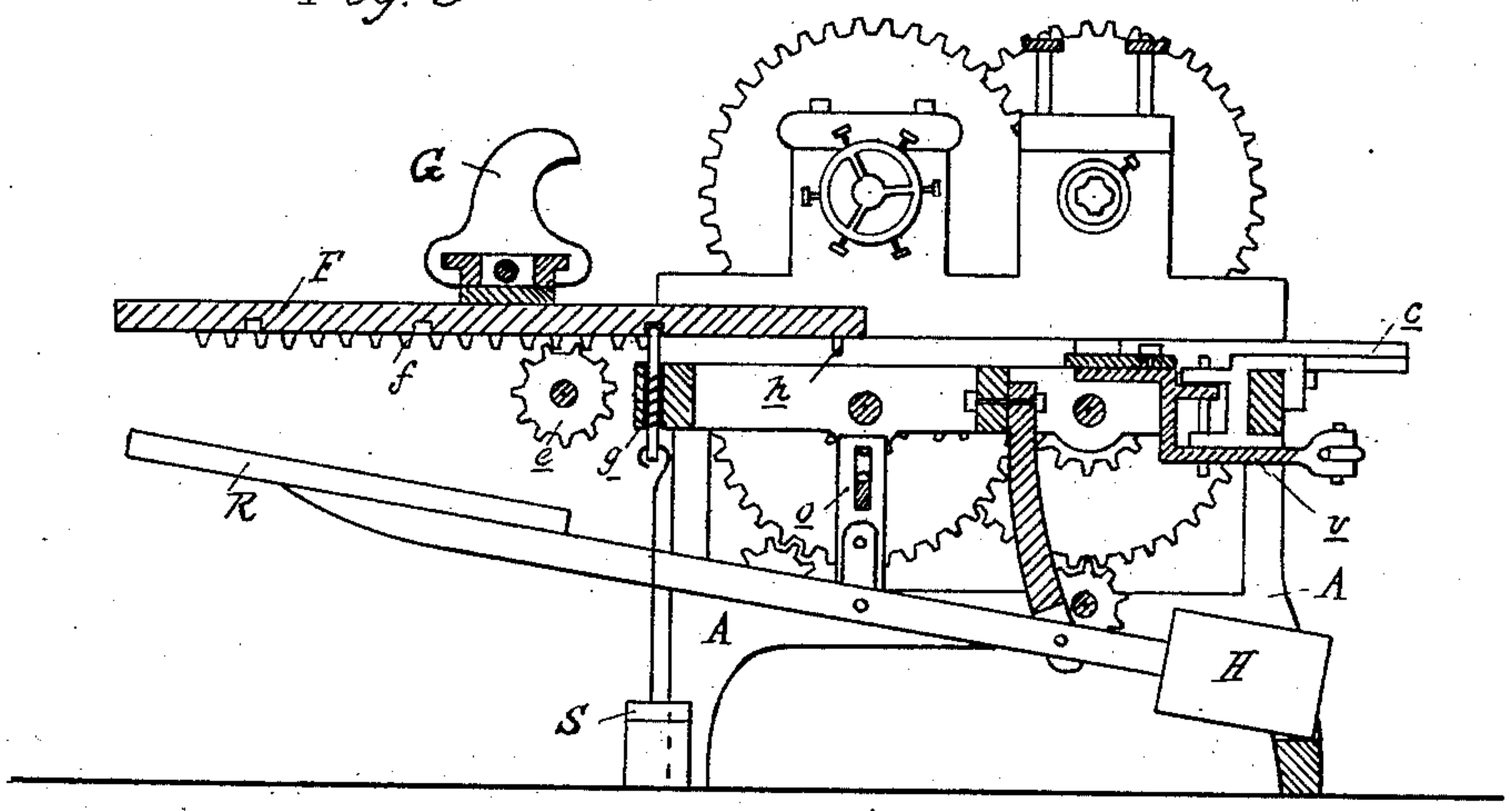

Fig. 4

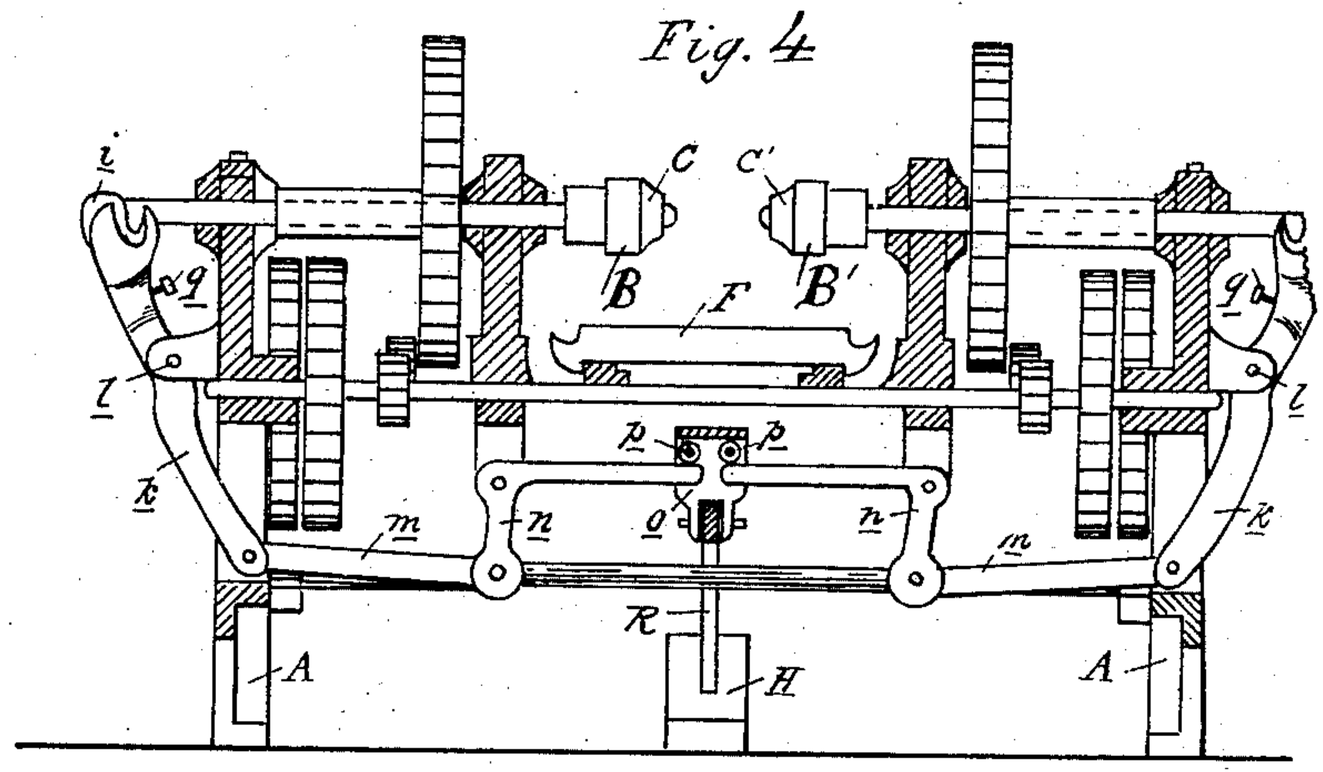

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Fig. 5

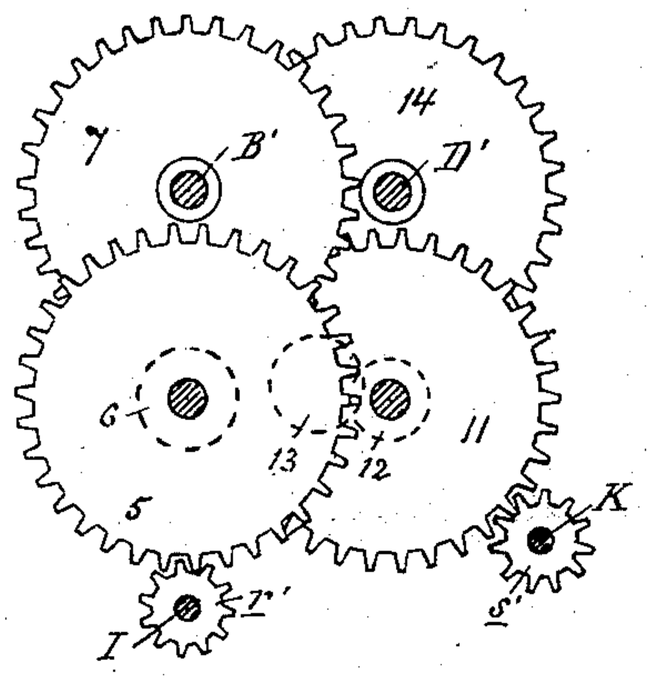

Fig. 6

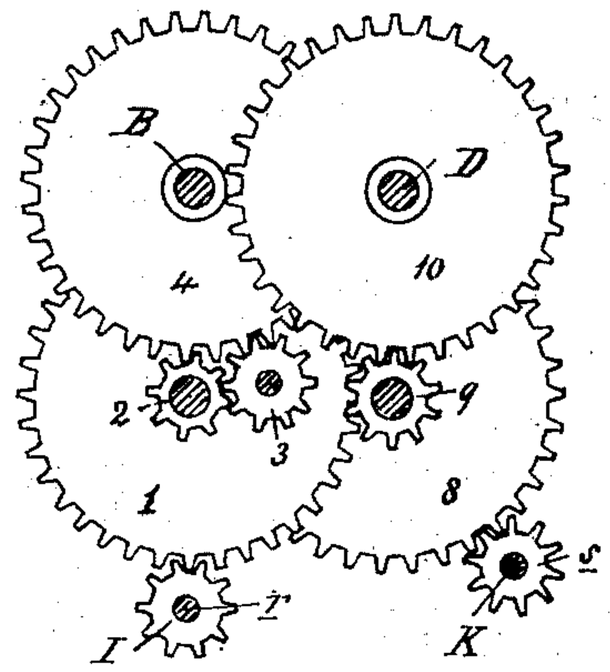

Fig. 7

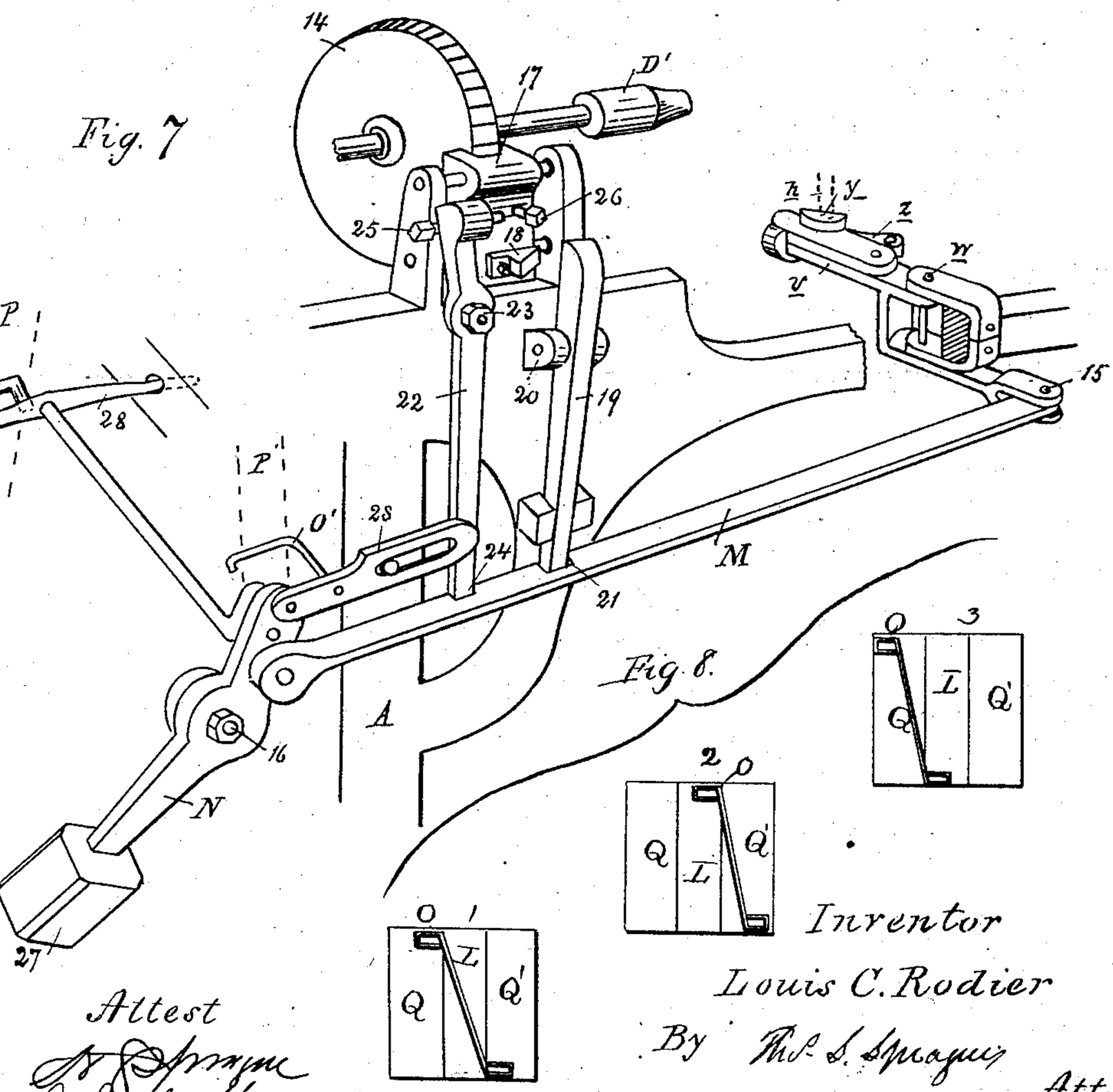

Fig. 8.

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UNITED STATES PATENT OFFICE.

LOUIS C. RODIER, OF DETROIT, MICHIGAN.

LATHE.

SPECIFICATION forming part of Letters Patent No. 317,209, dated May 5, 1885.

Application filed January 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, LOUIS C. RODIER, of Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Lathes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to an improvement in machines for steam and gas fitting; and the machine herein described is especially designed and adapted for doing quantity work of internally threading and fitting bosses for pipe or nipple connections. In articles such as couplings, radiators, traps, &c., generally two or more openings are provided upon different sides for the passage of gas, water, or steam through the article, and these openings or bosses have to be provided with internal threads for pipe-connection, and often require, also, facing, chamfering, &c. Where large quantities of like articles of this description have to be finished my machine will be found to save much labor, and to do the work with greater uniformity than can be done with any description of machine in present use.

The distinguishing features of my machine are, first, that for each boss on the article the necessary set of tools is provided separately, and so connected with the power that each kind of work is done simultaneously upon all the bosses, the tools are secured to head-stocks, which revolve, advance, and retract while the work is held in a stationary position upon a carriage adapted to be advanced and retracted laterally; second, devices are provided whereby the head-stocks holding the taps are reversed and stopped automatically.

In the drawings the machine depicted and described in the following specification is intended to chamfer, face, and internally thread the bosses of cast-iron radiator-loops, which are in axial line and upon opposite sides of the loop, and serve to connect the single loops in a stack as described in a patent granted to me March 8, 1881, and numbered 238,529.

Figure 1 is a plan view of my machine. Fig. 2 is a rear elevation. Fig. 3 is a central cross-section. Fig. 4 is a vertical central section on line X X in Fig. 1. Figs. 5 and 6 are diagrams showing the arrangement of the gear for revolving in opposite directions the head-stocks which contain the dies. Fig. 7 is a detached perspective view of the automatic gear for reversing and stopping the action of the taps. Fig. 8 is a diagram showing the different positions the belts assume during the operation of the machine.

A is the bed-frame of the machine.

B B′ are two head-stocks in axial line with each other and journaled in bearings *a* upon the top of the bed frame. The inner ends of these head-stocks are provided with proper tool-holders C C′, for holding the desired bits for facing and chamfering the bosses presented to them. D D′ are two other head-stocks in axial line with each other and journaled in bearings *b b* upon the bed-frame. The head-stocks B B′ and D D′ are in the same horizontal plane with each other, and the latter are also provided with suitable tool-holders E E′, in which taps are secured.

F is a sliding carriage adapted to be moved transversely across the bed upon guide-pieces or cheeks *c*, by means of a hand-wheel, *d*, which operates a pinion, *e*, engaging into a rack, *f*, in the under side of said carriage. The carriage is provided on top with a clamping device, G, by means of which the work to be operated upon is securely held while it is presented to the tools, which are secured to the head-stocks B B′ and D D′. On the under side of the table is a spring-latch, which may be operated by the foot of the operator, and is intended to lock the carriage in certain positions.

The head-stocks B B′ are susceptible of being moved endwise in their bearings *a*, whereby the tools they carry are advanced to and retracted from the work. These devices are fully shown in Figs. 3 and 4, and are arranged and operated as follows: The outer ends of the head-stocks B B′ are provided with loose cross-heads *i*, with which the upper ends of the levers *k* engage. These levers *k* are pivoted at *l* to the frame, and are pivotally connected at their lower ends, by means of links *m*, with one arm of the bell-cranks *n*. The other arms of these bell-cranks nearly approach each other in the center of the machine and engage with

a yoke, *o*, which is provided with the anti-friction rollers *p*. R is a foot-lever, to which the yoke *o* is pivotally connected, and which has a counter-weight, H, secured to its rear end. In operation, if the head-stocks B B′ are to be projected, the workman depresses the foot-lever R with his foot. This movement carries the yoke *o* with it, and thereby actuates the bell-cranks *n* and levers *k*, which push the head-stocks endwise in their bearings. Upon releasing the pressure upon the treadle the weight H restores the parts to their former position. To adjust the amount of projection given to the head-stocks by the depression of the foot-lever R, a set-screw, *q*, is secured to each lever *k*, which acts as a stop.

Rotary motion is communicated to the head-stocks B B′ in the following manner: I is a shaft journaled on the front side of the machine, which, by means of a drive-pulley, J, receives motion from an overhead counter-shaft, J′. (Shown in dotted lines in Fig. 2.) Upon the shaft I are secured two pinions, *r r′*, (see Fig. 1,) each of which drives a separate train of gears. (Shown in Figs. 5 and 6.) The train in Fig. 6 consists of the four gears 1 2 3 4, and in Fig. 5 of the three gears 5 6 7. The effect of this arrangement is that the head-stocks B B′ are revolved in opposite direction.

Rotary motion is communicated to the head-stocks D D′, which carry the taps E E′, in the following manner: K is a shaft journaled on the rear side of the machine, receiving motion by means of one of the two belts P P′ and a drive-pulley, L, Fig. 2, from an overhead counter-shaft. Q and Q′ are idlers. Upon the shaft K are secured two pinions, *s s′*, which engage with two separate trains of gears. (Shown in Figs. 5 and 6.) The train driven by the pinion *s* consists of the gears 8 9 10, and the train driven by the pinion *s′* consists of the gears 11 12 13 14. As the latter train has one more intermediate pinions, it is clear that the head-stocks D D′ must revolve in opposite directions, whereby the taps secured to these head-stocks both produce the customary right-hand thread. The feeding of these taps is produced by the outer ends of the head-stocks D D′ being threaded and engaging in the nuts *t t′*, which are adjustably secured in brackets *u u′*.

The automatic devices for reversing and stopping the operation of the taps are arranged as follows: *h* is a pin secured to the under side of the sliding carriage F, near its rear end. *v* is a vibrating switch-lever pivotally secured at *w* (see Figs. 3 and 7) to the rear side of the frame A between the cheeks *c* and in line with the pin *h*, so that when the carriage is sufficiently projected the said pin will strike a lug, *y*, which projects on top of the spring-latch *z*. The spring-latch *z* is pivotally secured to the inner end of the switch-lever *v* in such manner that the pin *h* in striking the lug *y* when the carriage F is projected will vibrate the switch-lever; but when the carriage is retracted the pin *h* will simply operate the latch without vibrating the said lever.

The rear end of the switch-lever is pivotally secured at 15 to a notched bar, M, the opposite end of which is pivotally secured to a lever, N. The lever N is pivotally secured to the frame at 16. It carries upon its outer free end a weight, 27, and has secured to its inner end the belt-shifter O O′, for shifting the belts P P′. The belt P is a crossed belt, and therefore by shifting one or the other of the belts alternately on and off the live-pulley L the shaft K will be alternately revolved in opposite directions. This is done automatically by means of the following devices: The gear-wheel 14 is one of the train of gears above described, which carries motion from the shaft K to the head-stock D′. Its rim engages in a recess of corresponding width in the sliding block 17, which latter is thereby forced to follow the endwise movement of the head-stock D′. 18 is a wedge adjustably secured to the sliding block 17, and 19 is a lever pivotally secured at 20 to the frame of the machine. The lower end of this lever engages in a notch, 21, of the bar M, but can be forcibly disengaged therefrom by the action upon its upper end of the wedge 18. 22 is another lever pivoted at 23 to the frame of the machine. Its lower end engages in a notch, 24, of the bar M, and its upper end is provided with a set-screw, 25. 26 is a set-screw secured upon the sliding block 17.

The combined operation of the aforedescribed parts is as follows: When the head-stocks D D′ are not operating, the belts P P′ are both on the idlers. As soon as the carriage F is projected to bring the work in position for the operation of the taps, the pin *h* of the carriage vibrates the switch-lever *v*, and pulling the bar M carries the belt P onto the live-pulley. This movement will also perfect the engagement of the lower end of the lever 19 into the notch 21, and thereby lock the bar M in position. Now, owing to the lateral motion of the head-stocks D D′ when rotated, as the taps begin to operate the sliding block 17 is moved laterally by the gear-wheel 14 until the wedge 18, engaging the upper end of the lever 19 and releasing it from the notch 21, allows the weight 27 to act by its gravity, which movement carries the belt P off the live-pulley and shifts the belt P′ onto the same. The shifting of the belts reverses the motion of the head-stocks D D′, and the sliding block 17 is carried in an opposite direction, and the set-screw 26 striking the set-screw 25 will vibrate the lever 22, which engages in the notch 24 of the bar M. The vibration of the lever 22 actuates the belt-shifter to carry the belt P′ again off the live-pulley, and with both belts again on the idlers the motion of the shaft K will cease. Thus the taps are automatically started, reversed, and stopped.

All necessary adjustments for longer or shorter threads can be made by means of the

adjustable wedge 18 and set-screw 25, and the taps can be set from and to the work by means of the internally-threaded collars *t t'*, which are adjustably secured to the bracket *u u'*.

The belt-shifter O O' is guided in its movements by being connected to the guide-bars 28.

Additional taps working simultaneously with the taps on the head-stocks D D' can be easily arranged, if required, as the automatic device will control them all if they derive their motion from the shaft K in the same manner as the taps on the head-stocks D D'.

The design of this machine can be easily adapted to meet the requirements for different work, and the head-stocks B B' may be provided with any desired tools to perform certain work. Their drive-belt is also provided with a suitable belt-shifter worked by the operator, so as to discontinue their motion when not in use.

The spring-latch *z* locks the carriage F when the work is in proper position to be operated upon by the tools. It is provided with a foot-lever, S, whereby it may be easily unlocked by the operator, and the carriage advanced or retracted. The nature of the clamping device G depends upon the shape of the work. It has to be of proper description to fit certain parts of the work so as to hold it firmly and obviate the necessity of adjusting it upon the carriage, the machine, as above described, being only intended for the same kind of work in large quantities. The head-stocks upon opposite sides, working in directions opposite to each other, prevent all tendency to tear the work from its fastening, while the work will be an exact duplication on each side.

Any one set of tools can be used independently from the other set, as they are connected and driven from independent shafts.

What I claim as my invention is—

1. In a machine for the purposes described, a set of head-stocks, as D D', carrying taps, and the work-carrying table F, in combination with the belt-shifting devices, substantially as described, all combined and arranged to serve jointly with the set of head-stocks B B', carrying chamfering-tools, as set forth.

2. In a machine for the purposes described, the head-stocks D D', for operating the taps, the carriage F, the shaft K, and intermediate gearing for revolving said head-stocks in opposite directions, the pin *h* on the carriage F, and the switch-lever *v*, secured to the frame and actuated by said pin to automatically operate a belt-shifting device, in combination with the live-pulley L, having idlers on each side, and belts P P', running in opposite directions, and said belt-shifting device, whereby the shaft K can be revolved in opposite directions by changing the belt upon the live-pulley, or stopped entirely by running both belts on the idlers, substantially as described.

3. In a machine for the purposes described, an automatically-operating device for reversing and stopping the action of the head-stocks carrying the taps, said head-stocks being threaded upon their inner ends and engaging in stationary nuts, said device consisting of the sliding block 17, wedge 18, lever 19, notched bar M, gear-wheel 14, vibrating lever *v*, spring-latch *z*, lug *y*, pin *h* in carriage F, vibrating lever 22, set-screws 25 and 26, weighted lever N, belt-shifter O O', belts P P', idlers Q Q', pulley L, shaft K, and intermediate gearing between shaft K and the head-stocks D D', all arranged, combined, and operating substantially as described.

4. In a machine for the purposes described, a set of head-stocks, D D', provided with taps, said head-stocks receiving their rotary motion by intermediate gear from one common shaft, in combination with the devices for reversing and stopping the motion of said shaft, the same being operated by one of said head-stocks in its longitudinal movement, substantially as and for the purposes described.

5. In a machine for the purposes described, a set of revolving head-stocks, as D D', and a carriage, F, having a pin, *h*, in combination with a lever, one end of which is arranged in the path of said pin, and the opposite end connected with a belt-shifter, substantially as and for the purposes described.

6. In a machine for the purposes described, a set of revolving head-stocks, as D D', carrying taps, and constructed to be revolved in opposite directions from one common shaft by intermediate gearing, substantially as described, in combination with the carriage F, having pin *h*, the switch-lever *v*, pivotally secured to the frame, and the bar M, one end pivotally secured to said switch-lever and the other end connected with a belt-shifter, substantially as and for the purpose specified.

LOUIS C. RODIER.

Witnesses:
H. S. SPRAGUE,
E. SCULLY.