(No Model.) 2 Sheets—Sheet 1.

O. C. LITTLE.

METAL CUTTING MACHINE.

No. 390,978. Patented Oct. 9, 1888.

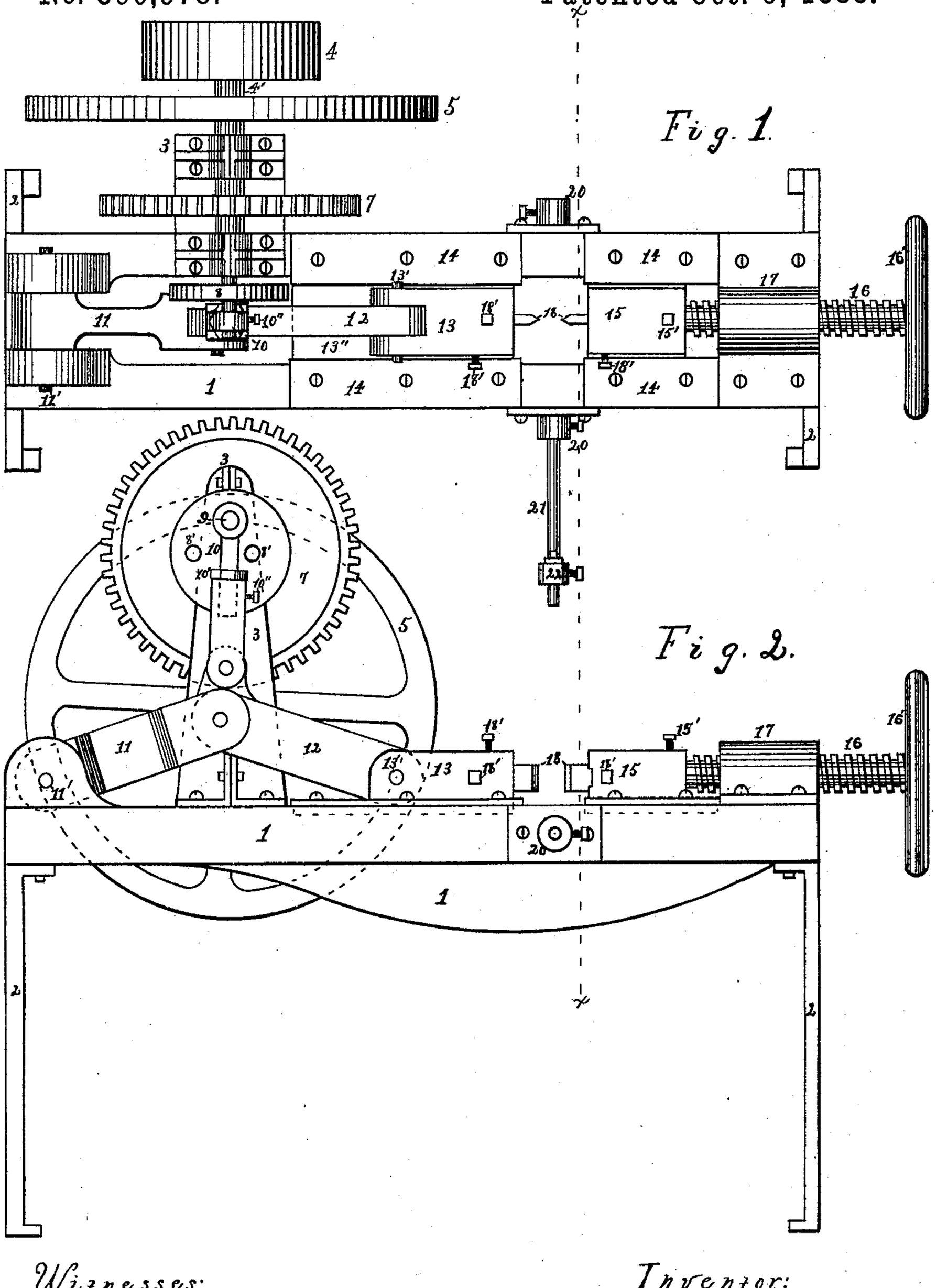

Fig. 1.

Fig. 2.

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(No Model.)

2 Sheets—Sheet 2.

O. C. LITTLE.

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Fig. 3.

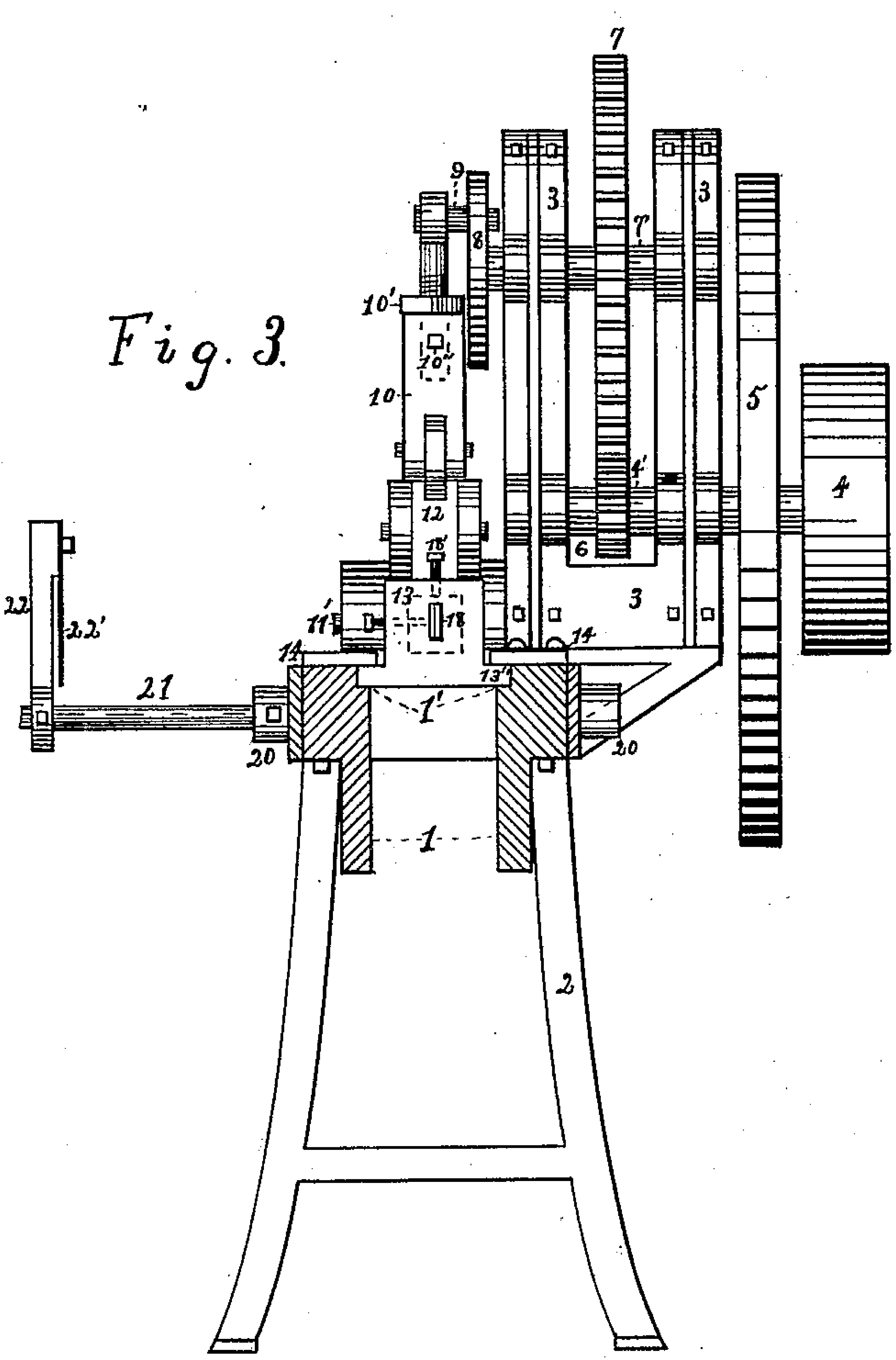


Fig. 4.

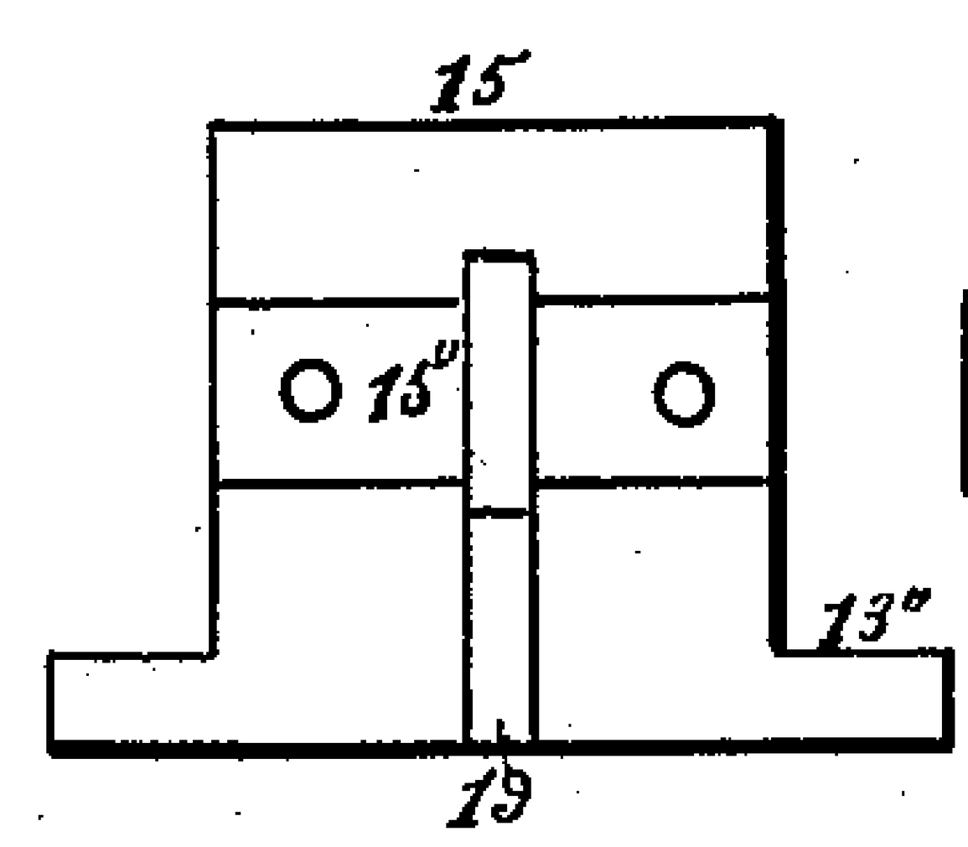


Fig. 6.

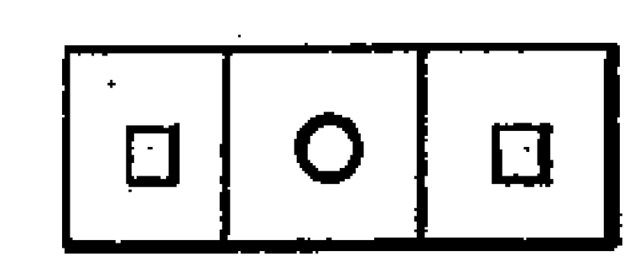


Fig. 9.

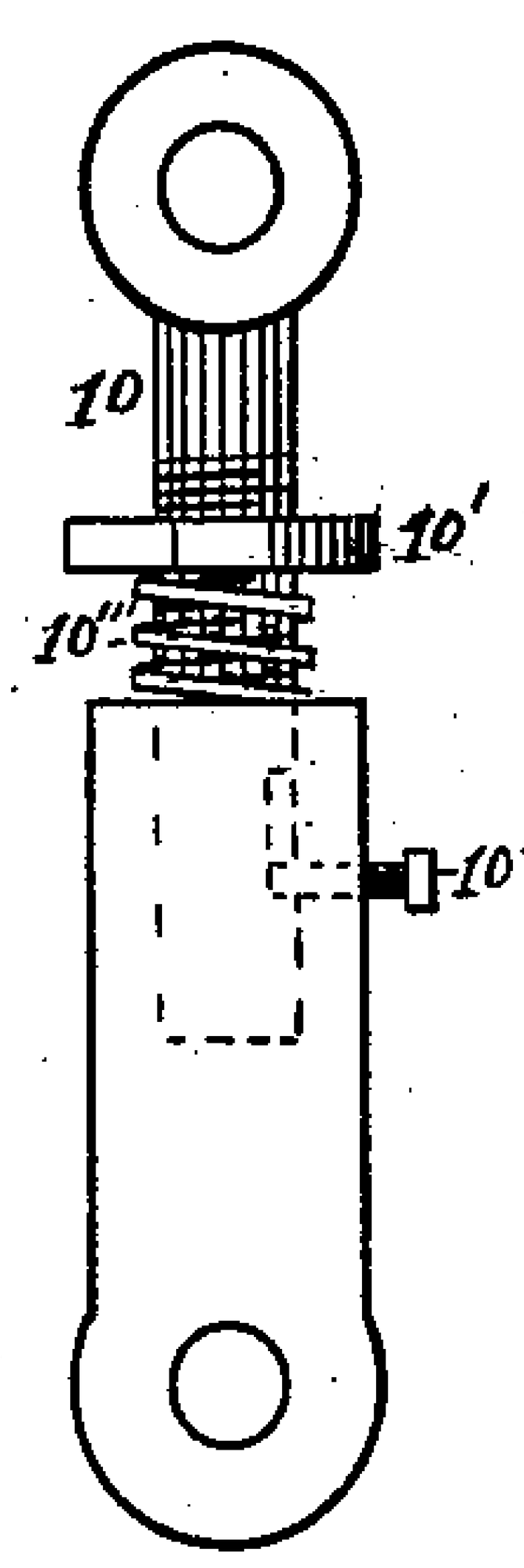


Fig. 5.

Fig. 8.

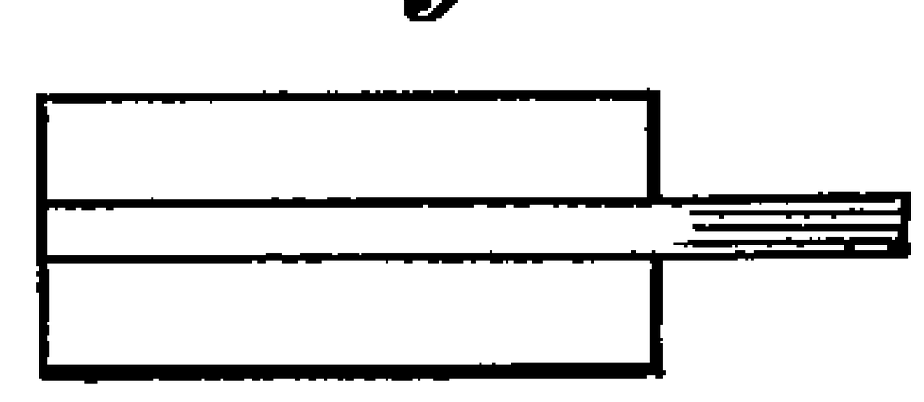
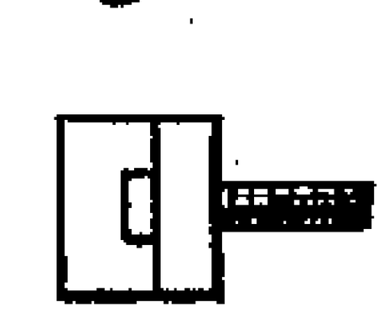
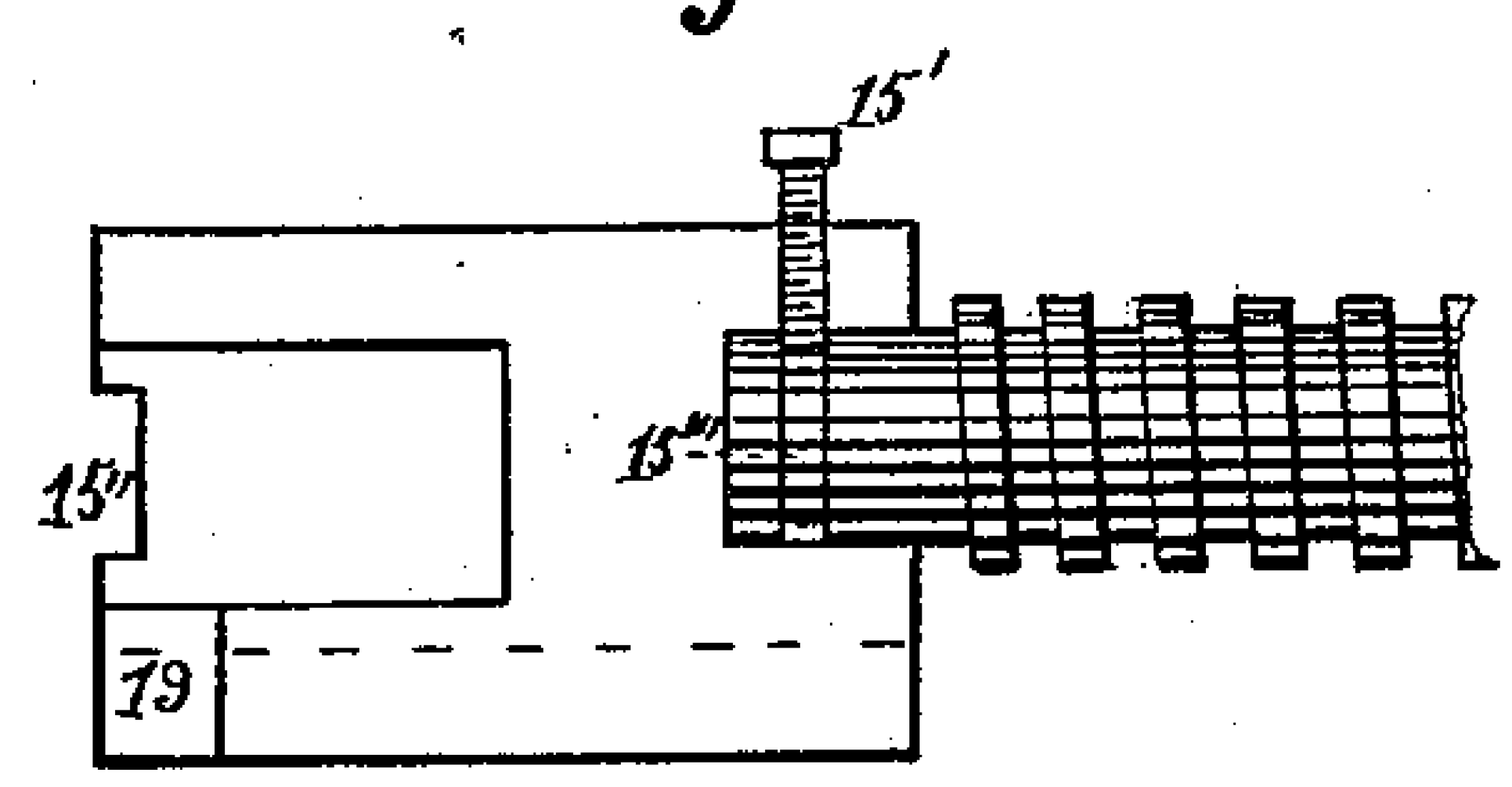


Fig. 7.





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UNITED STATES PATENT OFFICE.

ORTON C. LITTLE, OF MENASHA, WISCONSIN, ASSIGNOR TO DUNCAN T. H. MACKINNON, OF SAME PLACE.

METAL-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 390,978, dated October 9, 1888.

Application filed May 26, 1888. Serial No. 275,244. (No model.)

To all whom it may concern:

Be it known that I, ORTON C. LITTLE, a citizen of the United States, residing at Menasha, in the county of Winnebago and State of Wisconsin, have invented a new and useful Improvement in Metal-Cutting Machines, of which the following is a specification.

My invention relates to improvements in machines having sliding metal cutters, which are operated by steam or other power, and in which are combined features which adapt it for cutting, punching, pressing, and swaging iron or other metals; and the objects of my improvement are, first, to provide a machine of small cost, great power, and large and varied capacity; and second, to produce one in which the changes necessary to adapt it to the several purposes are easily and quickly made. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a top view of the machine with cutting-tools fitted to it for cutting purposes. Fig. 2 is a side view of the same. Fig. 3 is a transverse vertical section upon the line *x x* of Figs. 1 and 2. Figs. 4 and 5 are an end view and longitudinal vertical section, respectively, upon an enlarged scale, of the tool-stock 15, or the passive one, as shown in Figs. 1 and 2; Figs. 6 and 7, plan and end views upon the same enlarged scale, of a die for application to the aforesaid tool-stock; Fig. 8, a longitudinal side elevation, upon the same scale, of a punch for use in connection with the die aforesaid; and Fig. 9, a front elevation of a modification of the connecting-rod.

Similar figures of reference indicate like parts in the several views.

The table 1, legs 2, and bracket-stand 3 constitute the frame of the cutter, upon which the operating mechanism is located. This mechanism consists of the following: A driving-pulley, 4, upon the shaft 4′, to which power is applied from any convenient motor. Upon this shaft is a heavy fly-wheel, 5, and the pinion 6. Above and gearing with the pinion is a gear-wheel, 7, upon the shaft 7′, said shafts being journaled upon the bracket-stand 3 of the frame. Upon one extremity of the latter shaft is secured the crank-wheel 8, it having through its face numerous holes, 8′, into one of which the crank-pin 9 is placed and secured. Connecting with the crank-pin, by means of the connecting-rod 10, are toggle-joint bars 11 and 12, the former being connected with the machine-table 1 by the pin 11′, and the latter with the sliding tool-stock 13 by the pin 13′. The stroke or reciprocating movement of said tool-stock is made more or less by placing the crank-pin 9 in holes 8′ in the wheel 8, farther from or nearer to its center. The connecting-rod 10 is made longer or shorter, to accommodate the desired change, by means of the nut 10′ upon the threaded portion of the upper section of said rod, the lower section receiving the lower end of the upper section and retaining it from withdrawal during the upward movement of the crank-pin by means of the set-screw 10″.

In Fig. 9 a modified construction of the connecting-rod is shown. In using the machine for forging purposes it is sometimes found desirable to have a small amount of elasticity in the blow given. In order to produce this result, a spring, 10‴, is introduced into the construction of the connecting-rod, it being placed under the nut 10′, and the threaded end of said rod permitted longitudinal movement in the lower section thereof. A groove is cut in the threaded part, with which the set-screw 10″ engages, and prevents its withdrawal while permitting a limited movement. Upon the bottom of the tool-stock 13 is an extension, 13″, projecting beyond its body at its rear end and sides. It is planed upon its side edges and fitted into and slides in the grooves 1′, formed in the upper and inside edges of the table 1.

Fitted in the same manner and sliding in the same groove is the tool-stock 15. Both of said tool-stocks are retained within the grooves by means of the gib-plates 14, which are bolted to the table 1. A screw, 16, having a hand-wheel, 16′, upon its outer end, engages with the large nut 17, its other extremity entering the tool-stock 15. Within the tool-stock, as shown in Fig. 5, a groove, 15‴, is cut around said screw, into which a set-screw, 15′, enters, and preserves their connection during the receding movement of the tool-stock, which can be produced at the will of the operator by revolving the hand-wheel 16′.

Into each of the tool-stocks, Figs. 1 and 2,

cutting-tools 18 are secured. Other tools, as a punch and die, plain-faced hammers, or swages, &c., may be substituted for the cutters, as the nature of the work demands. Being retained in place by the set-screws 18′, they are quickly changed one for the other.

In Fig. 4 the tool-stock 15 is represented as having in its end a horizontal groove, 15″, for the reception of a die, and in Figs. 6 and 7 a die is shown as adapted to fit the same and be retained by bolts fitted to enter the round holes shown in the end of said tool-stock. A punch is shown in Fig. 8 adapted to be secured in the tool-stock 13 and engage with the aforesaid die. A vertical groove, 19, is shown in Figs. 4 and 5, which is formed for the purpose of providing for the escape of the pieces which are removed from the work being done by the action thereon of the punch.

The purpose of making the passive tool-stock movable at the will of the operator to and from the active one is to adapt the machine for cutting, swaging, &c., iron of large or small sizes, as by this means a cut or blow of any desired amount within the limits of its power is provided for.

In the operation of cutting round, square, or flat iron cuts of any desired depth, subject to the above-named limits, are possible. For cutting angle-iron it is particularly adapted, each leg of the angle being separately cut—a result attained in no cutter in which a shear cut is made, or one in which one of the cutters passes the other, after the manner of the shears in common use, except at the expense of jammed and jagged ends, loss of time and material.

For squaring or rounding the ends of shafts, hammer-faced tools, as shown in dotted lines, upon the end of the tool-stock in Fig. 3, or swages of the desired form being substituted for the cutters 18, it is also well adapted, as shafts of different sizes can have their ends formed as required, uniform in the sizes for which they may be adapted.

The speed at which the machine is driven can be made fast or slow, thereby adapting it for hammering, cutting, punching, &c., of large or small articles in any of the well-known ways, as by the use of sliding gears of different sizes upon the shafts 4′ and 7′, or by a pair of cone-pulleys upon counter-shafts, from one of which the power is transmitted to the pulley 4.

At each side of the table 1 are sockets 20, into either of which the gage-rod 21 can be secured. Fitted loosely upon said rod and capable of being secured at any point in its length is a gage, 22. This consists of a bar of iron, near the upper end of which a spring, 22′, is attached. Its upper end is secured by a bolt to a boss upon the bar aforesaid, and its lower end is left free to vibrate whenever force is applied sufficient to overcome its elasticity. The rod, bar, and spring are located in a line at right angles with the plane of the cutting-tools and their cutting-point, and the lower end of the spring is adapted in height relative to said tools for use as a gage for limiting the length of the bars to be cut.

The object of the gage is to provide means for cutting quantities of rods or bars of iron, wire, &c., of uniform length, and the purpose of the spring 22′ is to receive the end-thrust of the bar, which is produced by the action of the cutting-tools, and to prevent any kinking of the bar or undue strain upon the cutters or the gage.

The operation of the device is as follows: The shaft 4′ being revolved, motion is imparted to the crank-wheel 8 through the revolution of the gears 6 and 7, giving to the tool-stock 13, by the action of the toggle-joint bars, a reciprocating motion. The operator, placing with one hand a bar of iron between the tools of the tool-stocks and turning it as required, revolves the hand-wheel 16′ with the other, thereby moving the tool-stock 15 to and from the active one and giving to the piece being operated upon such action of the tools as the nature of the work to be done requires.

I do not desire to confine the construction of the parts comprising my invention to the identical arrangement here shown, as frames of other forms and other combinations of gearing for revolving the crank-wheel 8 may be successfully used.

I do not claim as new a metal-cutter in which the active cutter has a sliding movement; neither do I claim producing the sliding or reciprocating movement to said cutter by means of toggle-joint bars operated by a crank or eccentric; nor, as a distinctive feature of a tool-stock, one adapted for interchangeable tools; but

What I do claim, and desire to secure by Letters Patent, is—

1. The combination, in a metal-cutting machine, of active and passive tool-stocks arranged to slide in the same plane, the former reciprocated therein by means of the action of a revoluble shaft, crank-wheel, connecting-rod, and toggle-joint bars, and the latter capable of movement to and from the former, at the will of the operator, by the action of the screw 16, which is connected thereto, substantially as described and shown.

2. In a metal-cutting machine, its active tool-stock having a reciprocating motion upon its frame, the passive tool-stock 15, fitted to slide in the same plane to or from the active one, the hand-wheel 16′, screw 16, and nut 17, the screw connected with the tool-stock 15, and means for retaining them in working union, substantially as set forth.

3. In a metal-cutting machine having both active and passive tool-stocks sliding in the same plane, the latter at the will of the operator, the former having a reciprocating movement imparted to it by means of the action of a revoluble shaft and crank-wheel, a connecting-rod and toggle-joint bars, the combination of the connecting-rod 10, having its length

capable of extension or contraction, and means for its retention at the desired length, and means for securing one end thereof to the crank-wheel at points nearer to or farther from its center, for the purpose of producing a shorter or longer reciprocating movement to said tool-stock, substantially as described.

4. In a metal-cutting machine, the combination, with its frame and fitted to slide in the same plane therein, of active and passive tool-stocks, each fitted to receive tools for various purposes, as cutting, punching, hammering, and swaging, mechanism for producing a reciprocating movement to the active one, consisting of the crank-shaft 7′, wheel 8, pin 9, connecting-rod 10, and toggle joint bars 11 and 12, and also mechanism for the movement of the passive tool-stock to and from the active one at the will of the operator, all arranged and operating substantially as set forth.

5. In a metal-cutting machine, the combination of the frame, consisting of the table 1, legs 2, and bracket-stands 3, shafts 4′ and 7′, revoluble in said stand, pulley 4, pinion 6, gear-wheel 7, crank-wheel 8, crank-pin 9, connecting-rod 10, toggle-joint bars 11 and 12, tool-stocks 13 and 15, adapted to receive tools for various purposes, as cutting, punching, hammering, or swaging, the tool-stock 13 being reciprocated in ways upon the table 2 by means of the aforesaid mechanism, and the tool-stock 15, adapted for movement to and from the tool-stock 13 at the will of the operator, by means of the screw 16, nut 17, and hand-wheel 16′, substantially as described.

6. In a metal-cutting machine, the combination of a frame supporting the operating mechanism, cutting-tools 18, secured in tool-stocks 13 and 15, the former one being reciprocated in ways upon the frame-table by means of toggle-joint bars 11 and 12, operated by the crank-wheel 8, and the latter one capable of movement in the same plane, by means of the operation of the screw 16 and nut 17, to and from the tool-stock 13 at the will of the operator, and the spring-gage 22, capable of being secured at any desirable point upon the rod 21, said rod being adapted to be secured to the supporting-frame at either side thereof, substantially as set forth.

7. In a metal-cutting machine provided with an active tool-stock reciprocated in ways upon its frame by means of the action of a revolving shaft upon toggle-joint bars, the combination of a connecting-rod therefor formed of two sections and capable of having its length extended and contracted, and having means for limiting the extent thereof, and having a spring interposed between said sections, whereby elasticity is imparted to the longitudinal movement of said rod, substantially as shown and set forth.

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