(No Model.) 3 Sheets—Sheet 1.

T. E. CHERRY

METAL PLANER.

No. 477,510. Patented June 21, 1892.

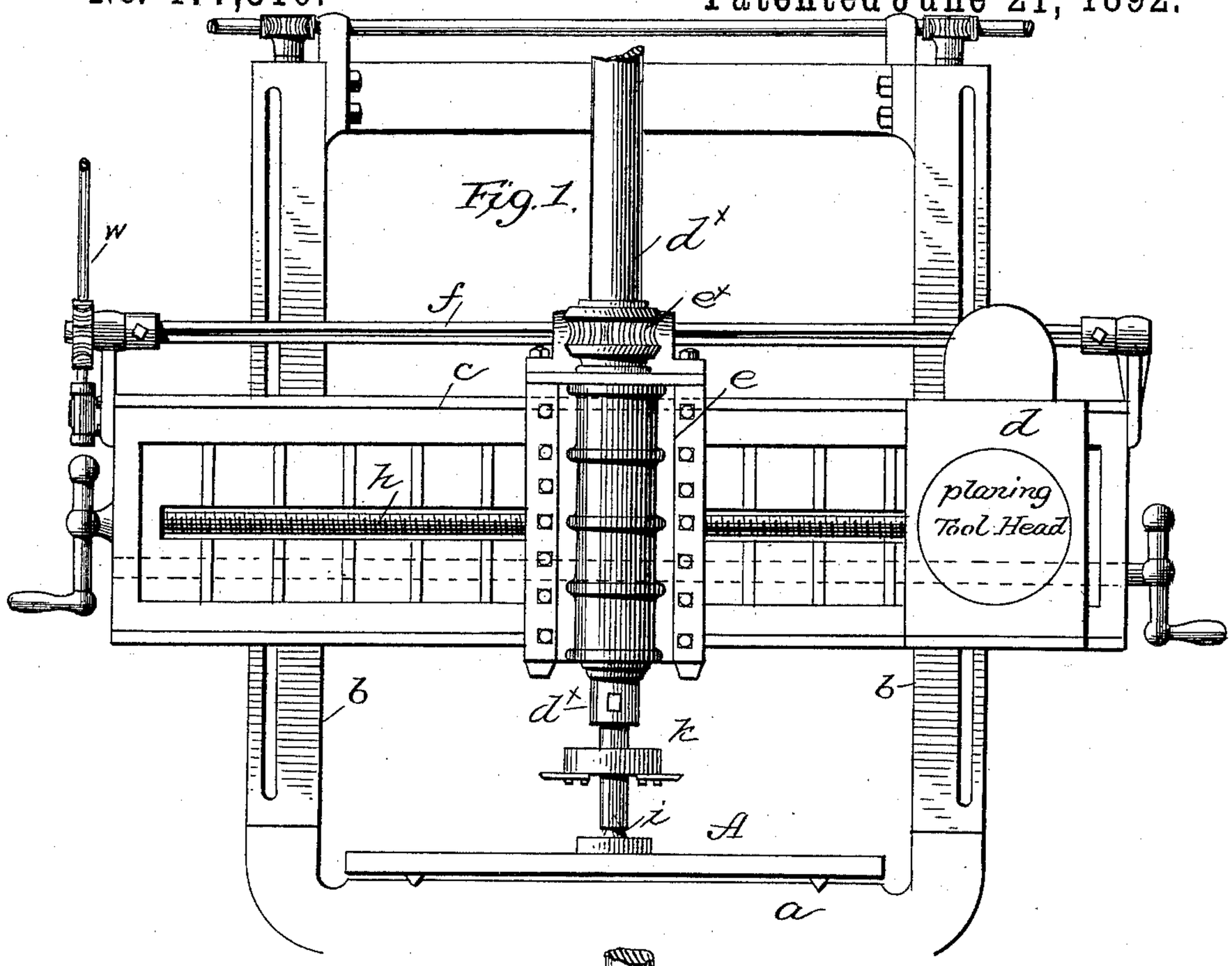

Fig. 1.

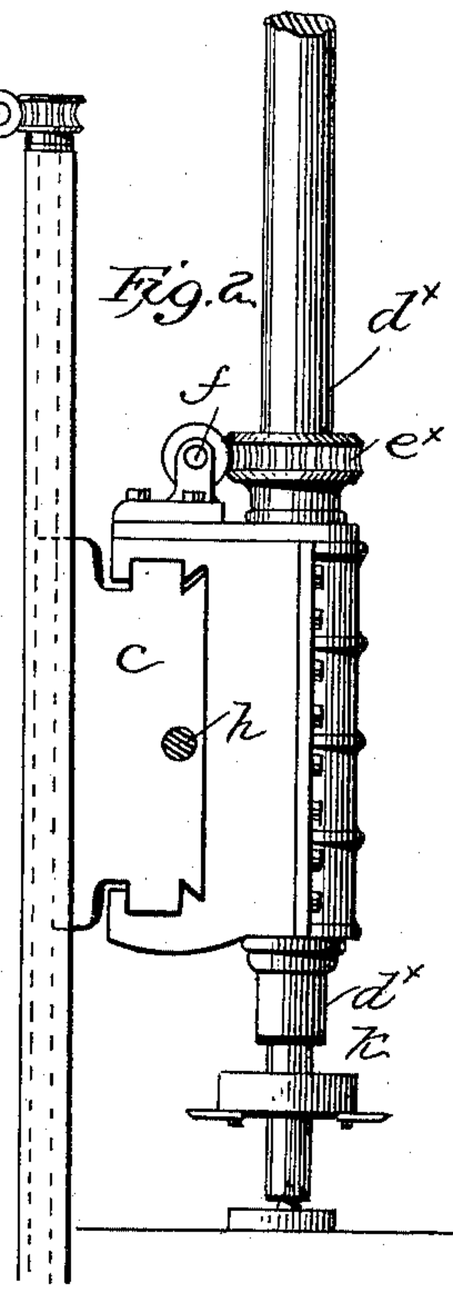

Fig. 2.

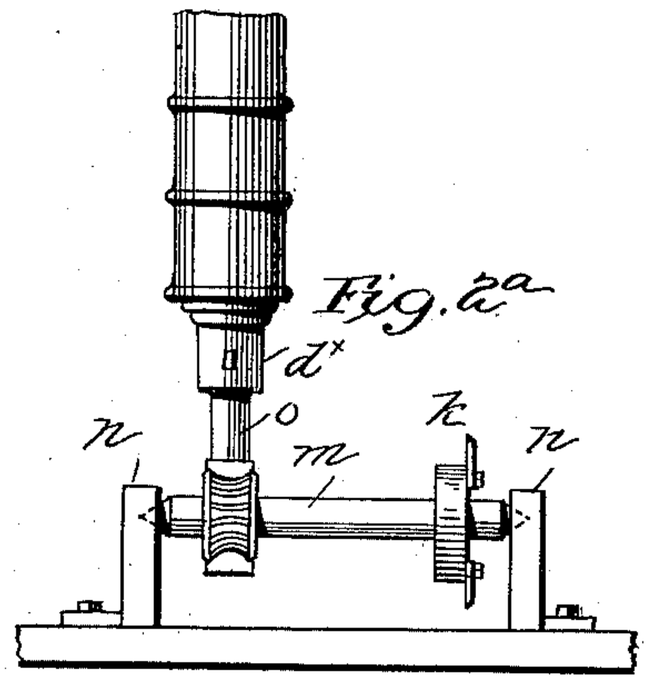

Fig. 2a.

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(No Model.) 3 Sheets—Sheet 2.

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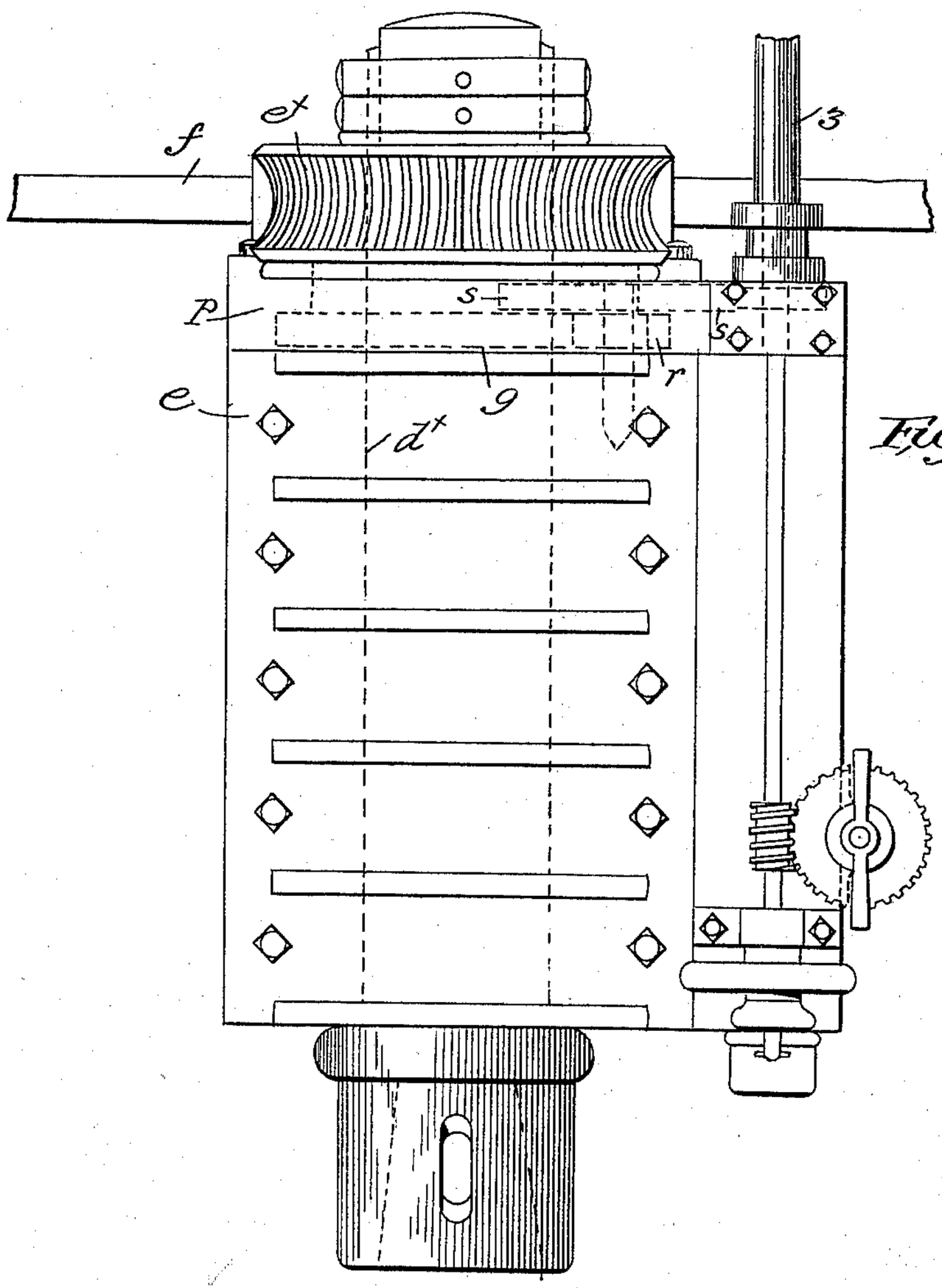

Fig. 4.

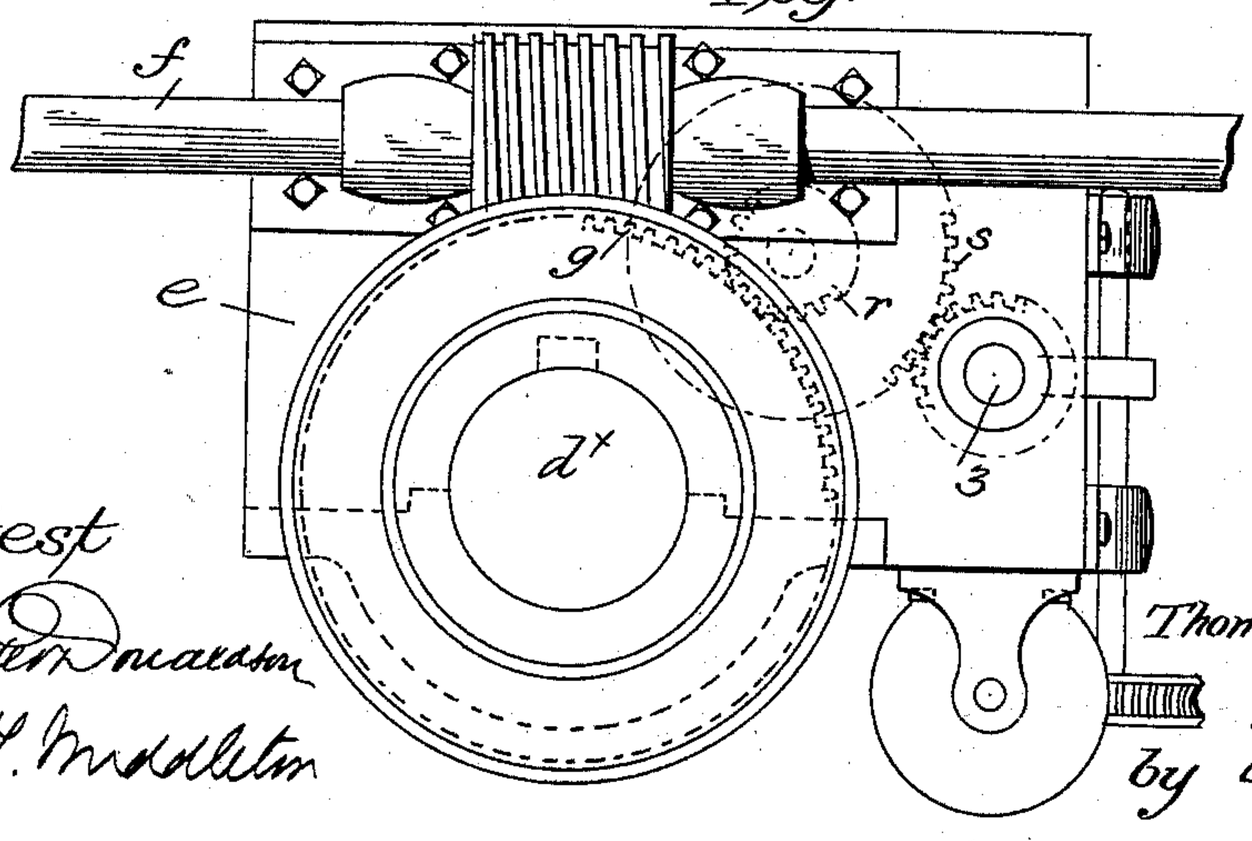

Fig. 3.

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(No Model.)

3 Sheets—Sheet 3.

T. E. CHERRY.

METAL PLANER.

No. 477,510. Patented June 21, 1892.

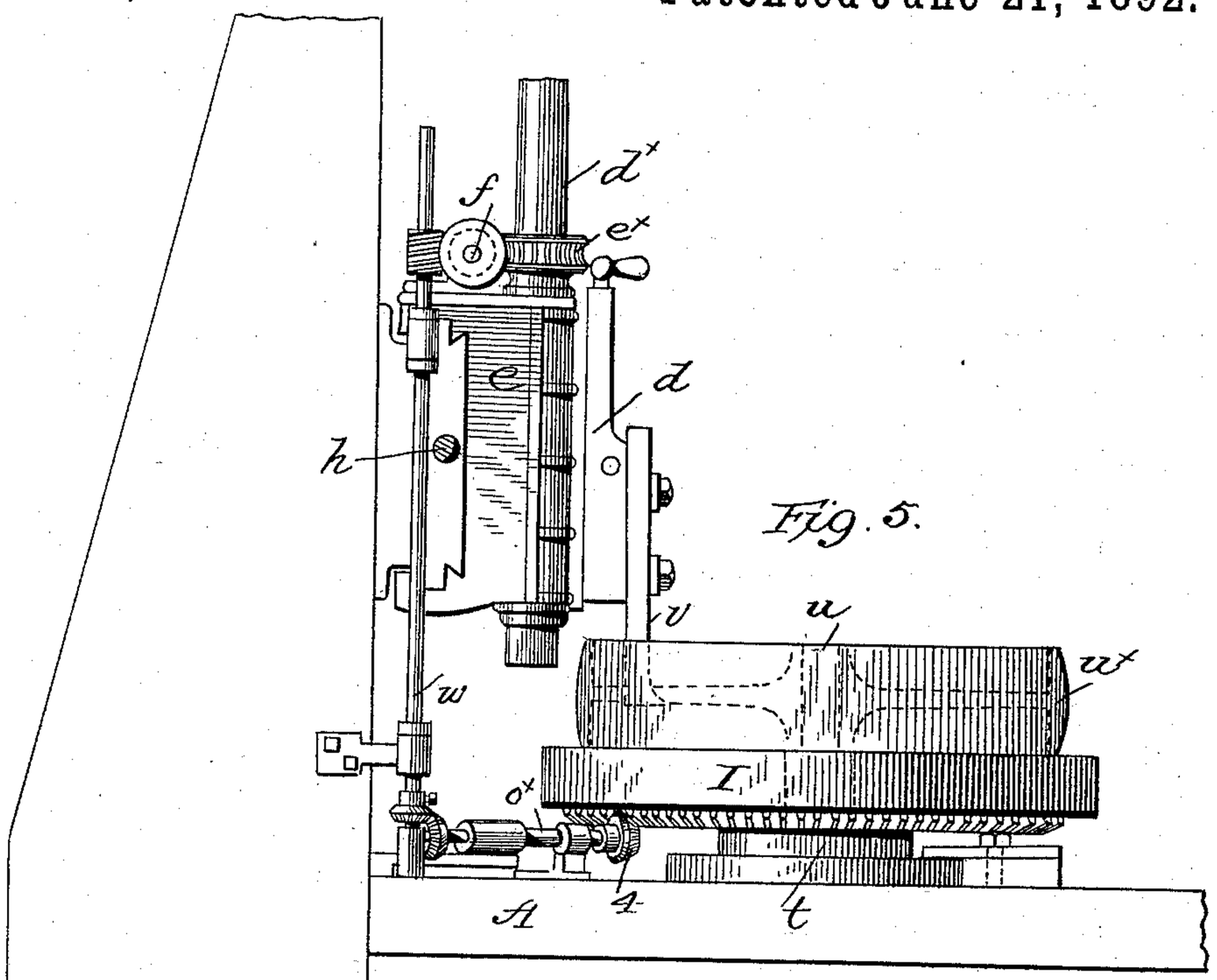

Fig. 5.

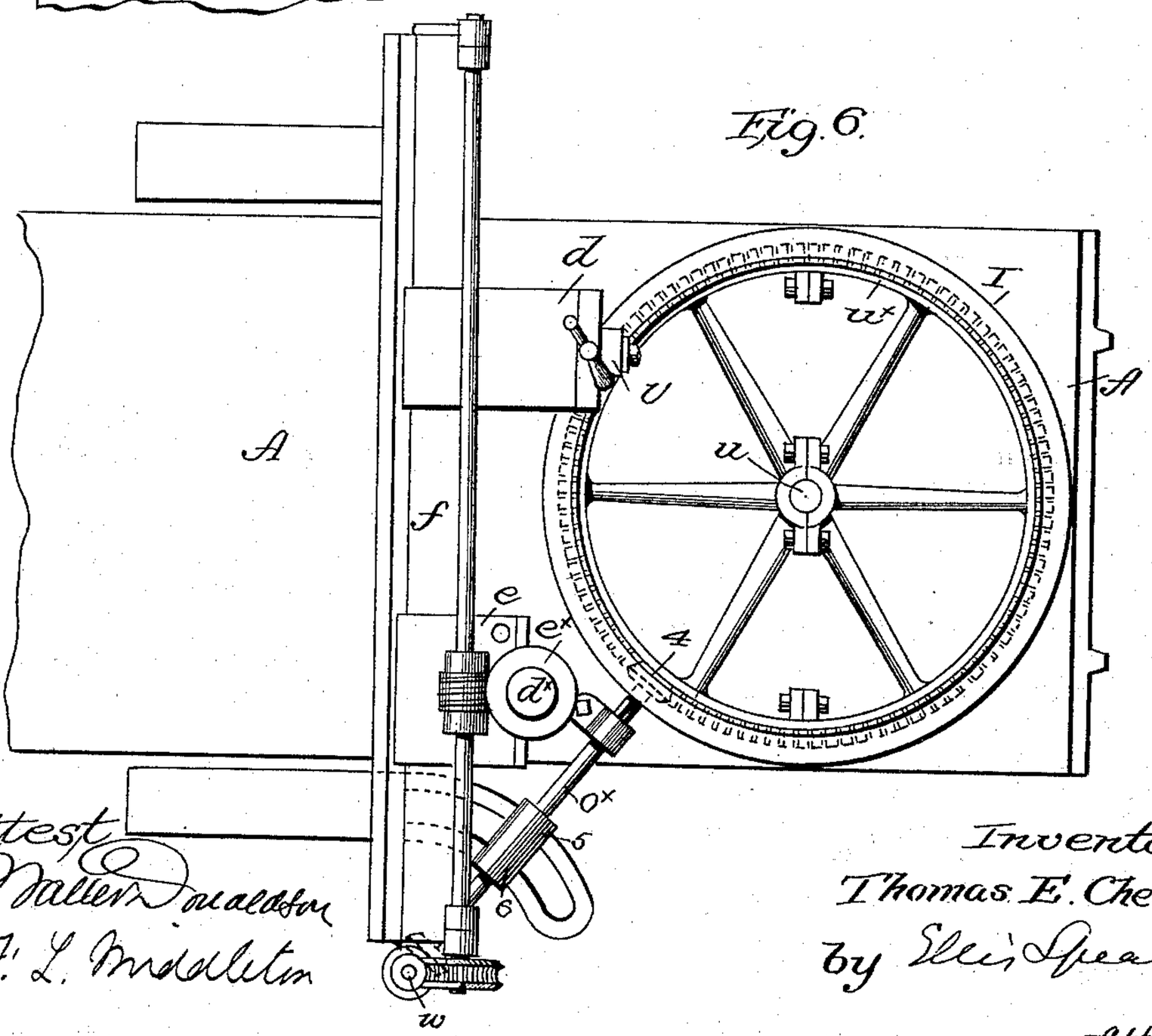

Fig. 6.

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UNITED STATES PATENT OFFICE.

THOMAS E. CHERRY, OF BATH, MAINE, ASSIGNOR OF ONE-HALF TO FRANCIS B. TORREY, OF SAME PLACE.

METAL-PLANER.

SPECIFICATION forming part of Letters Patent No. 477,510, dated June 21, 1892.

Application filed July 22, 1891. Serial No. 400,328. (No model.)

To all whom it may concern:

Be it known that I, THOMAS E. CHERRY, a citizen of the United States of America, residing at Bath, in the county of Sagadahoc and State of Maine, have invented certain new and useful Improvements in Metal-Planers, of which the following is a specification.

My invention relates to metal-planers, and includes certain constructions and arrangements of parts by means of which cylinders, fly-wheels, propeller-wheels, and other articles may be planed, bored, turned, and drilled on the same machine and without shifting their position on the planer-bed. Heretofore in finishing engine-cylinders and other articles requiring planing, boring, or drilling it has been customary and necessary to strap or clamp the article upon the platen of the planing-machine and for the boring or drilling to shift it to another machine fitted for boring, on which it was adjusted accurately and then secured, after which it was bored out. This method necessitated a second handling and more accurate and careful adjustment in order to have the bore in proper relation to the plane of the finished face.

My invention includes a revolving platen carried by the reciprocating platen, a cross-head carrying a planing-tool, and a rotary tool-holder, with means for laterally adjusting them, and driving means for the platen, to which are connected the driving means of the rotary tool-holder.

It is illustrated in the accompanying drawings, in which—

Figure 1 is a front view of the machine; Fig. 2, a side elevation of the same. Fig. 2^a is a detail view of the boring-tool horizontally arranged. Fig. 3 shows a plan, and Fig. 4 a side elevation, of the drilling attachment. Fig. 5 shows a side elevation, and Fig. 6 a plan, of the revolving platen and its connections.

In the drawings, *a* represents the bed of the machine, and *b* the frame on which the cross-head *c* is mounted. This cross-head is of ordinary construction, except that under some circumstances it may be desirable to extend it farther laterally; but its adjustment may be the same as usual. On the cross-head is the ordinary tool-block *d*, which may be moved aside, as shown in Fig. 1, when the boring-tool is brought into use. The block of the boring or drilling tool is shown at *e*. It is made to slide on the cross-head in the same manner as the ordinary tool-head is held and slides. It is provided with a vertical shaft $d^\times$, which has in its block a rotary movement. In the upper end of the block is a worm-gear $e^\times$, fixed on the shaft $d^\times$, which gear engages with a splined worm upon a transverse shaft *f*, mounted in bearings on the cross-head. The shaft *f* is turned by a shaft *w* or in any suitable manner. Thus the block *e* may be moved to any desired point over the bed of the planer by means of the shaft *h*, while the connections for driving the tool remain stationary. In the lower end of the shaft $d^\times$ is a socket to receive the shaft of the boring-tool *k*. This tool is keyed in and accurately centered in the usual manner.

The cylinder which is to be planed is strapped to the bed at the proper point and then planed. The planer-block is then moved aside and the block of the boring-tool moved into proper position over the cylinder. The boring-tool is put in place and the boring completed. This not only saves the removal of the cylinder to another machine and the use of another machine and the care and labor for accurately adjusting and securing the cylder in its new position, but it insures accuracy in the boring, since the bore must necessarily be exactly at the right angle to the planed surface of the end of the cylinder, and one or more bores can be done while the cylinder is in position.

Where it is necessary to bore horizontally, I have provided means shown in Fig. 2^a, in which *m* is a horizontal tool-shaft carrying tool *k*. This shaft is supported in removable standards *n*, fixed in the bed and provided with a worm-gear, which engages with a worm on a stem *o*, fitted to be keyed in the lower end of the shaft *d*.

The shaft $d^\times$ is necessarily large for the purpose of boring and is too large for drilling. In order to provide a drilling-stock of more suitable size for the drill and to give it more rapid motion, I provide an additional shaft.

(Shown in Figs. 3 and 4.) This shaft (marked 3 in the drawings) is set vertically in bearings in the same block which carries the boring-tool, and forms the stock of the drill. The shaft of the boring-tool carries a gear-wheel *g*. This is pivoted upon and is inclosed by the plate *p*, which is chambered out underneath to receive the wheel. Similarly located on the same plate is a smaller gear-wheel *r* in mesh with the wheel *g*, and fixed to this gear *r* is a larger gear *s*, which in turn meshes with a pinion on the drill-stock. By the train of gears the motion of the drill-spindle is increased to any required speed, according to the relative sizes of gear-wheels. On the same block I have shown, also, the ordinary mechanism for feeding the drill to its work. When the drill is to be used, the boring-tool is disconnected and the shaft serves only to run the drill, and by this means all the necessary work may be done upon the metal without unstrapping it.

In finishing fly-wheels the apparatus above described would serve to plane the sides and to bore the hub, and when, as is the case with the larger fly-wheels, the wheel is made in sections it serves to plane the meeting faces of the sections; but it will not serve to plane the periphery. To accomplish this, I have provided the mechanism which is illustrated in Figs. 5 and 6 for turning an article strapped on the platen. In these figures I represent a circular rolling platen. It is mounted upon a stud *u*, which has a flange, by means of which it is bolted to a plate *t*, secured removably to the ordinary platen of the planer. The fly-wheel—for example, such as shown at $u^{\times}$—is laid on its side on the revolving platen. To finish the complete wheel, the plate *t* is put on with the stud in place and with the revolving platen adapted to turn upon the stud. The revolving platen has an annular rack upon the lower face near the edge. With this engages a pinion 4 on the end of a horizontal shaft $o^{\times}$. This shaft $o^{\times}$ is driven by the vertical shaft *w* through bevel-gears. The shaft *w* has its bearings in the cross-head and is driven by counter-shaft or otherwise independently of the planer, and the shaft *w* drives the boring, drilling, and turning attachments independently or together. The wheel is strapped to the revolving platen and turns with it, with the periphery in contact with the tool *v* on the ordinary block on the cross-head of the planer. This tool may be set first at an angle and then at another angle to give the proper contour to the periphery of the wheel.

To set the machine for wheels of different sizes, the reciprocating platen A is moved in or out, and the shaft $o^{\times}$ is extensible and is mounted in movable bearings 5 and 6, which move in ways curved on a circle struck from the pivoted point of the outer end of the shaft *o*. One of the gears on the shaft *o* is splined—for example, the pinion 4—so that the shaft *o* may be swung to hold the connection with revolving platen when it is shifted for larger or smaller wheels.

The revolving platen is made of a diameter fitted to move between the standards of the planer, so that the platen may be moved close to the cross-head. With this revolving platen a cylinder may be bored by the revolution of the platen alone, the boring-tool being fixed on the block of the cross-head, so that I do not confine myself to the revolving tool.

Any kind of fly-wheel or pulleys may be turned and bored in the manner above described. A wheel can be turned whose diameter is twice the width of the planer.

I claim—

1. In combination, the tool-block carrying a tool, the reciprocating platen, a rotary platen carried thereby and having gear-teeth, and means for operating said rotary platen, including a gear-wheel meshing with the teeth on the rotary platen, and an extensible shaft carrying the same, substantially as described.

2. In combination, the cross-head carrying a planer-tool and a rotary tool-driver, a horizontal shaft with geared connections to the tool-driver, the vertical shaft *w*, the rotary platen carried by the reciprocating platen, and the connections from the vertical shaft *w* to the rotary platen.

3. In combination, the cross-head carrying a planer-tool and a movable tool-driver, the rotary platen carried by the reciprocating platen, and the driving connections between the rotary platen and the tool-driver, substantially as described.

4. In combination, the cross-head carrying a planer-tool and a movable tool-driver, a shaft *w*, a rotary platen carried by the reciprocating platen, extensible connections between the platen and the driving-shaft, and driving connections from the driving-shaft to the tool-driver, substantially as described.

5. In combination, the cross-head carrying a planer-tool and a rotary-tool driver, a rotary platen carried by the reciprocating platen, a vertical driving-shaft *w*, the connections therefrom to the rotary platen and the tool-driver, respectively, a supplemental tool-driver carried by the block of the main tool-driver, and geared connections from the main tool-driver to the supplemental tool-driver, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

THOMAS E. CHERRY.

Witnesses:

HENRY W. FIELD,

FRANCIS B. TORREY.