

(No Model.)

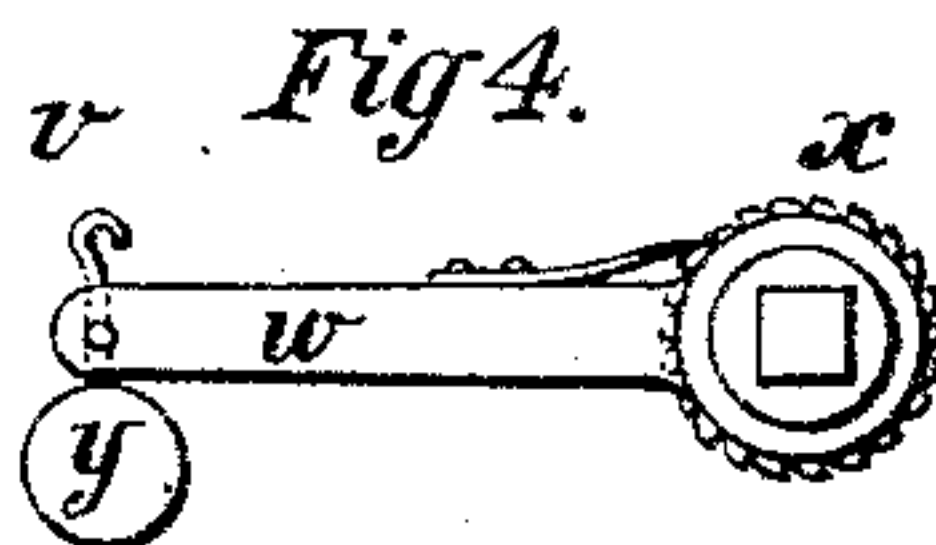
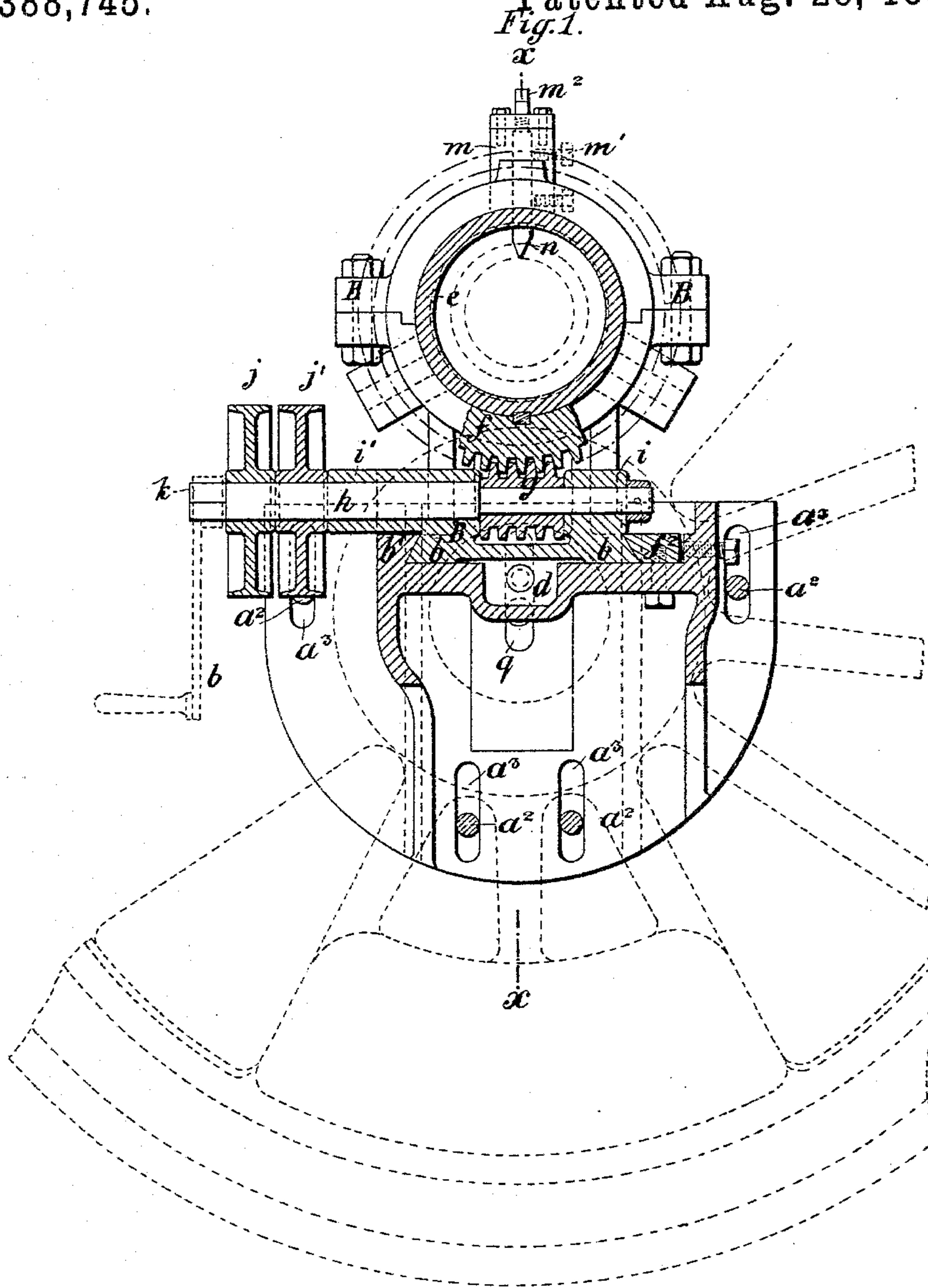
2 Sheets—Sheet 1.

T. URQUHART.

DEVICE FOR TURNING CRANK PINS.

No. 388,745.

Patented Aug. 28, 1888.



Witnesses:
J. A. Rutherford,
Robert Emmett.

Inventor:
Thomas Urquhart.
By James L. Norris.
Atty.

T. URQUHART.

DEVICE FOR TURNING CRANK PINS.

No. 388,745.

Patented Aug. 28, 1888.

Fig. 3.

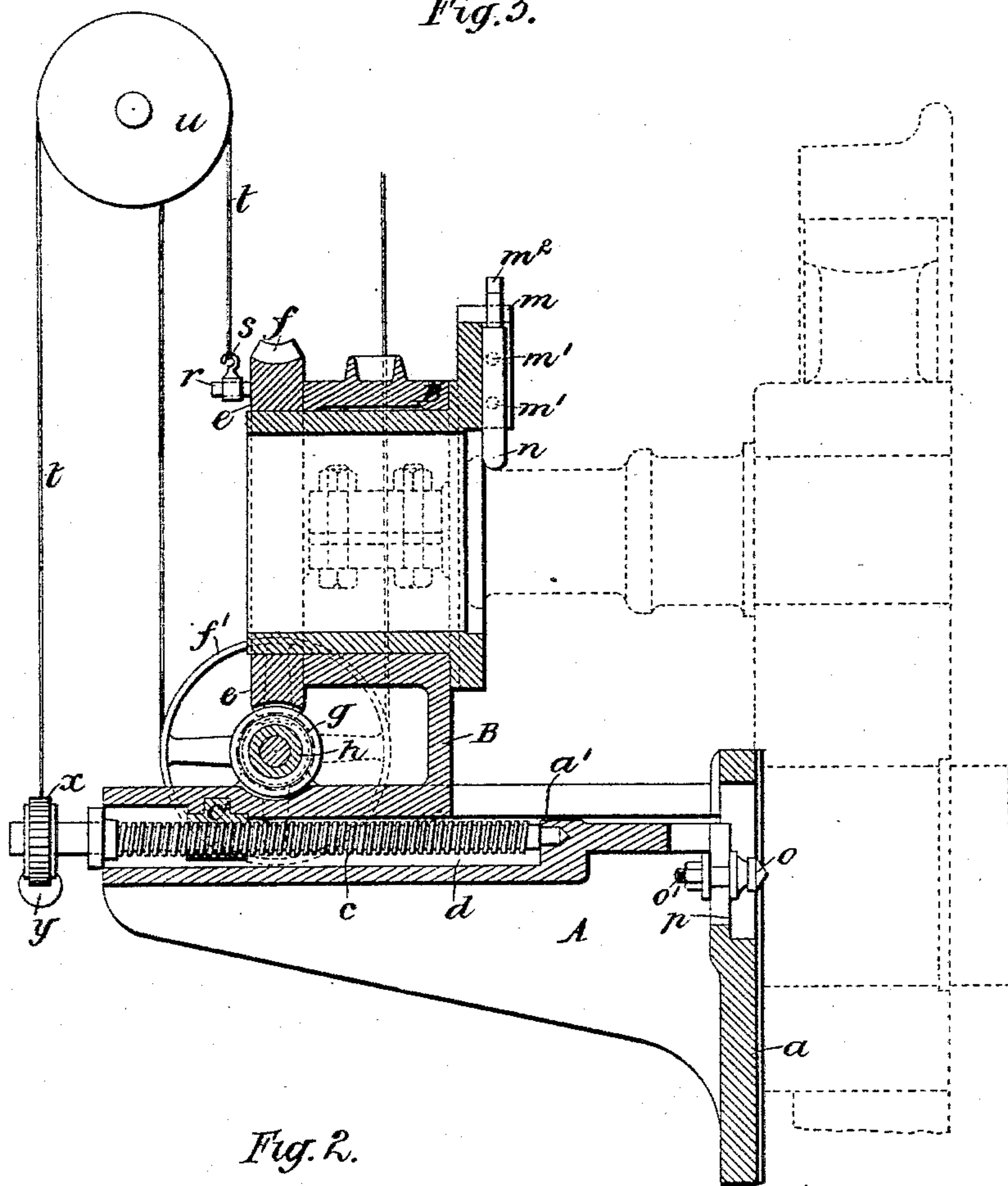
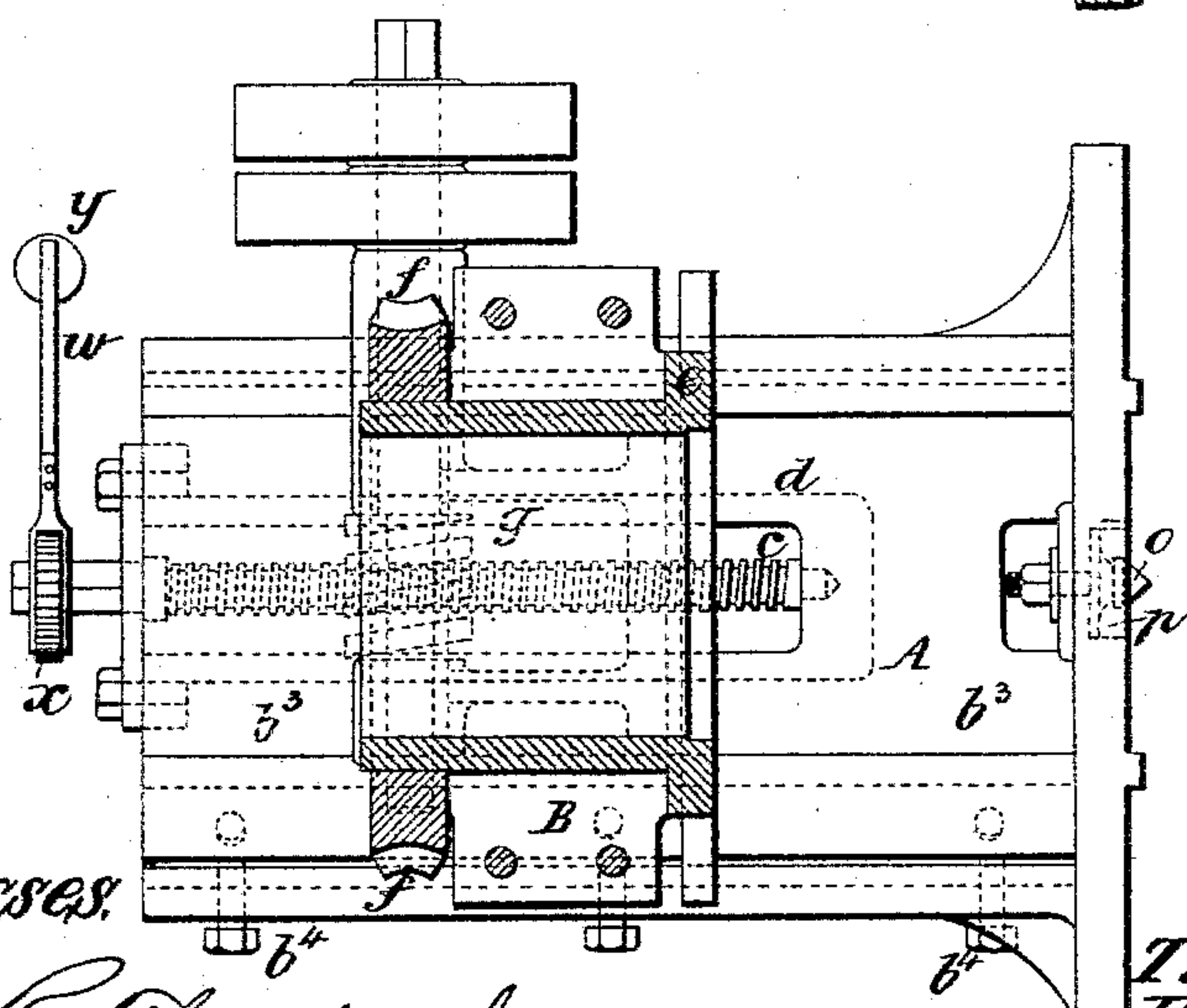


Fig. 2.



Witnesses.

J. A. Rutherford.
Phot. Dwyer.

Inventor.

Thomas Urquhart.

By

James E. Norris.
Atty.

UNITED STATES PATENT OFFICE.

THOMAS URQUHART, OF BORISSOGLEBSK, TAMBOF, RUSSIA.

DEVICE FOR TURNING CRANK-PINS.

SPECIFICATION forming part of Letters Patent No. 388,745, dated August 28, 1888.

Application filed May 29, 1888. Serial No. 275,466. (No model.)

To all whom it may concern:

Be it known that I, THOMAS URQUHART, engineer, a subject of the Queen of Great Britain, and a resident of Borissoglebsk, Tambof, Russia, have invented a new and useful Improved Machine - Tool Chiefly Designed for Turning Crank-Pins of Locomotives, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to machine-tools of that kind or class adapted for turning up or truing up locomotive or other crank-pins.

In locomotives with coupled axles as hitherto constructed—that is to say, having wheels on the said axles coupled by means of connecting or coupling rods fitting upon crank-pins inserted in the hubs or arms of the said wheels—it is desirable that the said wheels should be coupled or connected together by inelastic connecting or coupling rods in such a manner that the said wheels may revolve simultaneously without resistance other than that due to friction. In order to attain this result, all the cranks of each side of a locomotive must have the same radius, and the angles formed between the lines of radius of the cranks on one side of the locomotive and the lines of radius of the cranks on the opposite side of the locomotive must be equal in all the wheels. This angle is usually one of ninety degrees, or a quarter of the circle.

In the continuous working of locomotives with four, six, eight, ten, or more coupled wheels, the crank-pins, by running mostly in one direction—that is, forward—are worn almost altogether on one side. Moreover, the wear is not equal in all the pins, the main or center pins being subject to considerably greater wear than the end ones, thus destroying the equality of the angles between the cranks on one side of the locomotive and those on the other side, and also affecting the radius. Moreover, the crank-pins are worn oval. These defects cause greater resistance in the working parts of the locomotive, heating of the coupling-rod brasses, and consequently frequent breakages of the coupling-rods and of the crank-pins, and also very disagreeable thumping or knocking in the working parts, as the said parts, owing to the above-mentioned defects, have to be fitted very loosely upon the crank-pins.

The main object of this invention is to provide improved means whereby the crank-pins in the wheels of locomotives can be turned up or trued up in their places and the above defects thus obviated or greatly diminished.

In turning or truing up locomotive crank-pins according to my said invention the locomotive-wheels are either left in position under the locomotive or the axles with the two wheels fixed upon them are removed to some convenient position where power for driving the machine-tool can be obtained. A separate motor is sometimes employed, which is connected directly to the said machine-tool, or power is transmitted to the said machine-tool by belt-gearing or rope-gearing.

In the accompanying drawings I have shown how my said invention can be conveniently and advantageously carried into practice.

Figure 1 is a front elevation, partly in vertical section, of my improved machine-tool or apparatus, part of the worm-wheel, hereinafter described, being removed. Fig. 2 is a plan of the said machine tool or apparatus partly in vertical section. Fig. 3 is a section upon the line *x x*, Fig. 1. Fig. 4 is a front elevation of the ratchet and handle, hereinafter described.

Like letters indicate corresponding parts throughout the drawings.

A is a bracket provided with two surfaces, *a a'*, planed truly at an angle of ninety degrees to each other. The surface *a* is to be secured to the hub or face of the locomotive or other wheel (which forms a convenient base for supporting it) by means of bolts *a²*, which pass through slots *a³*, provided for that purpose in the bracket A. On the other planed surface, *a'*, is fitted the head-stock B, provided with V-shaped parts *b*, and having a sliding movement longitudinally in the correspondingly-shaped portions *b' b²* of the said bracket A. The part or portion *b²* is fixed to the bracket A by means of bolts *b³*, passing through slotted holes in the said part *b²*. Setting-up screws *b⁴* are, moreover, provided for adjusting the part *b²* to compensate for any wear that may take place. The reciprocating movement of the head-stock B is obtained by a screw, *c*, working in a nut, *c'*, fitted to the under side of the said head-stock B, a suitable recess, *d*, being provided in the bracket A for the said screw. The head-stock B is thus brought com-

pletely under control. In the said head-stock B is fitted a revolving hollow spindle or sleeve, *e*, of sufficient internal diameter to admit the largest crank-pin in use on locomotives or
 5 that it may be desired to turn or true up. On one end of this hollow spindle or sleeve *e* is fixed a worm-wheel, *f*, engaging with a worm, *g*, fixed or formed on the spindle *h*, which is supported in bearings *i* *i'* in the
 10 head-stock B. The said spindle *h* has, moreover, on its outer extremity the fast pulley *j* and the loose pulley *j'* for driving the machine by power, and is also provided with a square end, *k*, to receive the crank-handle *l*, for turning the machine by hand, if desired.

On the opposite end of the hollow spindle or sleeve *e*—that is, on the end next to the locomotive-wheel—and firmly attached to or cast in one piece with the said hollow spindle or
 20 sleeve *e* are one or more tool holders or pockets, *m*, in one of which a steel cutting-tool, *n*, is inserted for turning up or truing up the crank-pin upon which it is desired to operate. The object of providing more than one pocket
 25 or tool-holder is to have a spare one in case of accident. The said tool holders or pockets *m* are provided, moreover, each with two adjusting-screws, *m'*, for holding the tool *n* in position; also with a screw, *m''*, under control of
 30 the operator, for regulating the depth of the cut.

In order to render the above-described machine tool or apparatus equally applicable for locomotives having various radii of cranks, a
 35 suitable center, *o*, is fixed by means of the nut *o'* in a movable plate, *p*, inserted in a corresponding aperture provided in the surface *a* of the bracket A and adapted to slide in or out upon the line of radius in the slot *q*. This center
 40 *o* can be placed in position before securing the main bracket A to the wheel, the radius of the crank having first to be ascertained.

To adjust the machine tool or apparatus in position and to find the original center of the
 45 crank-pin, the head or collar of the crank-pin, which is not usually worn, is taken as a basis, and the bracket A is moved in any direction until a position corresponding to the center of the unworn collar or head of the crank-pin is
 50 found. The main bracket A is then fastened firmly by the bolts *a''*, passing between the arms of the locomotive-wheel and through the slots *a'''* in the part *a* of the bracket A.

The above-described machine tool or apparatus can be made self-acting as follows—that
 55 is to say: A suitable pin, *r*, is fixed in the worm-wheel *f* and provided with a hook, *s*, to which is attached a chain or cord, *t*, passing over a sheave or pulley, *u*, fixed in any convenient
 60 manner above the said hook *s*. The other extremity of this chain or cord *t* is attached to another hook, *v*, or is connected in any other convenient manner to the handle *w* of the ratchet *x*, fitted at the extremity of the feed-
 65 ing-screw *c*, provided in the main bracket A, and taking the place of the crank-handle for actuating the said head-stock B by hand, as

hereinbefore described. The handle *w* of the ratchet *x* is, moreover, provided with a counterbalance-weight, *y*, which causes the said
 70 handle *w* to fall when the chain or cord *t* is slackened during one-half of each revolution of the worm-wheel *f*.

The operation of the apparatus is as follows—that is to say: First, one or more cuts are taken
 75 off the crank-pin which it is desired to turn up or true up by means of a roughing-tool inserted in one of the said tool holders or pockets *m* in the hollow spindle or sleeve *e*. The crank-pin is then finished off with a spring-
 80 tool, and no further filing or polishing is required.

Although I have hereinbefore described my said invention more particularly for turning
 85 up or truing up locomotive crank-pins, it is obvious that it can also be adapted for turning up or truing up crank-pins or the like upon any other engines or machines in their places. It is, moreover, evident that I can modify the
 90 construction of my said apparatus without in any way departing from the nature of my said invention.

What I claim is—

1. In a machine-tool for the purposes above specified, a hollow spindle or sleeve provided
 95 with a tool holder or pocket and means for rotating the said spindle or sleeve upon or about its axis and feeding or moving it longitudinally, substantially as set forth.

2. The combination of a bracket, A, a head-
 100 stock, B, a hollow spindle or sleeve, *e*, having a tool holder or pocket, *m*, means for rotating said spindle or sleeve, and means for feeding or moving the same longitudinally, substantially
 105 as and for the purpose set forth.

3. The combination of the bracket A, having planed surfaces *a* *a'* and slots *a''*, the head-
 110 stock B, the screw *c* and means for intermittently rotating the same, and the movable or adjustable center *o*, substantially as and for the purpose described.

4. The combination, with the bracket A, head-stock B, hollow spindle or sleeve *e*, and
 115 worm-wheel *f*, of the screw *c* and the ratchet *x*, provided with a counter-weight and connected with the said worm-wheel by a cord or chain, *t*, substantially as and for the purposes set forth.

5. The combination, with the head-stock B and hollow spindle or sleeve *e*, of the worm-
 120 wheel *f*, the worm *g*, the spindle *h*, and means for rotating the same, substantially as and for the purpose specified.

6. The hollow spindle *e*, provided with a tool holder or pocket, *m*, and screws *m'* *m''*, sub-
 125 stantially as described.

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

THOMAS URQUHART.

Witnesses:

JOSEPH WASHINGTON COOPER,

RICHARD COOPER,

Both of 13 Hospital Street, Borissoglebsk.