(No Model.) 2 Sheets—Sheet 1.

O. KROMER.

TURNING LATHE.

No. 333,016. Patented Dec. 22, 1885.

Fig. 1.

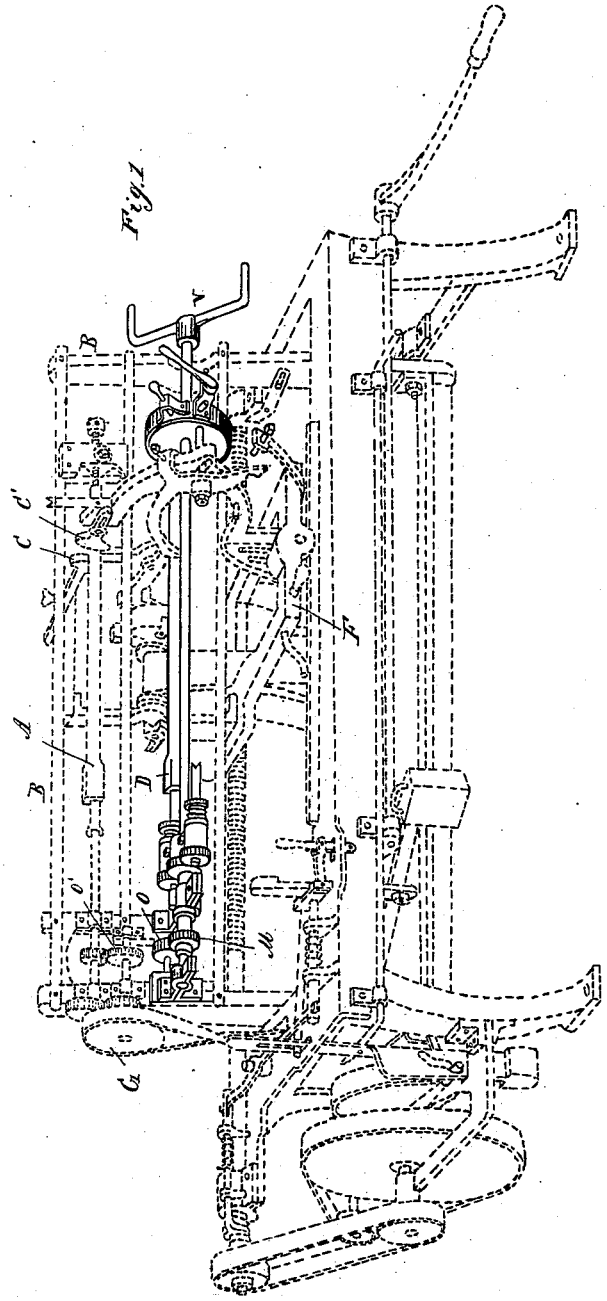
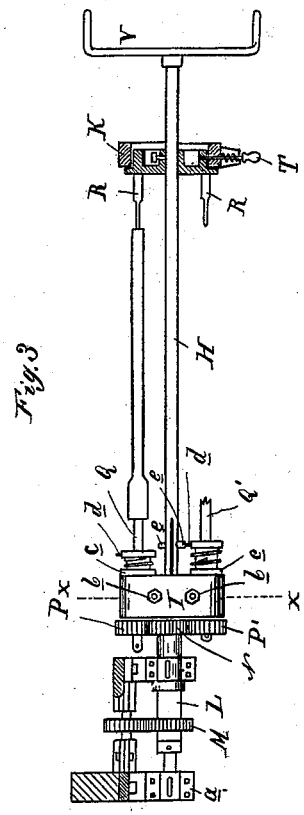


Fig. 3.



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Thos. S. Sprague

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2

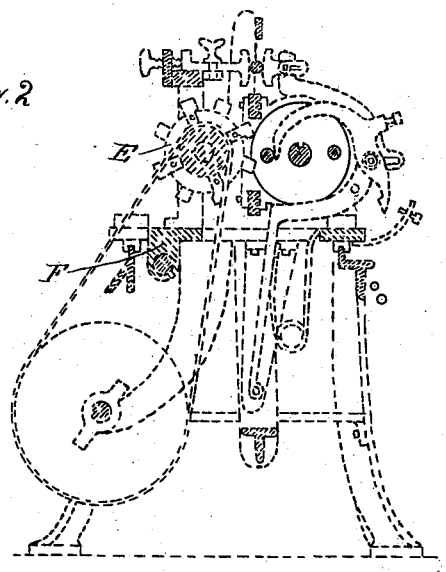


Fig. 7

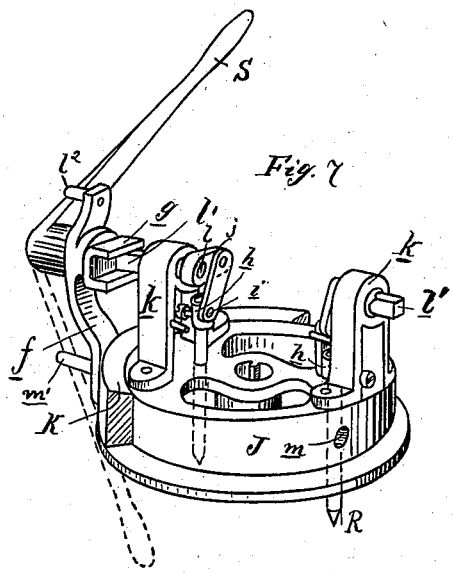


Fig. 6

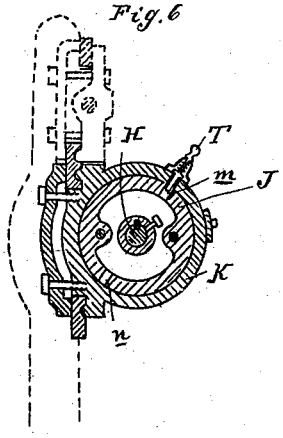


Fig. 8

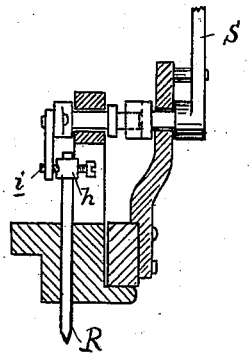


Fig. 4

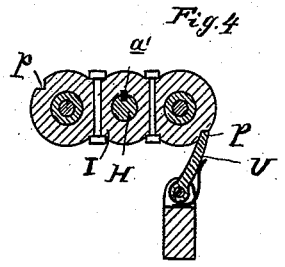
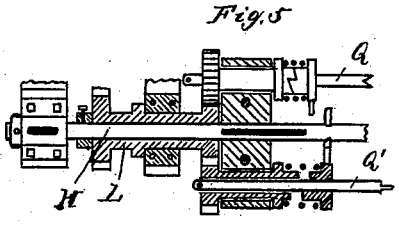


Fig. 5



Attest:
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Inventor:
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by his Atty
Thos. S. Sprague

UNITED STATES PATENT OFFICE.

OTTO KROMER, OF SANDUSKY, OHIO.

TURNING-LATHE.

SPECIFICATION forming part of Letters Patent No. 333,016, dated December 22, 1885.

Application filed June 4, 1885. Serial No. 167,593. (No model.)

To all whom it may concern:

Be it known that I, OTTO KROMER, of Sandusky, in the county of Erie and State of Ohio, have invented new and useful Improvements in Double Reversible 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 certain new and useful improvements in double reversible lathes; and the invention consists in the construction and arrangement of a reversible spindle-frame provided with two sets of head and tail stocks so arranged that while the cutters are operating upon the stick in one set a blank may be fixed in the opposite set, and then presented to the action of the cutters by rotating the frame, all in the manner hereinafter described.

In the drawings which accompany this specification, Figure 1 shows a perspective view of a lathe of known construction and operation, and to which I have applied my invention to illustrate it. Fig. 2 is a vertical central cross-section of the lathe. Fig. 3 is a plan of the reversible frame. Fig. 4 is a cross-section on line *x x* in Fig. 3. Fig. 5 is a horizontal section through the pivotal support of the reversible frame at the head end, a similar section through the pivotal support at the tail end of the reversible frame being shown in Fig. 3. Fig. 6 is a vertical central cross-section through the pivotal support of the tail end of the reversing-frame, showing its manner of securing it in position on the lathe. Fig. 7 is a detached perspective view of the pivotal point of the tail end of the reversible frame, showing the construction of the tail-stocks. Fig. 8 is a cross-section on the axis of one of the dead-spindles.

The lathe shown in Fig. 1 is of that well-known kind used for turning irregular forms—such as spokes—and in which the blank is placed between centers in a lathe-head, and is approached and drawn away from a revolving cutter in accordance with the shape of a pattern, which governs the proximity of the work to the tool.

A is a pattern-spoke, revolved between centers in the upper part of the swinging frame B.

C and C′ are the guides which bear against the pattern on opposite sides, and thereby govern the position of the swinging frame, approaching or drawing away the stick D from the cutter-head E in accordance with the shape of the pattern spoke.

F is the reciprocating carriage, upon which the revolving cutter-head is journaled, and G is the pulley which gives motion to the live-spindles of the pattern and of the work.

The lathe is also provided, as is usual in the modern spoke-lathe, with devices for making its work automatic, but which it is not necessary to describe in connectien with my improvement, which consists in the following arrangement:

H is a shaft forming the pivotal support of a reversible frame, of which the head-block I forms one end and the tail-block J the opposite end. The tail-block J is adjustably secured upon the shaft H by means of a set-screw, and engages by means of a spline in a keyway in the shaft H. The head-block I is provided with two head-stocks and the tail-block J with two tail-stocks, arranged upon opposite sides of the shaft H and at equal distances therefrom. The tail-block J is in the form of a circular disk, and by being journaled in the ring-bearing K, which is adjustably clamped to the swinging frame B, as shown in Fig. 6, it forms one pivot on which the reversible frame rotates, the other pivot being formed by the shaft H, which is journaled in the bearing *a*, likewise secured to the swinging frame B. The shaft H has sleeved upon it the hollow shaft L, which is provided with the pinions M and N. Intermediate pinions, O O′, communicate power to the pinion M on the shaft L.

P P′ are two like pinions meshing with the pinion N, and thereby communicating power to the head-stocks. The head-stocks are journaled in the head-block I, which latter is made in halves, clamped together by bolts *b b*, and engaging with a spline into the keyway *a′* of the shaft H.

The live-spindles Q Q′ are journaled in the head-stocks, and are driven by means of spring-clutches *c*, one member of each of which is fast on the head-stock and the other fast on the spindle. The spindle has enough end-play, limited by a pin, *r*, to allow the clutches

to be opened and closed. That member of each clutch which is fast on the spindle is provided with a pin, *d*, and stops *e* are secured to the shaft H, which, when the clutches are open, engage upon the pins *d*. The two members of each clutch have, preferably, but one clutch-tooth, instead of several, as in the ordinary style of clutches.

The dead-spindles R R are secured in the tail-block J, and are projected and retracted, for the purpose of dogging the stick, by means of a hand-lever, S, which is pivotally secured to a bracket, *f*, and is provided with the slotted wrist *g*. The spindles R are secured by means of an adjustable sleeve, *h*, and a link, *i*, to a crank, *j*, the shaft *l* of which is journaled in bearings *k*, and has a squared end, *l'*, adapted to engage in the slotted wrist *g*. The bracket *f*, which supports the hand-lever S, is secured to the ring-bearing K, and stops *l² m'* are suitably arranged to arrest the swing of the lever S in the proper positions corresponding with the retracted and projected positions of the dead-spindles.

It will be seen in Fig. 7 that the slotted wrist *g* and squared end *l'* of the crank-shaft make a breakable connection, which does not interfere with the rotating of the head-block J when the spindles are projected, as shown in Fig. 7.

T is a spring-bolt secured to the ring-bearing K, and adapted to lock the tail-block J in one of two positions by engaging into one of the two holes *m m* in the periphery of the tail-block.

U in Fig. 4 is a spring-dog engaging with a suitable notch, P, or stop on the head-block I, to support the reversible spindle-frame in position against the action of the cutters, but allow it to be reversed in the opposite direction.

To the end of the shaft H is secured a hand-lever, V, by means of which the operator reverses his spindle-frame.

In practice, while the cutters are operating upon the stick fixed between the rear spindles, the operator secures a blank between the front spindles, and then when the work between the rear spindles is done he reverses the spindle-frame by means of the lever V. Before reversing the operator must retract the spring-bolt T, which latter, as soon as the frame is sufficiently reversed, finds a new engagement and again locks the spindle-frame in place. The spring-dog U simply forms a rest for the reversible frame, so as to steady it against the action of the cutters. It also prevents the turning of the frame in a wrong direction.

It will be seen that both head-stocks are constantly revolving in the same direction; but as soon as the finished work is removed from the front spindles, in order to introduce a fresh blank, the clutch opens and the pin *d*, engaging with the stop *e*, arrests the movement of the live-spindle, always in the same specified position, for inserting the blank. As soon as the latter is dogged, the clutch is perfected again and the blank revolves.

In turning irregular work to a pattern, it must be remembered that it is often necessary to dog the stick in a position corresponding to the pattern; and to obtain this corresponding position I provide the clutch with one tooth only and arrest the live-spindle, when the clutch is opened by means of the pin *d* and stop *e*.

It is true that as far as the mere form of the work is concerned in making spokes or other goods, two clutch-teeth upon opposite sides of the clutch would answer as well; but as most timber, especially hickory timber, has wood of two colors, it would be beyond the control of the operator to bring the wood of a certain color always on the same side of the finished articles. Now, in the manufacture of wheels from hickory spokes, for example, it is desirable, on account of the different shrinkage of the wood, to have the white timber of the spoke always in front of the wheel, and in the use of other products of the lathe similar considerations prevail. It is therefore of practical importance in turning irregular forms to have the reversible spindle-frame so arranged that its reversal will not disturb any specified position of the blank. In the drawings in Fig. 1 I have also shown how the front guide and front rest may be brought out of the way of the reversible spindle-frame by curving them.

It is obvious that my reversible spindle-frame greatly increases the capacity of a lathe, and that it is applicable to most lathes with fixed centers; and it is of especial application for lathes turning irregular forms—such as spokes, ax-handles, plow-handles, &c.; but there is still another use for my improvement, and this is for using it in connection with two patterns secured in a reverse position, one pattern to be used in running the cutter one way and the other pattern in running it the other way. The lathe would thus be enabled, in swinging the pattern in the same manner as is above described for the blanks, to cut a spoke or other article while feeding either way, provided the cutters are made to cut both ways.

What I claim as my invention is—

1. In a lathe, a reversible frame provided with two sets of spindles and pivotally secured to the swinging frame carrying the pattern, substantially as described.

2. In a lathe for cutting irregular forms, a reversible frame pivotally secured to the swinging frame, in which the pattern is fixed, and having two sets of spindles secured to it upon opposite sides of the axis on which it rotates, substantially as described.

3. In a lathe for cutting irregular forms, a reversible frame pivotally secured to the swinging frame, in which the pattern is fixed, and having two sets of spindles secured to it upon opposite sides of the axis on which it

rotates, combined with the dog U, substantially as and for the purposes specified.

4. In a lathe, the combination, with the reversible spindle-frame and its shaft H, provided with stops, of the head-stock I, forming one end of said reversible frame, and provided with spindles Q Q′, and clutches *c*, provided with pins *d*, substantially as and for the purposes specified.

5. In a lathe, the combination, with the shaft H, frame B, and ring-bearing K, secured to said frame, of the tail-block J, journaled in said ring-bearing, substantially as and for the purposes specified.

6. In a lathe, the combination, with the shaft H, the swinging frame B, pivoted thereon, and the ring-bearing K, adjustably clamped to said frame, of the tail-blocks J, journaled in said ring-bearing, and provided with the spring-bolt T, substantially as and for the purpose specified.

7. In a lathe, the combination, with the shaft H and the tail-block J, secured thereon, and provided with holes *m n*, of the ring-bearing K, surrounding said tail-block, and provided with the spring-bolt T, adapted to engage said holes, substantially as and for the purposes specified.

8. In a lathe, the combination, with the reversible spindle-frame and the shaft H, on which it rotates, of the clutches *c* on the head-stock and the spindles Q Q′, secured to the loose members of the clutches, substantially as described.

9. In a lathe, the combination, with the reversible spindle-frame, of the clutches *c* on the head-stock, the loose members of said clutches being provided with pins *d*, adapted to engage stops *e* on the shaft H, on which said reversible frame rotates, substantially as described.

10. In combination with the reversible spindle-frame having two sets of spindles, the pinions P P′, and clutches *c* on the head-stocks, the spindles Q Q′, secured to the loose members of the clutches, the pins *d* upon the loose members of the clutches, and the stops *e*, all arranged substantially as described.

11. In combination with the reversible spindle-frame provided with two sets of spindles, the spring-dog U, and the stops *p* on the head-block I, forming a part of said reversible frame, substantially as and for the purpose described.

12. In combination with the reversible spindle-frame having two sets of spindles, the tail-block J, forming one end of said reversible frame, the lever S, pivoted to the bracket *f* and having slotted wrist *g*, and the crank-shaft *l*, for operating the dead-spindle, and having a squared end, *l′*, substantially as described.

13. In combination with the reversible spindle-frame provided with two sets of spindles, the tail-block J, forming one end of said frame, the bracket *f*, the lever S, pivoted to said bracket and having slotted wrist, the crank-shaft *l*, having squared end *l′*, the crank *g*, working in said slotted wrist, the link *i*, collar *h*, and dead-spindles R, all arranged substantially as described.

14. In combination with the reversible spindle-frame provided with two sets of spindles, the tail-block J, forming one end of said reversible frame and adjustably secured to the central shaft, H, of the reversible frame and engaging with a spline into a keyway on said shaft, and the ring-bearing K, provided with a clamping device for securing it adjustably in position, substantially as described.

15. In combination with the reversible spindle-frame provided with two sets of spindles, the tail-block J, forming one pivot of the reversible frame, the ring-bearing K, surrounding said tail-block, and provided with the spring-bolt T, the lever S, pivoted to the bracket *f* and having slotted wrist *g*, the crank-shaft *l*, provided with squared ends *l′*, working in said wrist, the crank-arms *j*, the links *i*, the collars *h*, and the dead-spindles R R, all arranged substantially as described.

OTTO KROMER.

Witnesses:
FR. DAHM,
C. MILLER.