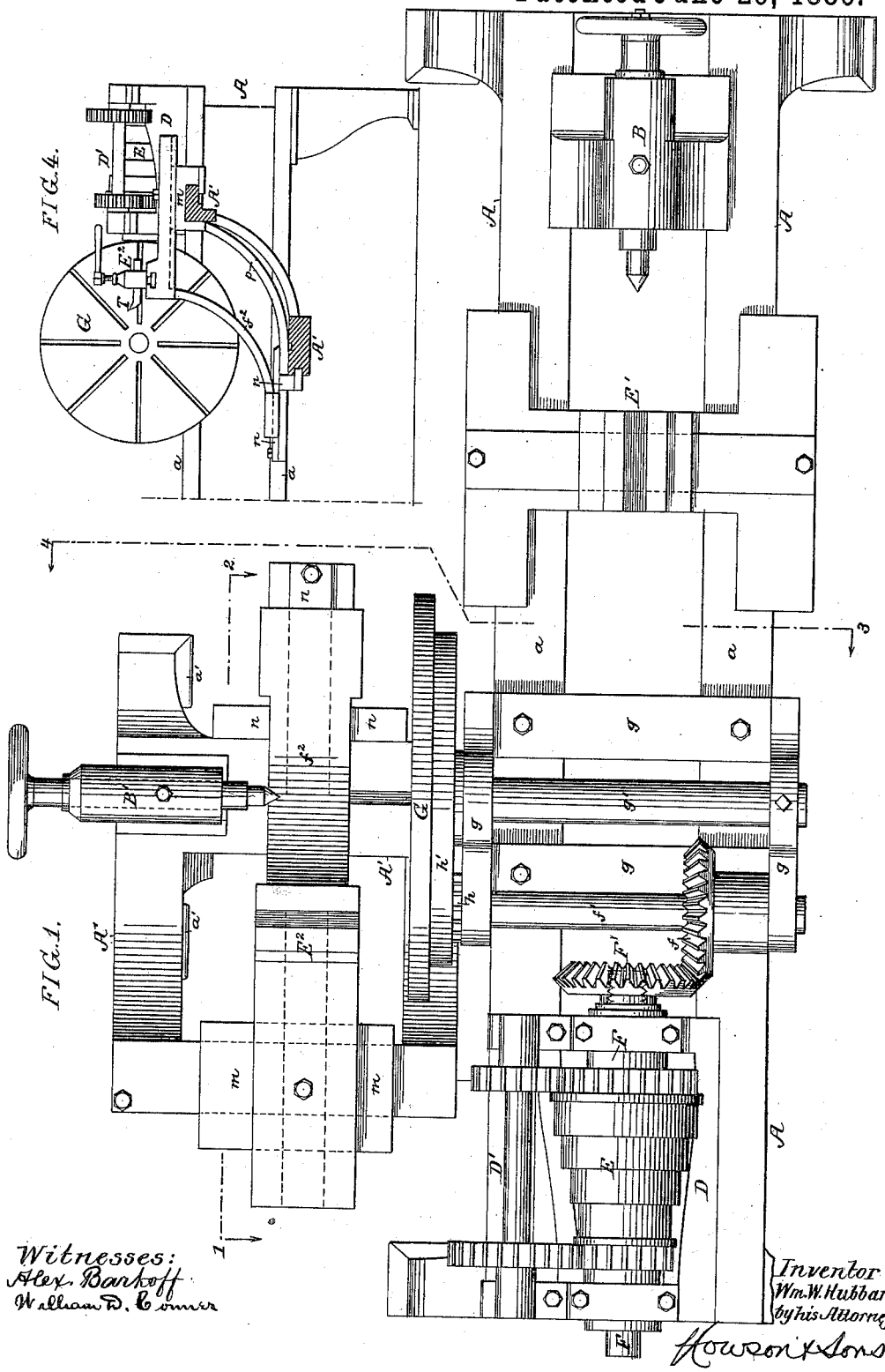
(No Model.)

4 Sheets—Sheet 1.

W. W. HUBBARD.

LATHE.

No. 344,580. Patented June 29, 1886.



Witnesses:
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William D. Conner

Inventor
Wm. W. Hubbard
by his Attorneys
Howson & Sons

(No Model.) 4 Sheets—Sheet 2.

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FIG. 2.

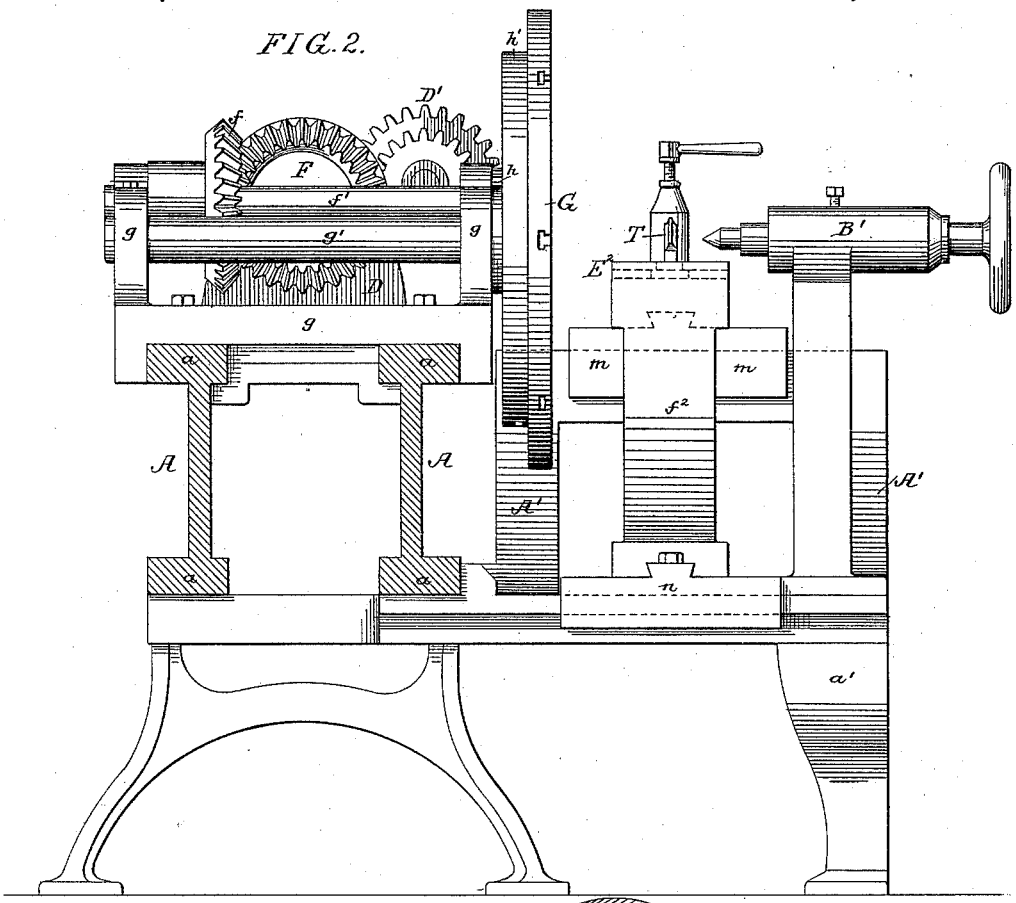
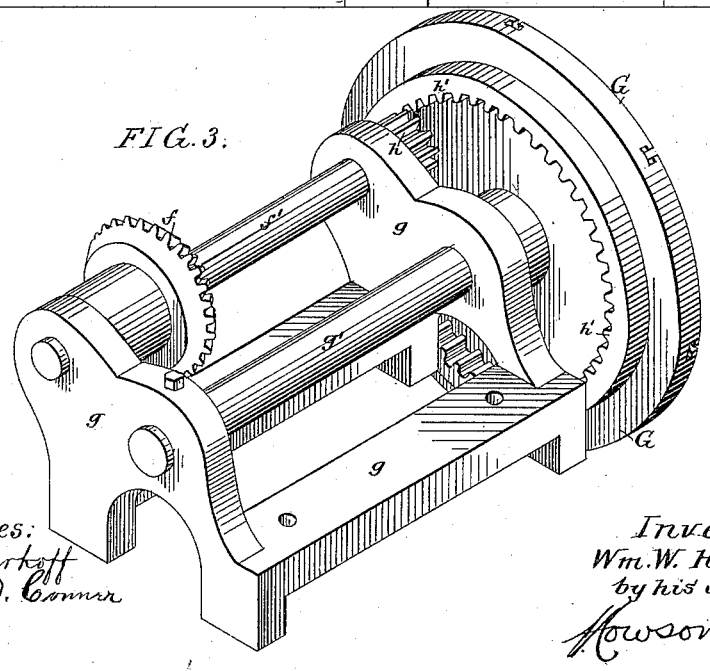


FIG. 3.



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(No Model.)

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LATHE.

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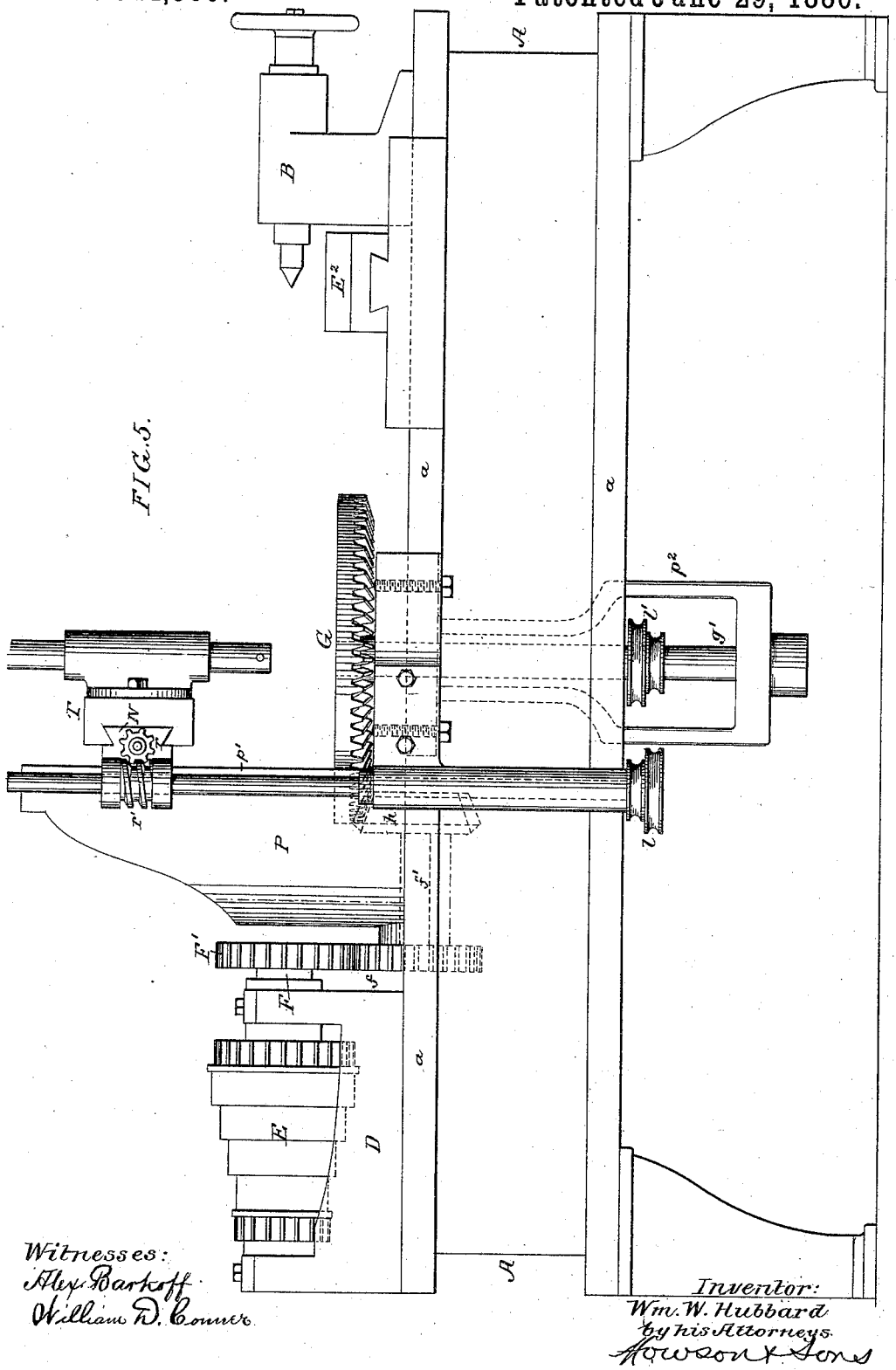
FIG. 5.



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(No Model.)

4 Sheets—Sheet 4.

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LATHE.

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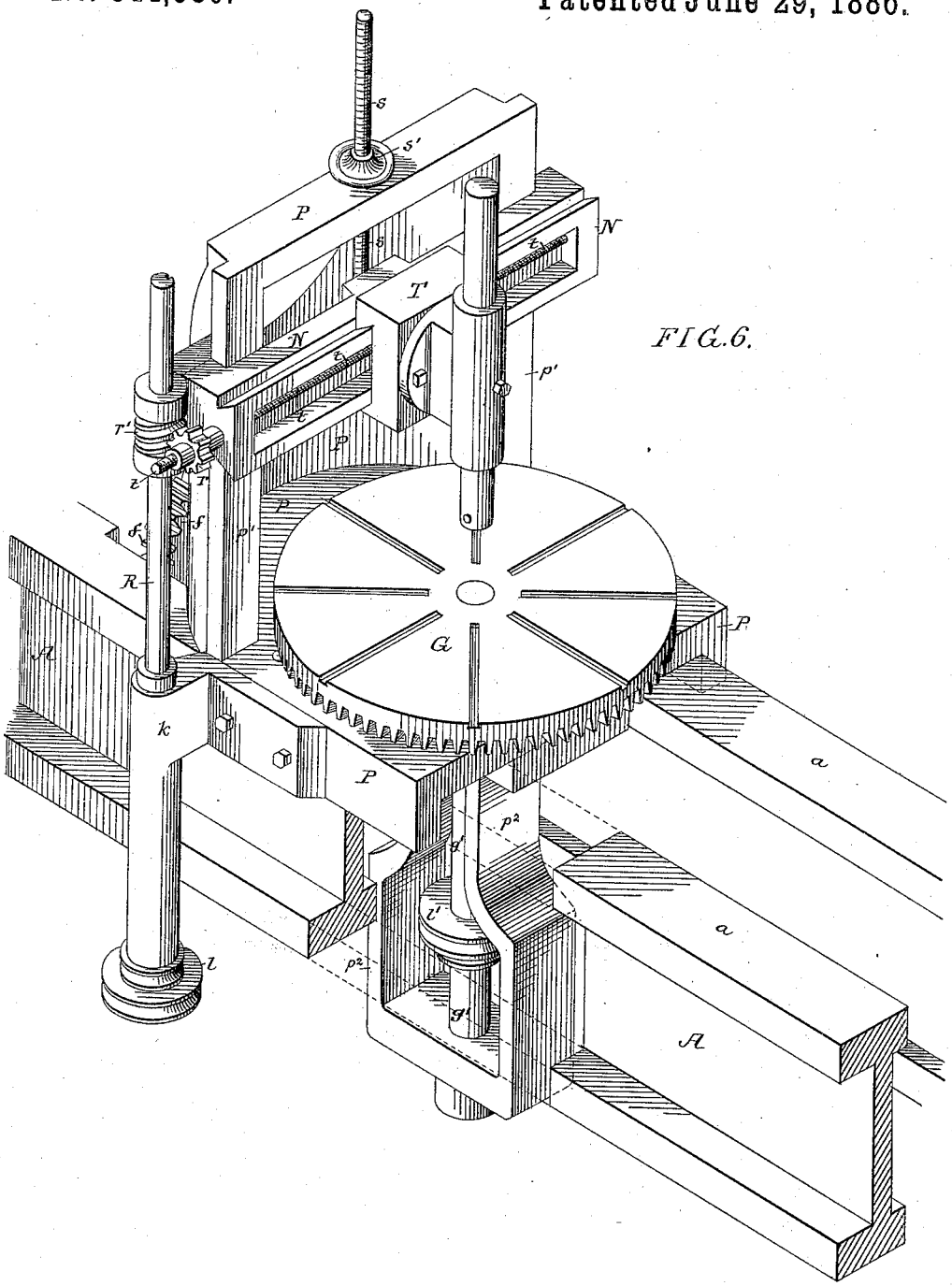

FIG. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM W. HUBBARD, OF PHILADELPHIA, PENNSYLVANIA.

LATHE.

SPECIFICATION forming part of Letters Patent No. 344,580, dated June 29, 1886.

Application filed February 27, 1886. Serial No. 193,453. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. HUBBARD, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Lathe Attachments, of which the following is a specification.

My invention consists of the combination, with a lathe, of an attachment whereby objects of larger diameter can be turned, bored, or otherwise worked than can be done on the lathe itself, as fully described hereinafter.

In the accompanying drawings, Figure 1 is a plan view of a lathe provided with an attachment in accordance with my invention. Fig. 2 is a transverse section on the line 3 4, Fig. 1. Fig. 3 is a perspective view of a portion of the attachment. Fig. 4 is a sectional view on the line 1 2, Fig. 1, but drawn to a reduced scale. Fig. 5 is a side view of a lathe provided with a modified form of attachment embodying my invention; and Fig. 6 is a perspective view, partly in section, of a portion of the lathe provided with this attachment.

Referring to the construction illustrated in Figs. 1, 2, 3, and 4, A is the frame of the lathe, which may be understood as being of the moderately-small size usually found in the shops of mechanics, and which is provided with ways *a*, having at one end the usual adjustable back center, B, and at the other end the head-stock D, gearing D′, and cone-pulleys E on the main spindle F. Any suitable form of slide-rest, E′, is also provided, so that the lathe can be used for ordinary work; but where it is desired to turn or bore articles of larger diameter than the position of the front and back centers with reference to the ways will allow, I combine with the main spindle F another spindle at right angles thereto, as I will now proceed to describe. In the first place, I detach the chuck or other device from the main spindle and put in its place a bevel gear-wheel, F′. To the ways *a* are fixedly secured by suitable bolts or clamps a frame, *g*, in bearings in which is mounted a spindle or shaft, *g′*, at right angles to the main spindle, and having at its outer end a face-plate, G. This face-plate is of a size suitable for the work to be done, and occupies a position beyond the frame of the lathe proper. The face-plate is geared to receive a rotary motion from the bevel-wheel F′ through the medium of a bevel-pinion, *f*, on a transverse shaft, *f′*, mounted in the frame *g*, this transverse shaft *f′* carrying a pinion, *h*, gearing into an internal circular rack or toothed wheel, *h′*, secured to or forming part of the face-plate G on the spindle *g′*.

In a suitable position on the side of the frame of the lathe is a supplementary frame, A′, mounted at one end on supporting-legs *a′*, and secured at the other end to the under side of the ways *a*. This frame carries at its upper part the adjustable back center, B′, which is in line with the center of the face-plate G, and the frame is also provided with an adjustable slide-rest, E², which is of the usual form illustrated in Fig. 4. This slide-rest E², which carries the tool T, is adapted to ways at right angles to a line drawn through the axes of the back center and face-plate, so that the tool can be adjusted toward and from the work, and the block *m*, on which the rest can be so adjusted, is adapted to ways on the supplementary frame A′ at right angles, so that the slide-rest can be adjusted longitudinally of the work. The front end of the slide-rest is provided with a downwardly-projecting curved leg, *f²*, adapted to ways on a block, *n*, on the lower part of the frame A, so as to support the front end of the slide-rest when the latter is projected forward, as illustrated in Fig. 4, but without interfering with the work. The block *n* is connected to the block *m* by a correspondingly-curved arm, *p*, so that the blocks can move together when adjusted longitudinally of the work.

As will be seen on reference to the drawings, the construction described enables work—such as pulleys of large diameter—to be bored or turned on a lathe which otherwise would be much too small for the purpose.

I prefer to make the above-described attachment removable; but it may be a permanent part of the lathe. I do not, however, restrict myself to the precise devices described, as other ways may be provided for carrying my invention into effect. For instance, in Figs. 5 and 6 I have illustrated another form of attachment for operating on work of larger size than the lathe is capable of working as ordinarily constructed. In this modification I have shown the face-plate G as occupying a

horizontal position, instead of the vertical one shown in Figs. 1, 2, 3, and 4.

The lathe is provided with the usual driving-gear, main spindle F, adjustable back center, and slide-rest, and there is secured to the main spindle F a spur-wheel, F′, for transmitting motion to the face-plate G, which is carried by the vertical spindle g' in bearings in an upright frame, P, this frame being adapted to rest on the horizontal ways a of the lathe. The under side of this face-plate is provided with teeth h', into which meshes a bevel-pinion, h, (shown by dotted lines in Fig. 5,) on a shaft, f', which is mounted in bearings in the removable frame P, and which carries a pinion, f, gearing into the spur-wheel F′.

The upright frame P is provided on its upper part with vertical ways p', for the reception and guidance of the vertically-adjustable cross-head N, this cross-head being adjustable by means of a suitable screw, s, passing up through an opening in the frame P, and provided with an adjusting-nut, s'. In this vertically-adjustable cross-head N is mounted a horizontal feed-screw, t, adapted to impart horizontal feed motion to the tool-carrier T. For imparting an automatic feed motion to this screw t, I provide at its outer end a worm-wheel, r, gearing into a worm, r', mounted between lugs on the end of the cross-head, and having passing through it a vertical shaft, R. This shaft has a longitudinal groove for the reception of a feather on the worm, or other suitable means by which the worm may be turned with the shaft and slide longitudinally thereon. This shaft R is mounted in a suitable bearing, k, projecting from the removable frame P, and has at its lower end a pulley or pulleys, l, over which passes a band from corresponding pulleys, l', on the vertical shaft g', which carries the face-plate G. The lower end of this shaft g' is adapted to suitable bearings in the downwardly-projecting bracket p^2 on the under side of the frame P.

It will be seen that the frame P and its attachments can be readily fitted to and removed from the lathe, and that it can be used for boring, turning, or otherwise operating on work of much larger diameter than can be turned on the lathe proper.

I claim as my invention—

1. A lathe having a main spindle and provided with a supplementary spindle having a face-plate at right angles to the main spindle, and gears connecting the two spindles, substantially as described.

2. A lathe provided with an attachment comprising a frame carrying a face-plate geared to the main spindle of the lathe and having a tool-carrier and back center, substantially as set forth.

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

W. W. HUBBARD.

Witnesses:

WM. W. HUBBARD, JR.,

HARRY SMITH.