G. A. STEINLE, M. SMITH AND L. R. TAYLOR.

LATHE FRAME.

APPLICATION FILED AUG. 15, 1918.

1,333,043.

Patented Mar. 9, 1920.

3 SHEETS—SHEET 1.

Fig. 1.

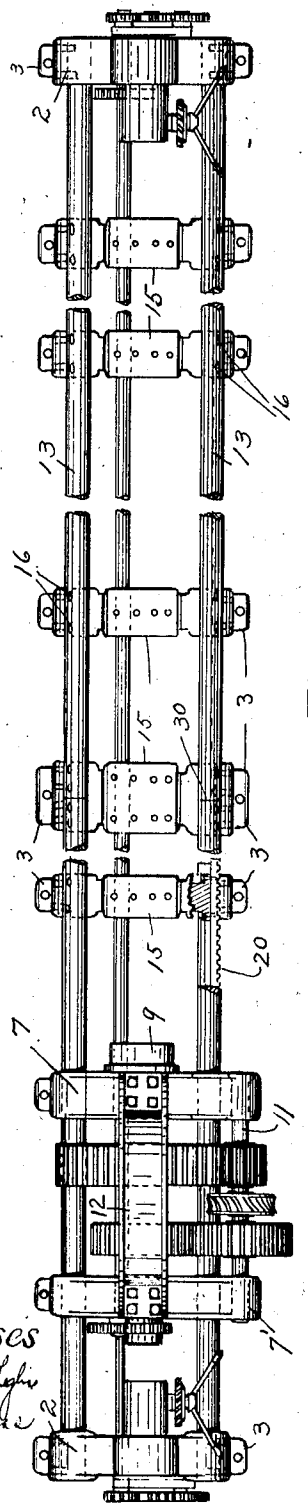
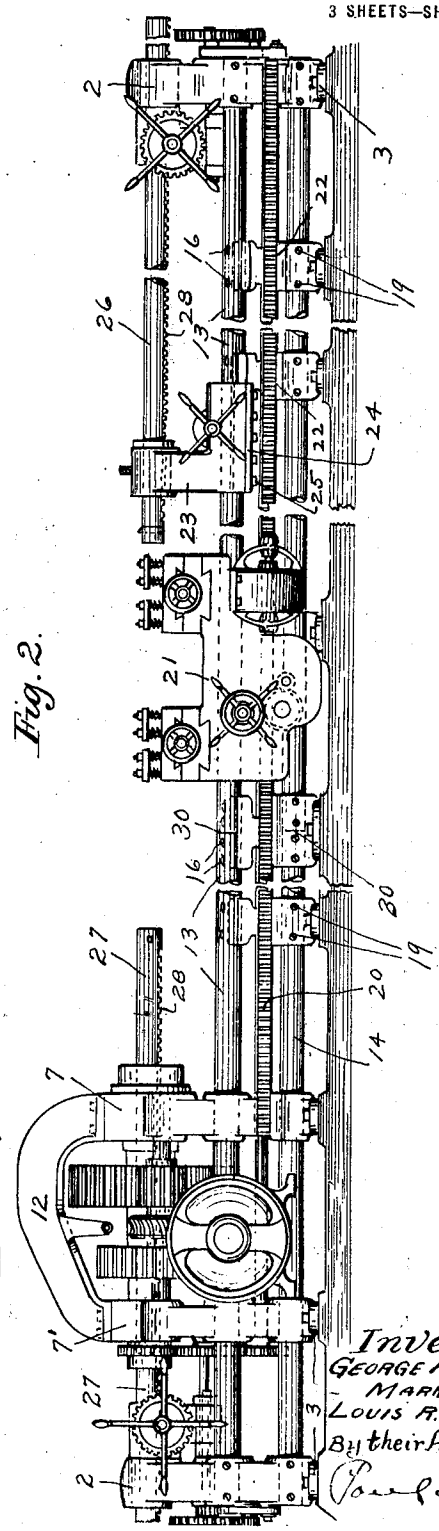


Fig. 2.



Witnesses
Margaret R. Dwight
C. H. Rehfuss

Inventors
GEORGE A. STEINLE
MARK SMITH
LOUIS R. TAYLOR
By their Attorneys
Paul & Paul

G. A. STEINLE, M. SMITH AND L. R. TAYLOR.

LATHE FRAME.

APPLICATION FILED AUG. 15, 1918.

1,333,043.

Patented Mar. 9, 1920.

3 SHEETS—SHEET 2.

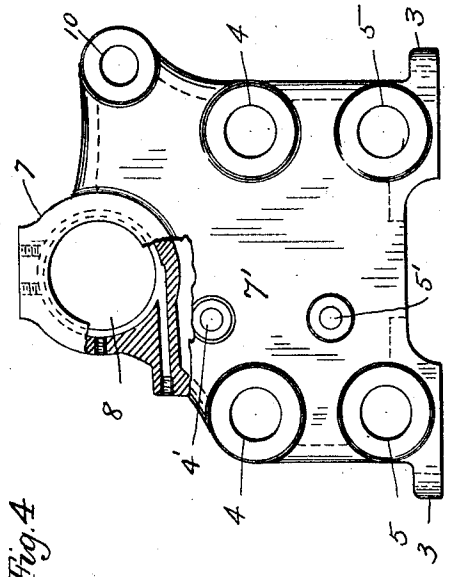


Fig. 4.

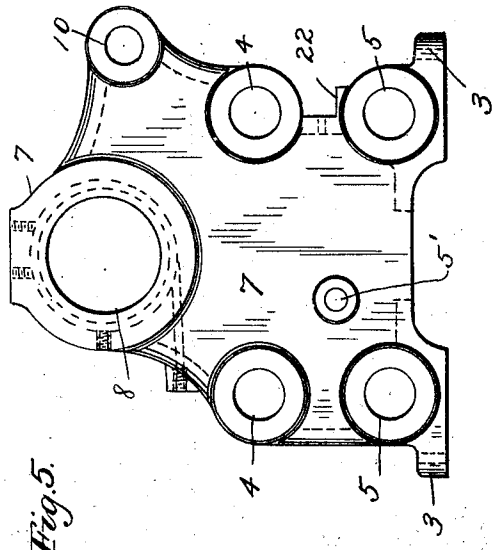


Fig. 5.

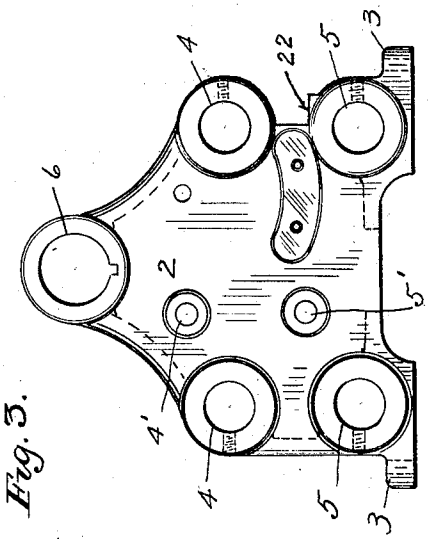


Fig. 3.

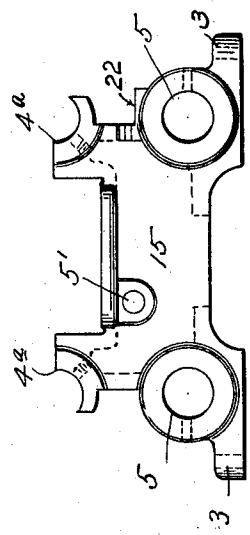


Fig. 6.

Witnesses
Margaret R. Schaefer
C. H. Rehfuss

Inventors
George A. Steinle
Mark Smith
Louis R. Taylor
By their Attorneys
Paul & Paul

G. A. STEINLE, M. SMITH AND L. R. TAYLOR.

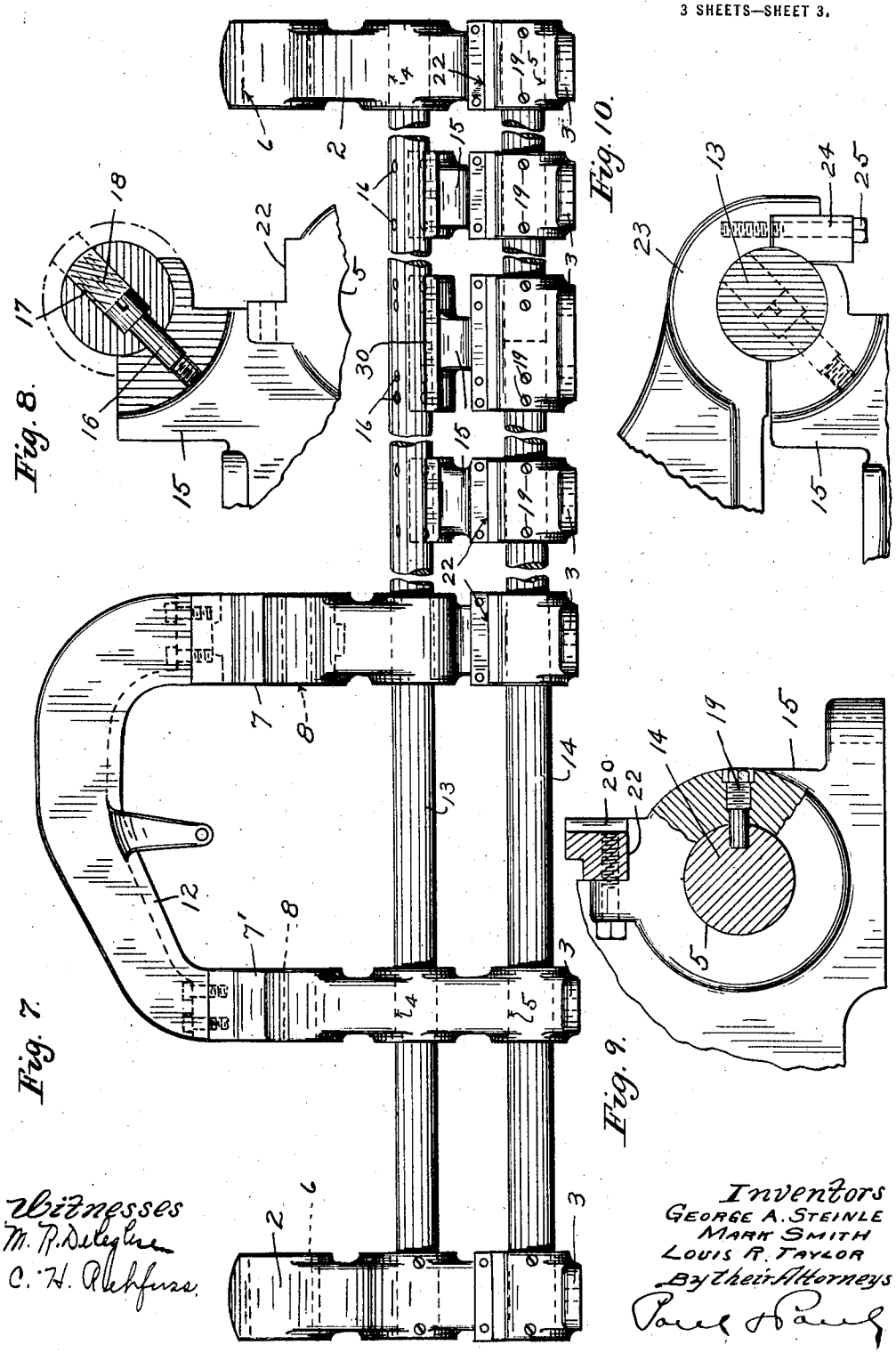
LATHE FRAME.

APPLICATION FILED AUG. 15, 1918.

1,333,043.

Patented Mar. 9, 1920.

3 SHEETS—SHEET 3.



Witnesses
M. P. Delegher
C. H. Aschfuss.

Inventors
GEORGE A. STEINLE
MARK SMITH
LOUIS R. TAYLOR
By their Attorneys
Paul & Paul

UNITED STATES PATENT OFFICE.

GEORGE A. STEINLE, MARK SMITH, AND LOUIS R. TAYLOR, OF MADISON, WISCONSIN.

LATHE-FRAME.

1,333,043. Specification of Letters Patent. Patented Mar. 9, 1920.

Application filed August 15, 1918. Serial No. 250,027.

To all whom it may concern:

Be it known that we, GEORGE A. STEINLE, MARK SMITH, and LOUIS R. TAYLOR, citizens of the United States, residing at Madison, in the county of Dane and State of Wisconsin, have invented certain Improvements in Lathe-Frames, of which the following is a specification.

This invention relates to improvements in the construction and arrangement of lathe frames, and particularly to improvements in the frames of long lathes adapted especially for boring and turning the exterior of naval and army guns, although the advantages of the present invention may be utilized in the construction of smaller and shorter lathes.

The invention consists generally in the constructions and combinations hereinafter described and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification,

Figure 1 is a plan view, partly broken away, showing the main features of a lathe having a frame constructed in accordance with our invention.

Fig. 2 is a side elevation of the structure illustrated in Fig. 1,

Fig. 3 is an elevation of one of the end housings,

Fig. 4 is a similar view, partly broken away, of the rear headstock housing,

Fig. 5 is an elevation of the front head stock housing,

Fig. 6 is an elevation of one of the double pedestals supporting and alining the intermediate portions of the ground shafts constituting the side members of the frame, the ways upon which the tool carriage is reciprocated, and the boring bar guides and the head stock housings are supported.

Fig. 7 is a side elevation of the frame corresponding to Fig. 2, but on a larger scale with the operative parts of the lathe omitted,

Fig. 8 is an end elevation and partial section of one of the side bar supporting pedestals showing also one of the ground shafts, or side bars, supported thereon and the means for securing said side bars in position,

Fig. 9 is an enlarged detail of one of the pedestals showing the means for securing the lower side bar in position and the means for supporting the rack.

Fig. 10 is a detail showing the means for adjustably supporting the rear boring bar guide on the upper cylindrical side members of the frame.

In the drawings 2, 2, represent the end housings of the lathe. These housings are preferably duplicate castings provided with perforated outwardly extending bottom flanges 3, by which they may be bolted or otherwise secured to a suitable base. Each housing is also provided with an upper pair of cylindrical bearing openings 4, 4, Fig. 3 and a corresponding lower pair of similar bearing openings 5, 5, Fig. 3. Each housing is also provided with an upper cylindrical opening 6 forming a bearing for a boring bar.

While we have shown the end housings each provided with a single pair of upper bearing openings 4, 4, and a single pair of lower bearing openings 5, 5, it will be understood that for lathes with wider frames we may employ two pairs of upper bearing openings, and two pairs of lower bearing openings, or, if greater rigidity is necessary, the upper and lower bearing openings may be arranged in groups of 3 instead of in pairs. This, however, will not alter the principle of the herein described frame construction. We also prefer to provide the housings with bearing openings 4′ and 5′ for the driving shafts of the boring and turning mechanism.

For supporting the head stock and rotatable chuck by which the gun or other article to be bored or turned is clamped and rotated, we provide a pair of head stock housings preferably in the form illustrated in Fig. 4 of the drawings. These housings we designate by the reference numerals 7 and 7′. They are provided with bearing openings for the cylindrical side bars or members, and, as these bearing openings are similar to those in the end housings and are correspondingly located we have designated them by the reference numerals 4 and 5, and have also designated the securing flanges or feet at the bottom of the housings by the reference numeral 3. The head stock housings 7 and 7′ are provided with openings 8 to receive and support the rotatable chuck 9 (see Figs. 1 and 2) and the gearing arranged thereon, and are also provided with bearing openings 10 that support a counter shaft 11. The head stock housings 7 and 7′ are, preferably, for the purpose of securing greater rigidity, connected by a suitable arch or casting 12. (See Figs. 1, 2 and 7.)

The side members of the frame, both the upper and lower members, are preferably composed of cylindrical bars or ground shafts designated in the drawings by the reference numerals 13 and 14. The ends of the bars 13 are secured in the bearing openings 4 in the end housings 2, and said bars extend through the corresponding bearing openings 4 in the head stock housings 7 and 7'. The lower bars 14 are secured in the bearing openings 5 in the end housings 2 and extend through the corresponding openings 5 in the head stock housings.

The upper surfaces of the upper pair of bars 13 also form ways upon which the tool carriage or carriages are longitudinally reciprocated, and upon which the rear boring bar support is longitudinally adjustable. It is, therefore necessary to provide a series of intermediate supports for both the upper side bars 13 and the lower side bars 14, and it is also necessary to have the upper portions of the bars 13 exposed for their full length so that the tool carriages and the adjustable boring bar support may move freely along said ways, while being supported thereby.

For this purpose we provide a series of standards or pedestals 15 (see Fig. 6), each of which is provided with bearing openings 5 corresponding to the like numbered openings in the end housing 2 and the head stock housings 7 and 7', and we provide the upper portion of said pedestals with pairs of curved recesses 4^a, the walls of said recesses being arcs of circles corresponding in location and size with corresponding arcs of the bearing openings 4 in the housings 7 and 7'. The cylindrical bars are preferably secured in the recesses 4^a in the pedestals 15 by means of bolts 16 located in counter sunk openings 17 in said bars, as shown in detail in Fig. 8 of the drawings, and we prefer to fill the said openings above the heads of the bolts with wooden plugs 18, which prevent dirt or material from accumulating in said openings.

We prefer to construct these pedestals with complete circular openings, that is to say with the metal extending in a complete circle around each opening as indicated by the dotted lines in Fig. 8, with a hole through the outer part thereof opposite the hole that is to receive the threaded end of the bolt, and after the side bars 13 are placed in position and are bolted to the pedestals, as illustrated in Fig. 8, the outer portion of the metal, or the part indicated by the dotted circle in Fig. 8, is cut away so as to leave the upper and a part of the outer surface of the bar 13 exposed, as illustrated for example in Fig. 10.

The pedestals 15 are also preferably provided with flanges or feet by which they may be bolted or secured to a suitable base and any number of said pedestals may be employed located as desired between the front end housing and the head stock housings as indicated in Fig. 3.

The bars 14 are preferably secured in the bearing openings 5 in the pedestals 15 by means of suitable bolts 19 as illustrated in Fig. 9.

To provide a support for a rack 20, which is engaged by a pinion on the tool carriage 21, for the purpose of permitting said carriage to be reciprocated longitudinally on the frame, we prefer to provide the rear head stock housing 7, each of the pedestals 15 and the rear end housing 2 with a rectangular shoulder 22 (see Figs. 5, 6, 9, and 10), upon which said rack may be supported as illustrated in detail in Fig. 9.

For the purpose of holding the boring bar guide, which is indicated in Fig. 2 by the reference numeral 23, in position on the upper side bars 13, we prefer to provide a block 24 which fits against the side of the bar 13 below the center thereof and is secured to the outer portion of said boring bar guide by means of suitable screws 25. This insures retention of this guide in position on the side bars 13 while it is being adjusted longitudinally of the machine.

The lathe herein shown is designed to bore a cylinder, such as a cannon, from both ends. It is, therefore, provided with two boring bars marked 26 and 27. These bars are suitably supported in line with each other and are provided with racks 28 and are arranged to be fed forward as the boring operation progresses.

The present invention, however, is confined to the construction of the lathe frame and we do not consider it necessary to describe in this application the means for supporting or feeding the boring bars or the means for rotating the chuck, the means for reciprocating the tool carriage, or the means for adjusting the boring bar guide. These features, in so far as they are new with us, are claimed in separate applications, Serial Nos. 250,028 and 250,029 filed of even date herewith.

For the purpose of cheapening the construction we prefer to employ side bars 13 made up of several sections arranged with abutting ends as shown in Figs. 1, 2 and 7, the joint at the abutting ends of the sections being indicated by the reference numeral 30. To permit these ends to be properly alined and held we prefer to use pedestals 15 at the joints substantially double the width of the other pedestals as illustrated particularly in Fig. 7. This pedestal is the same as the other pedestals 15 except that it has substantially double width to form a bearing for the abutting ends of sections of the bars 13.

There are numerous advantages resulting from this frame construction. The cylindri-

cal bars 13 and 14 are commercial articles designated in the market as "ground shafts." They can be purchased of any desired diameter and in sections of any desired length. The housings and pedestals are simple castings, many of which are duplicates, and the construction of the frame is really only an assembling proposition.

With a lathe of ordinary construction the ways of the lathe bed must be planed. For these large lathes only big planers can be employed and at the present time such planers are very difficult if not impossible to obtain. With our construction any number of sections may be employed to form the side bars. This necessitates no change in the construction except to require the use of a greater number of supporting pedestals.

As hereinbefore stated instead of using a single pair of the upper side bars 13 and a single pair of the lower side bars 14, one bar of each pair being located at one side of the center of the machine, we may use two pairs of each of said bars. This will be the preferable construction for very large machines, in which case each carriage will be supported upon two bars 13 both located on one side of the machine.

A frame embodying this invention is very quickly constructed, and the length of the frame may at any time be increased or decreased by adding or removing sections of side bars and their supporting pedestals.

We do not limit ourselves to the details of the construction as the same may be varied in many particulars within the scope of the claims which follow.

We claim as our invention:

1. A lathe frame comprising end housings having bearing openings therein, cylindrical bars having their ends seated in said openings, pedestals supporting said bars intermediate to said housings and a lathe carriage mounted for longitudinal movement on said bars.

2. A lathe frame comprising end housings, upper and lower side members seated in said housings, said members comprising a plurality of sections placed end to end, pedestals supporting the abutting ends of said sections and a carriage mounted for longitudinal movement on said members.

3. A lathe frame comprising end housings, side members consisting of upper and lower cylindrical bars seated at their ends in said housings and each of said members comprising a plurality of said bars placed end to end, whereby the length of the lathe may be increased or decreased, pedestals supporting said members and having bearings for the abutting ends thereof, and a lathe carriage mounted for forward and backward movement on said members.

4. A lathe frame comprising end housings, each having a pair of upper and a pair of lower bearing openings therein, cylindrical bars seated at their ends in said openings and forming the upper and lower side members of the lathe frame, pedestals having lower openings for the lower cylindrical bars and upper curved seats for the upper cylindrical bars, and a lathe carriage supported on said upper bars and movable longitudinally of the lathe thereon.

5. A lathe frame comprising end housings, upper and lower side members mounted therein, pedestals supporting said side members intermediate to said housings, head stock housings having openings therein through which said upper and lower side members extend, and an arched casting for said head stock housings.

6. A lathe frame comprising end housings, cylindrical bars mounted in said end housings and forming the upper and lower side members of the lathe frame, pedestals supporting said cylindrical bars intermediaie to said end housings, some of said pedestals being wider than others for supporting the abutting ends of the cylindrical bars forming said side members, said bars being removable from said housings and pedestals whereby the length of the lathe frame may be increased or decreased.

7. A lathe frame comprising end housings, cylindrical bars having their ends seated in said housings, and pedestals supporting said bars by engagement with the under surfaces thereof leaving the upper surfaces of said bars exposed.

8. A lathe frame comprising end housings, cylindrical bars having their ends seated in said housings, and pedestals arranged beneath said bars intermediate said housings, leaving the upper portions of said bars exposed to form ways for supporting a lathe carriage and permitting its longitudinal movement on said bars.

9. A lathe frame comprising end housings, cylindrical side bars seated at their ends in said housings, and pedestals arranged between said end housings and having curved seats for receiving and supporting said cylindrical bars and leaving their upper surfaces exposed, whereby a lathe carriage supported on said bars is movable longitudinally thereon over said pedestals.

In witness whereof, we have hereunto set our hands this 3rd day of August 1918.

GEORGE A. STEINLE.
MARK SMITH.
LOUIS R. TAYLOR.

Witnesses:
WM. R. BAGLEY,
FRANK D. REED.