

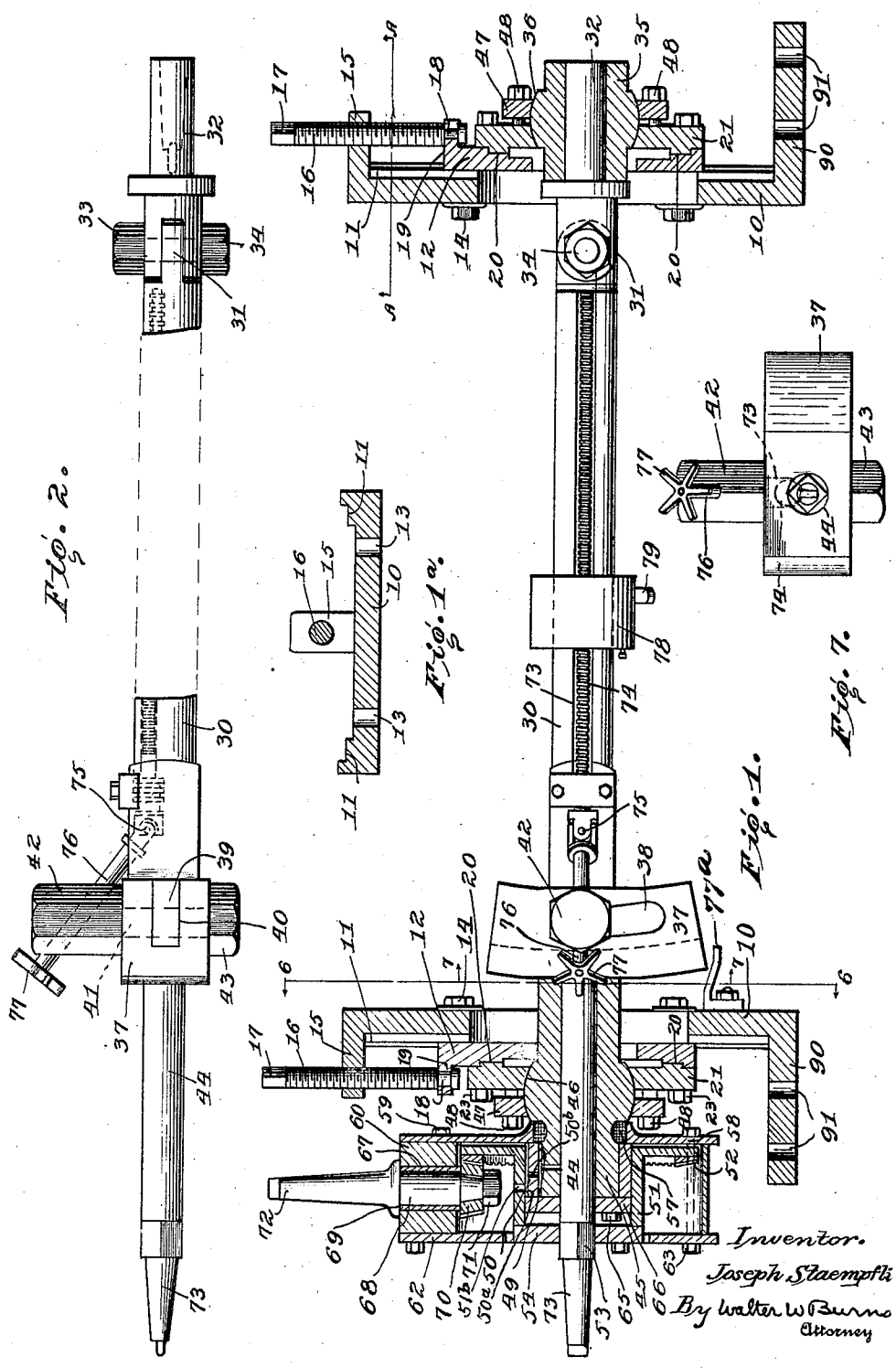
Apr. 17, 1923.

1,452,320

J. STAEMPFLI

PORTABLE BORING MACHINE

Original Filed July 16, 1920 2 Sheets-Sheet 1



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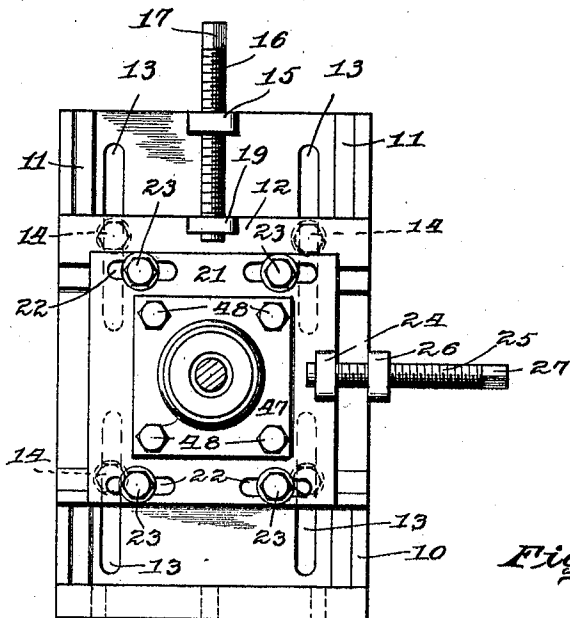


Fig. 3.

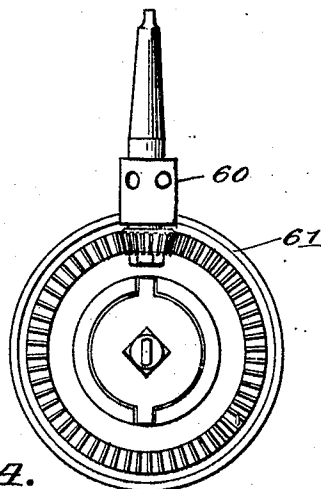


Fig. 4.

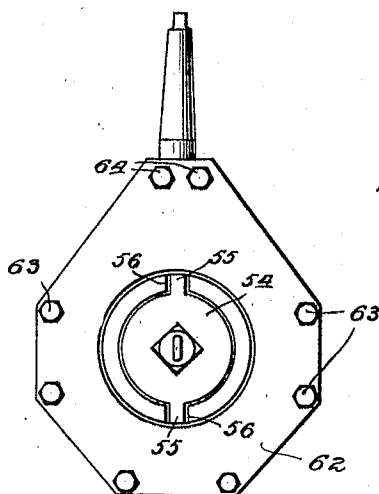


Fig. 5.

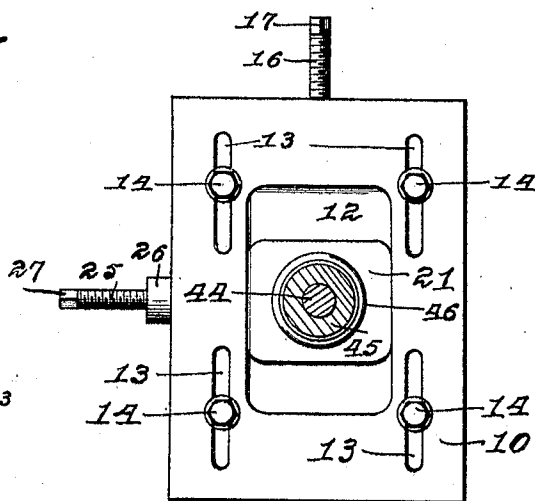


Fig. 6.

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UNITED STATES PATENT OFFICE.

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PORTABLE BORING MACHINE.

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To all whom it may concern:

Be it known that I, JOSEPH STAEMPFLI, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Portable Boring Machines, of which the following is a specification.

This invention relates to boring machines and particularly to that class of boring machines known as portable boring machines.

An object of my invention is the provision of a portable boring machine which may be quickly set up on the bed of a radial drill press and when so set up can be adjusted at either end in both horizontal and vertical planes and by a single adjusting element for each adjustment.

Another object of my invention is the provision of such a portable boring machine which may be set up on the work itself such as on a locomotive or ship's frame or hull and which may after being set up, be independently adjusted at either end of the boring bar or shaft and in both the horizontal and vertical planes.

Another object of my invention is the provision of such a portable boring machine which may be driven, when set up, either by a direct connection of the power means to the boring bar or shaft, or by a reduced gearing at 90° to the axis of the shaft.

Another object of my invention is the provision of such a portable boring machine having a reduced gearing drive which may be driven by a power shaft in any one of many positions as long as the shaft is in a certain plane perpendicular to the axis of the boring bar or shaft.

Another and further object of my invention is the provision of such a portable boring machine having a boring bar which while it is adjustable at either end by simple adjusting means, has bearings which run true regardless of the adjustment.

Another and still further object of my invention is the provision of such a portable boring machine having a boring bar provided with an adjustment providing for the boring of tapered holes.

Another and still further object of my invention is the provision of such a portable boring machine, which after being set up on a piece of work, can bore a hole having a portion cylindrical, and one or more portions

tapered without re-setting up the machine and by merely re-setting the taper adjustment.

Referring to the drawings wherein a preferred embodiment of my invention is illustrated,

Figure 1 is a side elevation sectional view showing the end supports in section.

Fig. 1^a is a cross section on the line A—A of Fig. 1.

Fig. 2 is a fragmental view of the shaft or bar showing the middle portion of the bar broken away.

Fig. 3 is an end elevation view of the right hand adjustable support shown in Fig. 1.

Fig. 4 is a detail view of the gear connections in the reduced or slow speed gear drive of the boring bar.

Fig. 5 is an end elevation of the swinging drive head of the driving mechanism.

Fig. 6 is a sectional view on the line 6—6 of Fig. 1.

Fig. 7 is an end elevation of the boring bar when removed from its bearing, and showing the taper segment and the star wheel for operating the boring bar feed.

Like reference characters refer to similar parts throughout the several views.

The supporting and adjusting means for each end of the bar are similar in construction and operation and the similar parts will therefore be referred to by the same reference characters.

10 designates supporting members which are provided with vertical guides 11 (see Fig. 3) on which the vertical carriage 12 travels. In the vertical portion of the supports 10 are slots 13 which are parallel to the guides 11 and which provide for the movement of the bolts 14 which are threaded in the rear of the vertical carriage 12. The heads of the bolts 14 are larger than the width of the slots 13 and when tightened hold the vertical carriage securely in place. Near the top of the vertical portion of the support 10 is an ear 15 having a threaded hole in which is an adjusting screw 16 having a squared end 17 and having a reduced portion 18 secured in an ear 19 integral with the vertical carriage 12. When it is desired to adjust either vertical carriage, the bolts 14 are loosened, a suitable wrench applied to the squared end 17 and the screw is then turned to raise or lower the vertical carriage 12 until the desired point is

reached. The bolts 14 are now tightened. This holds the carriage in its adjusted position.

Similarly on the carriage 12 are located horizontal guides 20 upon which travels the horizontally movable carriage 21. This carriage 21 is provided with slots 22 which are parallel to the guides 20. Through the slots 22 and threaded in the vertical carriage 12 are the bolts 23. The carriage 21 is provided with an ear 24 in which is mounted one end of an adjusting screw 25 similar in construction to the adjusting screw 16. The end of the screw 25 is mounted in the ear 24 similar to the corresponding end of the screw 16 in the ear 19, and so as to revolve with relation to the bearing in the ear 19 but without having any axial movement with relation to the ear. The screw 25 is threaded and passes through a threaded bearing in the lug 26 which is integral with the vertical carriage 12. The screw 25 has a squared end 27 by which it may be turned by a suitable wrench. When it is desired to adjust the ends of the boring bar in a horizontal plane the nuts 23 are first loosened. The adjusting screws 25 are now utilized to place the horizontal carriages in the proper positions to locate the ends of the boring bar in the correct place. The screws 23 are now tightened.

During these vertical and horizontal movements, the relation of the boring bar to the supports 10, changes. I will now describe the structure which permits this change without disturbing the bar or shaft in its bearings.

The boring bar or shaft is designated as 30. At the right end of the bar, as illustrated in Figs. 1 and 2, is a hinge joint connection 31 composed of a hinge member integral with the bar 30 and another complementary hinge member integral with the bearing member 32. This hinge joint is held tight by a bolt 33 and nut 34. The bearing member 32 is journaled in a journal member 35 having a spherical bearing on its outer side and designated by 36.

At the other end of the boring bar is a segment 37 which has a slot 38 described about the center of the hinge 31 as a center, and in a plane perpendicular to the axis of the said hinge connection. The bar 30 has a tongue 39 inserted in a correspondingly constructed groove 40 in the segment 37. The tongue 39 is provided with a hole in which is mounted a bolt 41 having a head 42. On the end of the bolt 41 is a nut 43 by means of which the tongue 39 can be held securely in the segment 37.

The segment 37 is provided with a bearing shaft member 44 which is journaled in a journal member 45 shown in Fig. 1. The journal member 45 is longer than the journal member 35 at the other end of the bor-

ing bar since it has to carry the driving mechanism of the boring bar. The member 45 has a spherical surface 46 which provides universal movement of the boring bar to be later described.

Mounted on each horizontal carriage 21 is a plate 47 which is spaced from the carriage 21 and is secured in place by the stud bolts 48.

The carriages 21 and their respective plates 47 have complementary part-spherical bearings as shown at each end of the shaft. The carriage 21 and plate 47 at the left in Fig. 1 cooperate with the spherical portion 46 of the member 45 while the carriage 21 and plate 47 at the right of Fig. 1 cooperate with the spherical bearing portion 36 of the journal member 35. During adjustment of the boring bar by means of the vertical and horizontal carriages, movement of the spherical bearing members 36 and 46 takes place within their respective bearing members. However, during the process of boring, the shaft portions 44 and 32 turn within the members 45 and 35 respectively. The tightness of the spherical parts 36 and 46 within their respective bearings is controlled by the bolts 48 which may be tightened or loosened as desired.

Adjacent the spherical bearing portion 46 the journal member 45 has an oil groove 49, connected by an opening 49^a to the opening in which the shaft 44 is journaled. Surrounding the end of the journal member 45 is a bushing 50, which provides a bearing for the sleeve 51 which latter is provided with a flange carrying the bevel gear 52. An oil groove 50^a is formed in the outer surface of the bushing 50, and the bushing 50 and sleeve 51 are formed with oil holes 50^b and 51^b respectively so that lubricant can pass from the interior of the gear casing to the journaled portion of the shaft 44. The shaft 44 is provided with a square portion 53 on which is mounted a plate 54 having lugs 55 engaging recesses 56 in the sleeve 51 (see Figure 5).

Seated in an annular groove in the journal member 45 is a suitable bearing 57 which is suitably secured to the back plate 58 of the gear box. Secured to the back plate 58, by the bolts 59, is a block 60. Extending around near the periphery of the back plate 58 and abutting the sides of the block 60 is a ring 61 (Fig. 4) forming the sides of the gear box. Attached to the block 60 and the ring 61 is the front plate 62. Bolts 63 secure the front and back plates to the ring 61. Stud bolts 64 are provided to secure the front plate to the block 60.

Bolted to the end of the journal member 45 by the bolts 65 is a plate 66. This plate 66 retains the bushing 50 in place.

The block 60 is provided with a bearing opening in which is a bushing 67. Within

the bushing 67 is journaled a driving shaft 68 having suitable means for limiting the downward movement, as a collar 69. Keyed to the inner end of the shaft 68 is a bevel gear 70 which meshes with the bevel gear 52. The extreme inner end of the shaft 68 is provided with a threaded portion which is engaged by a nut 71. The nut 71 secures the gear 70 on the shaft 68. On the outer end of the shaft 68 is a shank 72 which may be operated by a drill press or by the ordinary air motor. Another shank 73 is provided on the shaft portion 44 and is used similarly to the shank 72 when a direct connection is desired. It will be noted that due to the relative size of the gears 70 and 52, a slower driving of the shaft 44 is obtained by the use of the shank 72. It will also be noted that due to the construction of the gear box and its bearing, the same may be turned at almost any angle relative to the shaft 44 and in a plane perpendicular thereto. This feature is very useful since in some places, the shank 73 would be inaccessible, and the shank 72 would also be inaccessible in some positions.

The boring bar 30 is provided with a groove 73 in which is mounted a feeding screw 74 which is journaled at its ends in any well known or suitable manner. At the left end of the screw 74 is a universal joint 75 which is connected to the shaft 76. On the end of the shaft 76, which is journaled in the nut 42, is a star wheel 77. When the boring bar revolves, the star wheel 77 engages a suitable projection 77^a which is adjustably secured to a stationary part of the frame. This turns the star wheel 77 one point at the end of each revolution to operate the feed bar to move the tool carriage 78 which carries the tool 79. Any well known or suitable means may be provided to give the tool 79 radial movement before beginning a new cut.

In setting up my portable boring machine, preliminary adjustments of the vertical and horizontal carriages may be made so that when the machine is set up with relation to the work, only small adjustments will be necessary. The machine is now set up with relation to the work, the left hand support and its attachments being slipped off the shaft portion 32 in order to get the bar 30 in place. When assembled in approximately the correct position the short portions 90 of the supports 10 are clamped to the drill press, locomotive frame, ship's hull, or other solid support by means of clamps, utilizing if desirable the holes 91 for the passage of securing bolts. Accurate adjustments of the carriages, as already described, is now accomplished. The tool carriage 78 is drawn to one end and set to begin its cut. The projection 77^a for operating the star wheel 77 is set in position to be engaged by the same

as it revolves. Power is now applied to either of the shanks 72 or 73 and the machine is ready to operate.

If it is desired to cut a tapered hole the nuts 43 and 34 may be loosened and the left end 39 of the bar 30 may be swung in the slot 30 to the desired place after which the nuts 43 and 34 are tightened. It will be clear to one skilled in the art that a hole tapered in one part and cylindrical in another part may be made without resetting the carriages.

While I have described my preferred form in detail, I desire to have it understood that modification and changes may be made without departing from the spirit of my invention and within the scope of the appended claims.

Having described my invention what I claim is:

1. In a portable boring machine, a boring bar provided with a shaft portion at each end, independently adjustable supports for each end of the bar, and a ball and socket joint connection between each shaft portion and its support.

2. In a portable boring machine, a boring bar provided with a shaft portion at each end, supports for each end of the bar, and a ball and socket joint connection and adjusting mechanism between each shaft portion and its support for changing the position of the same in a lateral direction relative to the axis of the shaft.

3. In a portable boring machine, a boring bar provided with a shaft portion at each end, supports for each end of the bar, horizontally and vertically adjusting means on each support, and a ball and socket joint connection between each horizontally and vertically adjusting means and the support.

4. A portable boring machine having supports, a boring bar, adjusting means on the supports for carrying the bar comprising bearings at each end of the bar for carrying the respective ends, means at each end for moving the bearings horizontally and independent means at each end for moving the bearing vertically relative to the supports and connections between each of the bearings and its support for allowing universal angular movement of the bearings relative to the supports.

5. A portable boring machine having supports, a boring bar, adjusting means on the supports for carrying the bar comprising means at each end of the bar for carrying the respective ends in horizontal directions, and means for carrying the respective ends in vertical directions, and a single means at each end for moving the horizontally carrying means, and a single means at each end for moving the vertically carrying means and a connection, between the boring bar and its end-carrying means, to give a free

movement to the boring bar bearing with relation to its adjusting means when the horizontal and vertical adjustments are made.

6. A portable boring machine having supports a boring bar, adjusting means on the supports for carrying the bar comprising means at each end of the bar for carrying the respective ends in horizontal directions, and means for carrying the respective ends in vertical directions, and a single means at each end for moving the horizontally carrying means, and a single means at each end for moving the vertically carrying means, and a spherical bearing connection, between the boring bar and its end-carrying means, to give a free movement to the boring bar bearing with relation to its adjusting means when the horizontal and vertical adjustments are made.

7. In a portable boring machine, a boring bar having a shaft portion at each end, a journal member supporting each shaft portion, a spherical bearing portion on each journal member, a carrying member for each journal member and having bearings complementary to the spherical bearing portions, and separate means for adjustably supporting the carrying members.

8. In a portable boring machine, a boring bar having a shaft portion at one end, a journal member supporting the shaft portion, a spherical bearing portion on the journal member, a carrying member for the journal member and having a bearing complementary to the spherical bearing portion, a support for the carrying member and mechanism for giving a horizontal adjustment to the carrying member relative to the support, and mechanism for giving a vertical adjustment to the carrying member relative to the support and single members for controlling the horizontal and vertical adjusting mechanisms, respectively.

9. In a portable boring machine, a boring bar having a shaft portion at one end, a journal member supporting the shaft portion, a spherical bearing portion on the journal member, a carrying member for the journal member and having a bearing complementary to the spherical bearing portion, a single screw mechanism for giving a horizontal adjustment to the carrying member relative to the support, and a single screw mechanism for giving a vertical adjustment to the carrying member relative to the support.

10. In a portable boring machine, a boring bar having a shaft portion at one end, a journal member supporting the shaft portion, a spherical bearing portion on the journal member, a carrying member for the journal member and having a bearing complementary to the spherical bearing portion, the carrying member and a single screw mechanism for giving a horizontal adjust-

ment to the carrying member relative to the support, and a single screw mechanism for giving a vertical adjustment to the carrying member relative to the support.

11. In a portable boring machine, a boring bar having a shaft portion at each end, a journal member supporting each shaft portion, a spherical bearing portion on each journal member, a carrying member for each journal member and having bearings complementary to the spherical bearing portions, supports for the respective carrying members and mechanisms for giving horizontal adjustment to the carrying members relative to the respective supports, and mechanisms for giving vertical adjustment to the carrying members relative to the respective supports.

12. In a portable boring machine, a boring bar having a shaft portion at each end, a journal member supporting each shaft portion, a spherical bearing portion on each journal member, a carrying member for each journal member and having bearings complementary to the spherical bearing portions, supports for the respective carrying members and screw mechanisms for giving horizontal adjustment to the carrying members relative to the respective supports, and screw mechanisms for giving vertical adjustment to the carrying members relative to the respective supports.

13. In a portable boring machine, a boring bar provided with a shaft portion at each end, supports for each end of the bar, vertically and horizontally guided carriages carried by the supports and connections between the shaft portions and one of the carriages of the respective supports, a single operating adjusting element for moving each carriage at each end with relation to the respective supports, and a ball and socket connection between each shaft end and one of the carriages on each support.

14. A boring machine having a boring bar, the boring bar having a shaft, a housing mounted to revolve about the said shaft of the boring bar, a second shaft mounted in the housing at an angle to the first mentioned shaft and having a gear connection therewith and a power shaft engaging means on the end of the second mentioned shaft.

15. A boring machine having a boring bar, the boring bar having a shaft, a power shaft engaging means on the end of the shaft in line therewith, a housing mounted to revolve about the said shaft of the boring bar, a second shaft mounted in the housing at an angle to the first mentioned shaft and having a gear connection therewith, and a power shaft engaging means on the end of the second mentioned shaft.

In testimony whereof I affix my signature.

JOSEPH STAEMPFLI.