Sept. 15, 1931. J. J. THACHER 1,823,670

WORK POSITIONING MEANS FOR CENTERING MACHINES

Original Filed May 3, 1927 2 Sheets-Sheet 1

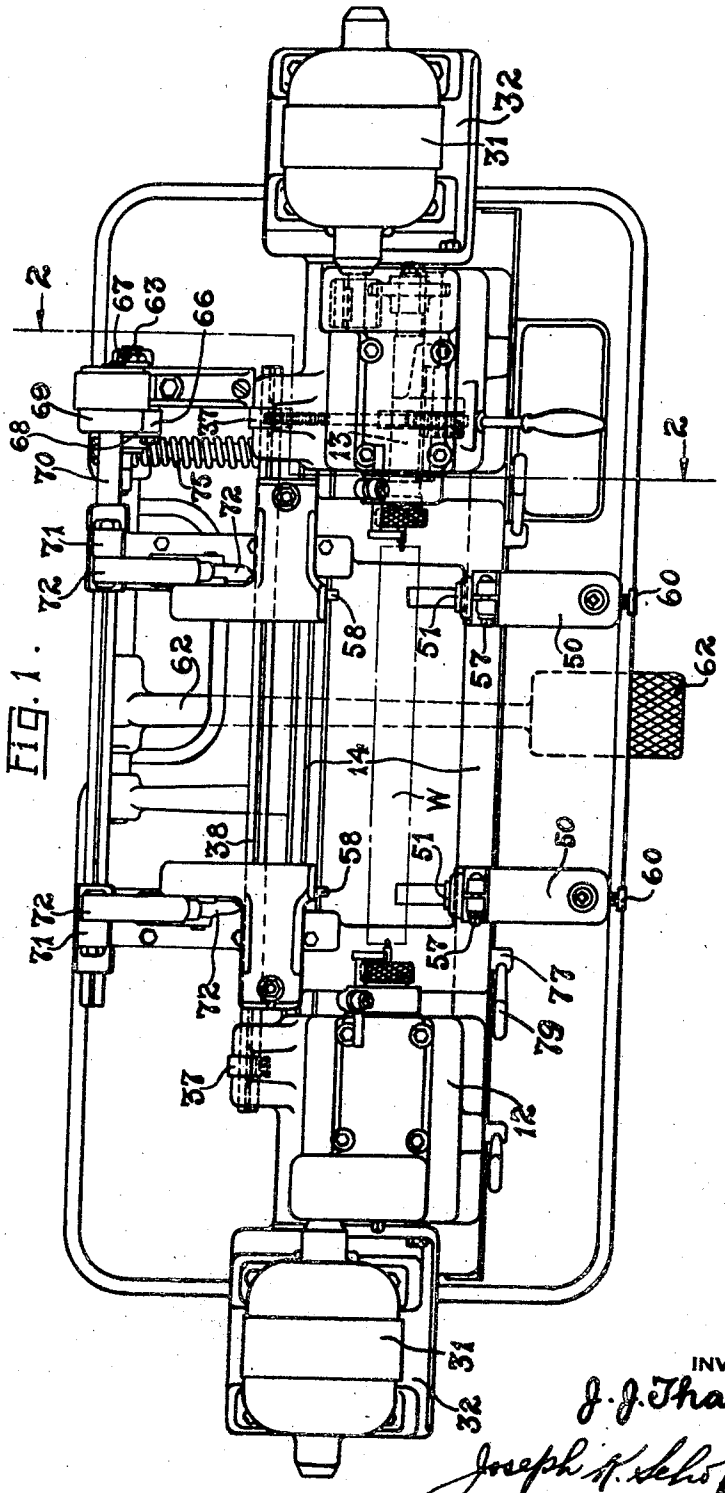


Fig. 1.

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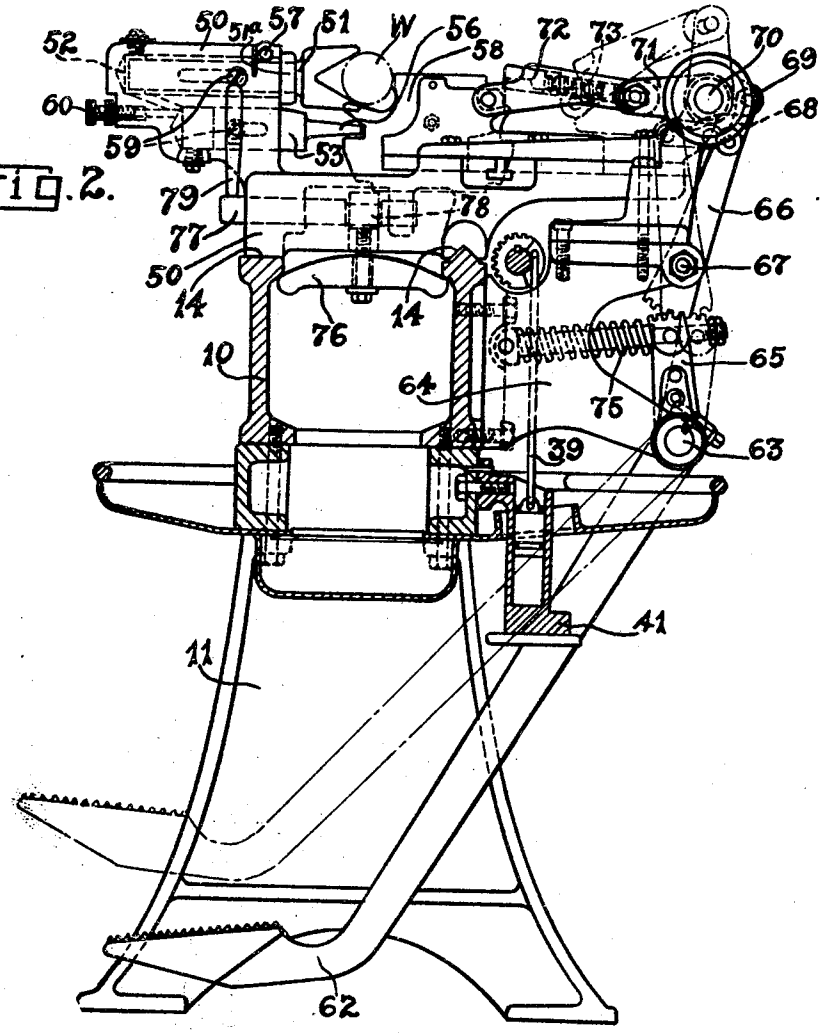
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Fig. 2.



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UNITED STATES PATENT OFFICE

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WORK POSITIONING MEANS FOR CENTERING MACHINES

Original application filed May 3, 1927, Serial No. 188,554. Divided and this application filed October 3, 1928. Serial No. 310,117.

This invention relates to centering machines and particularly to one adapted to simultaneously center the opposite ends of a blank held against rotation during the centering operation.

An object of the present invention is to provide improved supporting and retaining means for the work being centered which will permit work of widely different diameters to be properly positioned while being centered and held against rotation without manual adjustment of the holding members.

Another object of the present invention is to provide work supporting and retaining members comprising a plunger and an abutment adapted to support a work blank between them, the abutment through fluid actuated means being adapted to adjust the position of the plunger to properly and accurately position a blank of any diameter horizontally for the centering operation.

Another object of the invention is to provide a slight vertical adjustment of the work supporting means by means of an eccentric sleeve so that the supporting means may be accurately aligned with the axis of the drill spindles.

This application forms a division of my copending application Serial No. 188,554, filed May 3, 1927, in which the complete machine is disclosed in detail.

With these and other objects in view, my invention consists in the features of construction and operation set forth in the following specification and illustrated in the accompanying drawings.

In the accompanying drawings annexed hereto and forming a part of this specification, I have shown my invention embodied in a treadle operated machine adapted to simultaneously center opposite ends of a work blank, but it will be understood that the invention can be otherwise embodied and that the drawings are not to be construed as defining or limiting the scope of the invention, the claims appended to this specification being relied upon for that purpose.

In the drawings:

Figure 1 is a plan view of the complete machine.

Fig. 2 is a side elevation taken substantially upon the line 2—2 of Fig. 1.

In the above mentioned drawings I have shown but one embodiment of the invention which is now deemed preferable, but it is to be understood that changes and modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

Briefly, and in its broadest aspect, my invention comprises the following principal parts: first, a base; second, drill heads mounted in opposed relation upon opposite ends of the base and adapted to be moved along the base; third, work supporting members adapted to support work blanks of different diameters in axial alignment with the drill spindles; fourth, plungers forming parts of the work supporting members having V-shaped notches at their rear ends adapted to engage the periphery of work blanks being centered; fifth, abutments movable toward and from the plungers and adapted to contact with the opposite side of the work blank being centered; sixth, lever mechanism actuated by a foot treadle to advance the abutments into operative position; seventh, auxiliary plungers disposed parallelly to and adjacent the plungers having the V notches and adapted on their rearward end to engage surfaces on the abutments; and eighth, fluid means within the cylinders for said plungers, the ratios of these plungers being such that work of any diameter may be properly centered when the abutments are advanced to engage the work and the auxiliary plungers force the first plungers to firmly engage the periphery of the work.

Referring more in detail to the figures of the drawings, I provide a base 10, preferably mounted upon suitable pedestals 11 and adapted to support drill spindle mounting tool heads 12 on the opposite ends of the base. As these heads 12 may be and preferably are similar, a description of one will suffice, it being understood, however, that the heads will be in opposed relation and will have their drill spindles 13 axially advanced toward the opposite ends of the work W being centered

by manually operable means in one of the heads 12.

In order to rotate the spindle 13 at high speed a motor 31 is mounted on a bracket 32 secured to the head 12 and provided with driving connections so that spindle 13 may be rotated in any axial position.

In order to properly and accurately support work blanks W of different diameters coaxially with the drill spindles 13 and to permit blanks W of different diameters within the capacity of the machine to be properly centered without manual adjustments for their different diameters, the following mechanism is provided. Upon suitable supports 50 adjustably mounted upon the ways 14 of the base 10 are plungers 51 operating within cylinders 52 formed within the supports 50 and having a V-shaped notch preferably of 60° in their rear ends. The work being centered or otherwise acted upon is adapted to engage the angular surfaces of this notch. Two of these supports 50 are preferably provided which may be adjusted along the base 10 for different lengths of work blanks W. These supports 50 and parts mounted thereon are similar to each other so that but one will be described.

Adjacent and extending parallel to the plunger 51 is an auxiliary plunger 53 within a second cylinder 54 within the support 50 connected to the first cylinder by a suitable passage 55. This second or auxiliary plunger 53 has a rearward extending projection 56. The relative cross sectional areas of these two plungers 51 and 53 with notches of 60° formed in the plungers 51 is such that movement of the auxiliary plunger 53 will move the first plunger 51, which engages the work, exactly one-half the distance moved by the auxiliary plunger. In other words, the area of the auxiliary plunger 53 is exactly double that of the first cylinder 51. With different angles between the surfaces of the notches in the plungers 51 it will be understood that the ratios between the diameters of the plungers 51 and 53 will be varied accordingly.

To engage the opposite side of the work blank W and to simultaneously engage the projection 56 on the auxiliary plunger 53 to force that plunger to correspondingly advance the first plunger 51, a member 58 is provided as shown clearly in Fig. 3. This member 58 is adapted to be moved in suitable ways within the support 50 toward and from the plungers 51 and 53. Upon movement forward of the member 58 it engages the work blank W and forces the blank W against the surfaces of the notch in the plunger 51. This supports the blank W at an elevation corresponding to that of the spindles 13.

Simultaneously forward movement of the member 58 causes it to engage the projection 56 on auxiliary plunger 53 and force the plunger 51 rearwardly through the liquid within the cylinders 52 and 54. This movement of the plungers 51 and 53 and the member 58 continues until the blank W is firmly held between the surfaces of the notch in plunger 51 and the forward surface of the member 58. The relative movement of the plunger 51 and the member 58 is such that blanks W will be held upon the same axis regardless of their diameter. To initially adjust the plunger 51 so that the axis upon which blanks W are held will coincide with the axis of the spindles 13, an adjustment of the plungers 51 and 53 is provided. This comprises a screw 60 which may be screwed in or out to slightly vary the space within the inner ends of cylinders 52 and 54 and the passage 55. The effect of this adjustment is to slightly vary the lateral position of the plunger 51 and member 58 when a blank W is held between them. To initially adjust the plunger 51 to the correct height an eccentric sleeve 51ª is inserted within the cylinder 52 closely surrounding the plunger 51. By rotating the sleeve 51ª the elevation of the plunger 51 may be slightly varied. A clamping screw 57 is provided to tightly hold the sleeve 51ª in adjusted position. To hold the plungers 51 and 53 from rotation and from movement beyond limited positions, screws 59 are provided adapted to engage splines formed within the plungers 51 and 53.

The mechanism for advancing the member 58 toward and from its operative position is shown fully in Fig. 3. This comprises a foot treadle 62 adapted to be oscillated about the axis of a shaft 63. Preferably this shaft 63 is supported for rotation in a bracket 64 secured upon the rear surface of the base 10. For convenience the treadle 62 may be adjusted along the shaft 63 between the projections on the bracket 64 supporting the shaft. The shaft 63 has secured to it a lever 65 provided with gear teeth adapted to mesh with teeth on the lower end of a lever 66 mounted for pivotal movement about a stud 67 in the bracket 64. Movement therefore of the treadle 62 will oscillate the lever 66. The upper end of this lever 66, through a suitable short connecting link 68, is pivotally connected to an oscillating member 69 adapted to oscillate with a shaft 70 mounted in the bracket 64. The shaft 70 is splined substantially throughout its length and is provided with levers 71, one for each of the supports 50. Oscillation of the shaft 70 therefore oscillates the levers 71 which are attached through connecting rods 72 to the member or block 58. A spring 73 is interposed between the lever 71 and rod 72 permitting the lever 71 to be moved to a limited position with blanks W of any diameter.

In their work clamping position the lever 66 and link 68 are in alignment, thus acting

similar to the links of a toggle. Similarly the members 71 and 72 are in alignment when the member 58 is in its forward or work clamping position.

To return the treadle 62 and connected parts to their inoperative positions, a spring 75 is provided normally forcing the lever 65 to its outer position and the treadle to its upper position. The supports 50 are adjustably secured to the base 10 by straps 76 on cross shafts 77 having eccentrics thereon 78. Hand levers 79 provide means for oscillating the shafts 77.

What I claim is:

1. Supporting means for work pieces in a drilling machine comprising in combination, a support, oppositely disposed work engaging members on said support, means manually operable to move one of said members toward and from its work engaging position, and means to vary the position of the opposite member, said means including hydraulically connected plungers movable within cylinders in said support, one plunger being engaged by the manually movable work engaging member and the other plunger carrying the work engaging members opposed to said manually movable member, whereby said opposed member will be adjusted and blanks of different diameters may be mounted upon the same axis.

2. Means to position work of different diameters centrally upon a fixed axis in a drilling machine comprising in combination, a support, a manually movable work engaging member, an opposed work engaging member, a plunger forming part of said opposed work engaging member, a second plunger adjacent said opposed work engaging member and extending parallelly thereto, cylinders within which said plungers are movably mounted, a block forming part of said manually movable work engaging member adapted to engage the opposite side of the work and said second plunger, and a fluid conduit connecting said cylinders, whereby said plungers are simultaneously movable in opposite directions.

3. Means to position work of different diameters upon a fixed axis in a drilling machine comprising in combination, a support, a work engaging member movable on said support, a second movable member adjacent said member having a projection thereon and movable parallelly thereto, cylinders therefor within which said members are slidable, a fluid conduit connecting said cylinders whereby said members are movable in opposite directions, a manually movable block on said support movable toward and from said member and adapted to engage said member and projection, movement of the block forwardly serving to hold the work between the member and block.

4. Supporting means for work pieces in a drilling machine comprising in combination, a support, oppositely disposed work engaging members on said support, manual means to move one member into and out of its work engaging position, a plunger supporting the other of said work engaging members, a second plunger having a cross section different from said first plunger, cylinders in which said plungers are slidable, a fluid connection between said cylinders, and means on said first work engaging member adapted to engage and move said second plunger, said second plunger through said fluid conduit serving to adjust said first plunger.

5. Supporting means for work pieces in a drilling machine comprising in combination, a support, oppositely disposed work engaging members on said support, manual means to move one member into and out of work engaging position, a plunger movable with the other of said work engaging members, a second plunger parallel to the first plunger, cylinders for said plungers opening one into the other, a fluid filling said cylinders, and means on said first work engaging member engaging said second plunger when moved to its work engaging position, whereby movement of said second plunger forces said first plunger into its work engaging position.

6. Supporting means for work pieces in a drilling machine comprising in combination, a support, oppositely disposed work engaging members on said support, manual means to move one member into and out of work engaging position, a plunger movable with the other of said work engaging members, a second plunger parallel to the first plunger, cylinders for said plungers opening one into the other, a fluid filling said cylinders, an eccentric sleeve within the cylinder mounting the plunger carrying the work engaging member, whereby rotary adjustment of said sleeve will vary the transverse position of said work engaging member, and means on said first work engaging member engaging said second plunger when moved to its work engaging position, whereby movement of said second plunger forces said first plunger into its work engaging position.

7. Supporting means for work pieces in a drilling machine comprising in combination, a support, oppositely disposed work engaging members on said support, manual means to move one member into and out of work engaging position, a plunger movable with the other of said work engaging members, a second plunger parallel to the first plunger, cylinders for said plungers opening one into the other, a fluid filling said cylinders, means to adjust the relative positions of said plungers within said cylinders, and means on said first

work engaging member engaging said second plunger when moved to its work engaging position, whereby movement of said second plunger forces said first plunger into its work engaging position.

In testimony whereof, I hereto affix my signature.

JOHN J. THACHER.