Nov. 23, 1926. 1,608,443

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BLANK ROTATING MECHANISM FOR CENTERING MACHINES

Filed Nov. 28, 1924 2 Sheets-Sheet 1

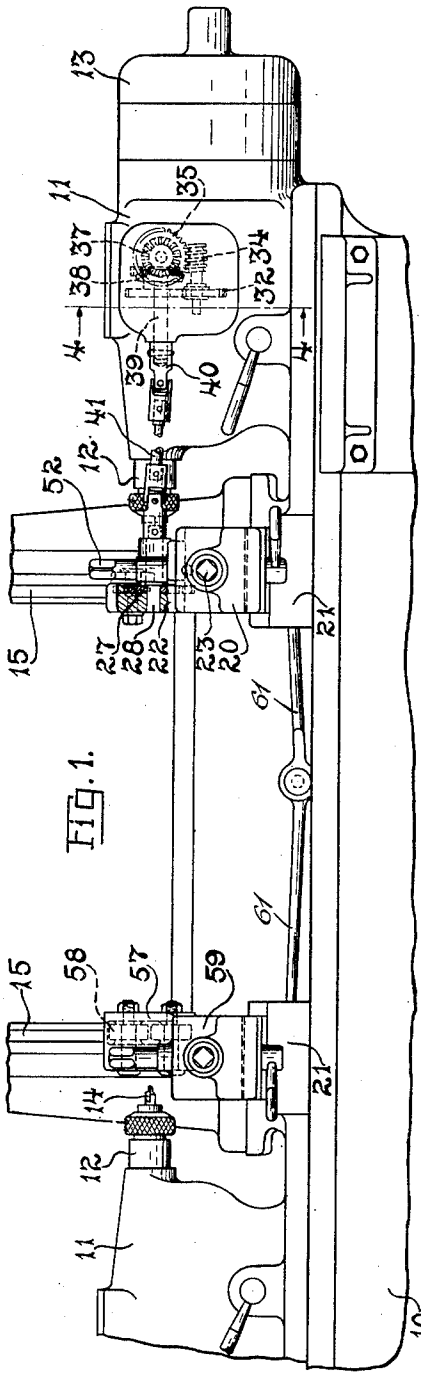


Fig. 1.

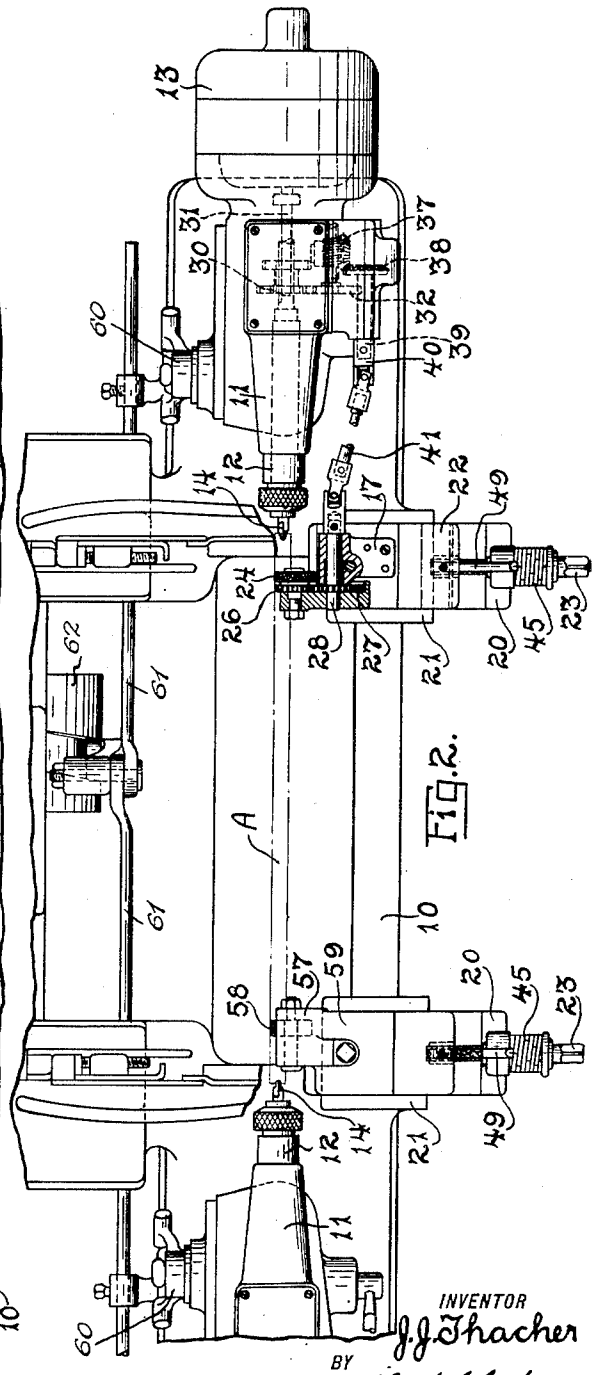


Fig. 2.

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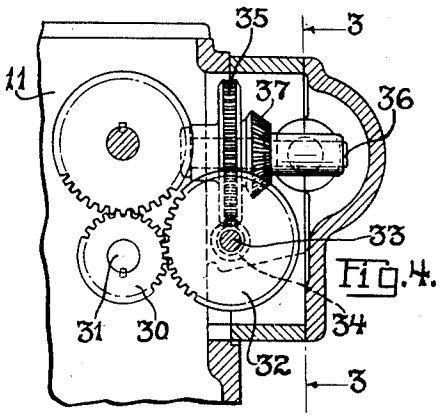



Fig.4.

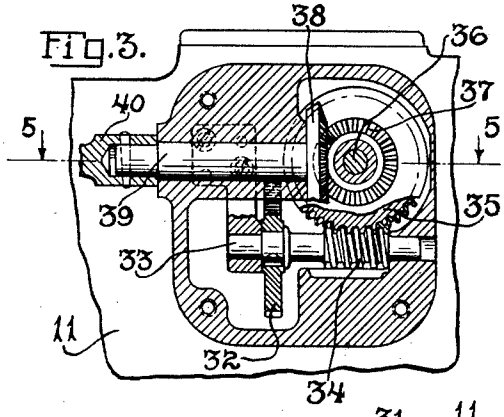



Fig.3.

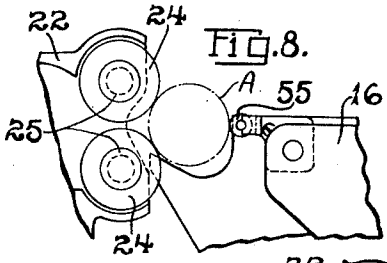



Fig.8.

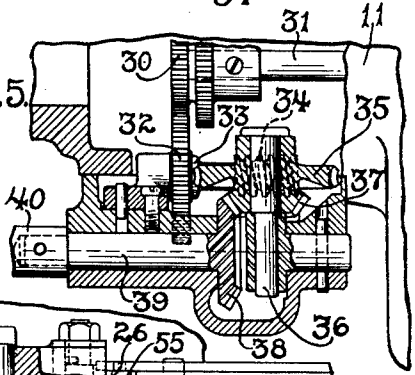



Fig.5.

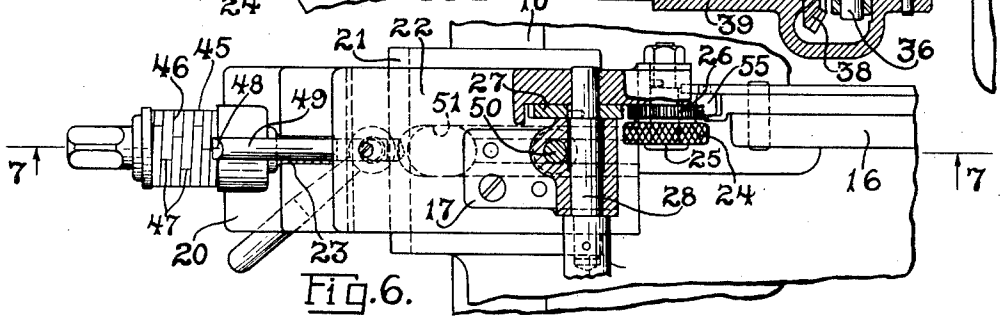



Fig.6.

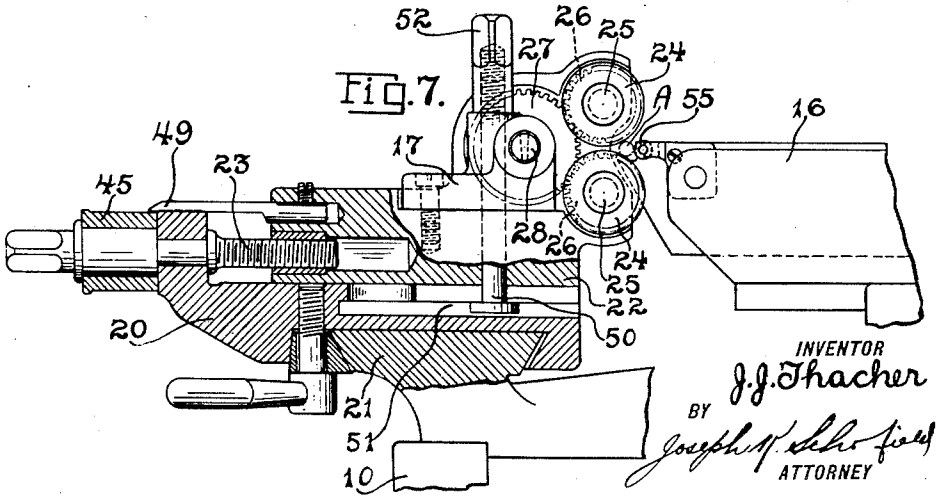



Fig.7.

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# UNITED STATES PATENT OFFICE.

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## BLANK-ROTATING MECHANISM FOR CENTERING MACHINES.

Application filed November 28, 1924. Serial No. 752,662.

This invention relates to centering machines adapted to accurately center drill and countersink one or both ends of a blank.

An object of the present invention is to provide rotating means for the blank so that it may be slowly rotated upon its own axis while in operative position in a centering machine.

Another object of the invention is to provide adjustable means of improved form for supporting blanks of varying diameters so that their axes will be in alignment with the drill spindle or spindles of the centering machine.

One feature which enables me to accomplish the above named objects is that a support for the blank, positioned so that it will engage the blank near one end, is provided with rotatable rollers adapted to be engaged by the blank during the centering operation. Rotating means are provided for these rollers so that the blank will be frictionally rotated at a slow speed.

Another feature of importance is that a transfer member for advancing the blanks from a magazine to operative position relative to the spindles is provided with a roller also adapted to contact with the work and adapted to retain the blank in contact with the rotating rollers.

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 an automatic centering machine having two drill spindles oppositely disposed and adapted to contact simultaneously with and drill opposite ends of the 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 front elevation showing the principal parts of an automatic centering machine provided with the present invention.

Fig. 2 is a plan view of the principal parts of an automatic centering machine showing the present invention, parts being cut away to more clearly disclose their construction.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 4 and showing a part of the rotating means for the blank.

Fig. 4 is a cross sectional view taken substantially on line 4—4 of Fig. 1.

Fig. 5 is a sectional view taken substantially on line 5—5 of Fig. 3.

Fig. 6 is a plan view of the blank positioning, supporting and rotating means, parts being broken away to more clearly show their construction.

Fig. 7 is an elevation of the parts shown in Fig. 6, and

Fig. 8 is a view of the blank supporting means and the transfer arm in position for a blank of large diameter.

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

Referring more in detail to the figures of the drawings, the present invention is shown applied to an automatic centering machine disclosed in my Patent No. 1,540,819, granted June 9, 1925. This centering machine comprises briefly a base 10 having, in its preferred form, opposed drill heads 11 mounted at opposite ends of the base within each of which is rotatably mounted a drill spindle 12. One or both of these heads 11 may be adjustable on base 10 for different lengths of blanks. Rotating means for the spindles 12 are provided preferably in the form of motors 13 mounted on each head 11. Each spindle 12 carries a small combined drill and countersink 14 at its operative end adapted, as the spindles 12 are automatically advanced, to enter and drill the end faces of the blank A. In rear of the base 10 is a vertically disposed magazine 15 adjustable for different diameters and lengths of blanks, and, just below the magazine 15 are transfer arms 16 adapted to advance a blank A from the magazine 15 to operative position relative to the spindles 12. In front of the base 10 and preferably provided near each of the drill heads 11 is a new and special form of support 17 for the blank A, these supports 17 being associated with the transfer arms 16 to maintain the blanks A in operative

position during the drilling operation. It is these supports 17 for the blanks which constitute the present invention.

The construction of magazine 15, transfer means 16, spindles 12 and their advancing and rotating means is fully disclosed in the above referred to copending application so that further description of these parts is thought to be unnecessary. Means 60 actuated by the rods 61 are provided to automatically actuate the spindles 12 so that they will be advanced or fed into contact with and enter the opposite end faces of the blank A. A cam 62 suitably supported and rotated during operation of the machine oscillates a lever 63 to which the rods 61 are attached. Also means are provided to automatically actuate the transfer means 16 to periodically advance a blank A into operative position in timed relation to the operation of the other parts.

The present invention relates primarily to improved means for supporting the blanks A being centered in operative position relative to the spindles 12 and particularly to a supporting means permitting the blank A to be slowly rotated during the centering operation so that it will be centered properly relative to its axis.

In order to support the blank A in operative position for drilling, a carriage 20 is provided mounted on suitable ways 21 extending along the base 10 and provided with a cross slide 22 movable on the carriage 20 transversely toward and from the axis of the spindles 12. This slide 22 may preferably be adjusted to accommodate blanks A of different diameters by means of a screw 23 clearly shown in Fig. 7. Mounted on this slide 22 are two rollers 24, one directly above the other, and their peripheries are slightly knurled or roughened to frictionally engage the blank A being centered. These two rollers 24 are positioned to rotate about fixed axes in the slide 22 and provide means for engaging against and supporting the blanks A correctly. Adjustments of the slide 22 toward the axis of the spindles 12 is the only adjustment necessary to properly position them for different diameters of blanks A. In order to rotate these rollers 24, which preferably are rotatably mounted on fixed studs 25, gears 26 mounted substantially adjacent the rollers 24 and preferably integral therewith are in mesh with a gear 27 mounted upon a short horizontal shaft 28 rotatably mounted in the slide 22.

In order to rotate the driving shaft 28 connected to the blank rotating rolls 24. I provide connections extending preferably from one of the shafts of the spindle rotating mechanism. This is clearly shown in Figs. 3, 4 and 5. As shown in these figures, one of the gears 30 on the motor shaft 31 is in mesh with a gear 32 on a short shaft 33 rotatably mounted within the spindle head 11. On this shaft 33 is a worm 34 in mesh with and driving a worm wheel 35 upon a transversely disposed shaft or stud 36 which carries a bevel gear 37. This bevel gear is in mesh with a corresponding bevel gear 38 on a short shaft 39 extending parallelly with the drill spindle 12. By means of universal couplings 40 and a telescoping shaft 41, this driving shaft 39 is connected with the shaft 28 on which the roller driving gear 27 is mounted. It will therefore be seen from this description that when one of the spindles 12 is being rotated by its motor 13, the driving shaft 28 is rotated at a materially reduced speed which serves to drive the rollers 24 and consequently the blank A at slow speed.

For convenience, special indicating means are provided for determining the adjustment for which the slides 22 are set so that the rollers 24 will be properly positioned for blanks A of different diameters. On the outer end of the adjusting screw 23 for each slide 22 is a sleeve 45 preferably fastened to this screw 23 and provided with a helical groove 46, the lead of which corresponds in direction and distance to that of the adjusting screw. At varying positions along this helical groove 46 are graduated markings 47 indicating the setting of the slide 22 and therefore the rollers 24 for different diameters of blanks A. These marks are adapted to be aligned with a zero mark 48 carried on an arm 49 fixed to and moving with the cross slide 22. By adjusting the screw 23 therefore the zero mark 48 will follow the helical groove 46, and, to adjust the slide 22 for any given diameter of blank A to be centered, it is only necessary to align the corresponding graduated mark 47 on the groove 46 with the zero mark 48 to properly set the rollers 24 for that particular diameter. It will be understood that the graduations 47 on the helical groove 46 are very accurately located by any preferred means. To clamp the slide 22 in position on the carriage 20 when properly adjusted for any diameter of blank A, a bolt 50 is provided passing entirely through the cross slide 22 and entering a T-slot 51 in the carriage 20. By means of a nut 52 on the threaded upper end of this bolt 50, the cross slide 22 may be secured in any adjusted position.

As will be seen from Fig. 7, the position of the rollers 24 when clamped in adjusted position determines the position of the blank A relative to the axis of the drill spindles 12. To maintain the blank A in this position, it must be held firmly toward and in contact with the surface of the rollers 24. For this purpose, I mount upon the forward end of the transfer arms 16, a

small roller 55 so that when the transfer arms 16 move forwardly and are retained in their forward position during operation, the roller 55 carried at its forward end is firmly pressed against the periphery of the blank A. These three cooperating rollers 24 and 55 therefore maintain the blank A upon a fixed axis as long as the transfer arm 16 is held in its forward position and permit it to be rotated frictionally by rotation of the two rollers 24 on slide 22.

For long work, it is necessary to support the blank A at both of its ends, but, ordinarily, it is not necessary to provide blank rotating means for the rollers 24 on both of the supports 17 when two supports are provided I therefore provide a second or auxiliary support 57 for the blank A which may, as shown in Fig. 2, be provided with rollers 58 similar in diameter and position to those on the support 17 described above. These rollers 58, however, are not provided with rotating means but may be adjusted by movement of the transverse slide 59 carrying them for different diameters of work. Preferably and as shown in Fig. 2, this second support 57 is of the same form as the support 17 carrying the driven rollers 24, the cross slide and its positioning and indicating means being identical with those previously described.

Coming now to a description of the operation of the mechanism, the transfer arms 16 are periodically and automatically actuated to advance a blank A from the magazine 15 to alignment with the drill spindles 12. The means for effecting this movement of the arms is or may be similar in every way to the means described in the above mentioned copending application. When advanced to this position, the blank A contacts with the two pairs of rollers 24 and 58. The transfer arms 16 during operation are constantly urged forward and resiliently force their rollers 55 against the blank A, thus holding the blank A between the two groups of rollers. While so held, the drill spindles 12 are being constantly rotated and also advanced to feed their drills 14 into and drill the opposite end faces of the blanks A. Rotation of one of the spindles 12 serves to slowly rotate the rollers 24 through the driving connections above described and thus slowly rotate the blank A by the frictional engagement of the blank with these rollers during the drilling operation. As soon as the drilling operation has been completed, the spindles 12 are retracted and the transfer arms 16 are moved rearwardly thus permitting the centered blank to drop from its operative position relative to the spindles 12. In the retracted position of the transfer arms, a new blank is taken up by the transfer arms 16 from the magazine 15 for movement to operative position and the cycle of operations above described is repeated.

What I claim is:

1. An automatic centering machine comprising in combination, a base, a pair of oppositely disposed drill spindles thereon, means to rotate and advance said spindles, a blank carrying magazine, transfer mechanism adapted to advance a blank from the magazine to operative position relative to the spindles, and means to rotate said blank, said rotating means and transfer mechanism serving to maintain the blank in operative position during rotation.

2. An automatic centering machine comprising in combination, a base, a pair of oppositely disposed drill spindles thereon, means to rotate and advance said spindles, a blank carrying magazine, transfer mechanism adapted to advance a blank from the magazine to operative position, rotating rollers adapted to engage said blank while in operative position, and means on said transfer mechanism to retain said blank against said rollers during operation.

3. An automatic centering machine comprising in combination, a base, a pair of oppositely disposed drill spindles thereon, means to rotate and advance said spindles, a blank carrying magazine, transfer mechanism adapted to advance a blank from the magazine to operative position relative to said spindles, and adjustable supporting means to frictionally rotate said blank while in operative position, said supporting means being operative when the transfer mechanism advances a blank to operative position.

4. An automatic centering machine comprising in combination, a base, a pair of oppositely disposed drill spindles thereon, means to automatically rotate and advance said spindles, adjustable means to support a blank of any diameter in alignment with said spindles, rollers on said support, and means to rotate said rollers to frictionally engage and rotate the blank while in operative position.

5. An automatic centering machine comprising in combination, a base, a pair of oppositely disposed drill spindles thereon, means to automatically rotate and advance said spindles, adjustable means to support a blank of any diameter in alignment with said spindles, transfer mechanism for advancing a blank to operative position, rollers on said support and on said transfer mechanism, and means to rotate one of said rollers to frictionally engage and rotate the blank while in operative position.

6. An automatic centering machine comprising in combination, a base, a pair of oppositely disposed drill spindles thereon, means to automatically rotate and advance said spindles, adjustable means to support a

blank of any diameter in alignment with said spindles, indicating means for determining the position of said support, means to rotate a part of said supporting means, a transfer arm, and means on said transfer arm to frictionally engage and rotate the blank while in operative position.

7. An automatic centering machine comprising in combination, a base, a pair of oppositely disposed drill spindles thereon, means to automatically rotate and advance said spindles, adjustable means to support a blank of any diameter in alignment with said spindles, rollers on said support, and means driven from one of the rotating means for said spindles to rotate one of said rollers to frictionally engage and rotate the blank while in operative position.

8. Blank supporting and rotating means for centering machines comprising in combination, a transversely adjustable slide, a pair of rollers thereon, means to hold a blank against said rollers during operation, and means to rotate one of said rollers whereby the blank will be rotated about its axis during operation.

9. Blank supporting and rotating means for centering machines comprising in combination, a transversely adjustable slide, means to adjust the position of said slide for different diameters of blanks, a pair of rollers thereon, means to hold a blank against said rollers during operation, and means to rotate one of said rollers whereby the blank will be rotated about its axis during operation.

10. Blank supporting and rotating means for centering machines comprising in combination, a transversely adjustable slide, a pair of vertically disposed rollers thereon, means to hold a blank against said rollers during operation, and gear means to rotate each of said rollers whereby the blank will be rotated about its axis during operation.

11. Blank supporting and rotating means for centering machines comprising in combination, a carriage adapted to be adjusted along the machine, a transversely adjustable slide thereon, a pair of rollers on said slide, means to hold a blank against said rollers during operation, and means to rotate one of said rollers whereby the blank will be rotated about its axis during operation.

12. Blank supporting and rotating means for centering machines comprising in combination, a transversely adjustable slide, a pair of rollers thereon, a transfer arm having a roller thereon for engaging and holding a blank against said first rollers, and means to rotate one of said first rollers whereby the blank will be rotated about its axis during operation.

13. Blank supporting and rotating means for centering machines comprising in combination, a transversely adjustable slide, a pair of rollers thereon, a transfer arm having a roller thereon for engaging and holding a blank against said first rollers, means to advance and retain said transfer arm in its advanced position, and means to rotate one of said first rollers whereby the blank will be rotated about its axis during operation.

14. Blank supporting and rotating means for centering machines comprising in combination, a transversely adjustable slide, a pair of vertically disposed rollers thereon, a transfer arm having a roller thereon for engaging and holding a blank against said first rollers, and gear means to rotate each of said first rollers whereby the blank will be rotated about its axis during operation.

15. Blank supporting and rotating means for centering machines comprising in combination, a transversely adjustable slide, means to indicate the transverse position of said slide, a pair of rollers thereon, a transfer arm having a roller thereon for engaging and holding a blank against said first rollers, whereby said blank may be rotated about its axis during operation and while supported between said rollers.

16. An automatic centering machine comprising in combination, a base, a pair of oppositely disposed drill spindles thereon, means to rotate said spindles, means to automatically advance said spindles toward a blank, a magazine, transfer means to move said blank from said magazine to operative position relative to said spindles, a support for said blank while in operative position, and frictional means to rotate one of said blanks while in operative position and during operation of the spindles, said last mentioned means being operative when the transfer means advances a blank to operative position.

17. An automatic centering machine comprising in combination, a base, a pair of oppositely disposed drill spindles thereon, means to rotate said spindles, means to automatically advance said spindles toward a blank, a magazine, transfer means to move said blank from said magazine to operative position relative to said spindles, a support for said blank while in operative position comprising rollers, and means to rotate one of said rollers whereby said blank will be frictionally rotated while in operative position and during operation of said spindles.

18. An automatic centering machine comprising in combination, a base, a pair of oppositely disposed drill spindles thereon, means to rotate said spindles, means to automatically advance said spindles toward a blank, a magazine, transfer means to move said blank from said magazine to operative position relative to said spindles, adjustable rollers forming with said transfer

means a support for said blank while in operative position, and means to rotate one of said rollers whereby said blank will be frictionally rotated while in operative position and during operation of said spindles.

19. An automatic centering machine comprising in combination, a base, a pair of oppositely disposed drill spindles thereon, means to rotate said spindles, means to automatically advance said spindles toward a blank, a magazine, a transfer arm to move said blank from said magazine to operative position relative to said spindles, an adjustable support for blanks of different diameters comprising vertically disposed rollers on a slide and a third roller on the forward end of said transfer arm, and means to rotate one of said rollers whereby said blank will be frictionally rotated while in operative position and during operation of the spindles.

In testimony whereof, I hereto affix my signature.

JOHN J. THACHER.