May 21, 1929. F. T. SEIBERT 1,714,246

GRINDING MACHINE

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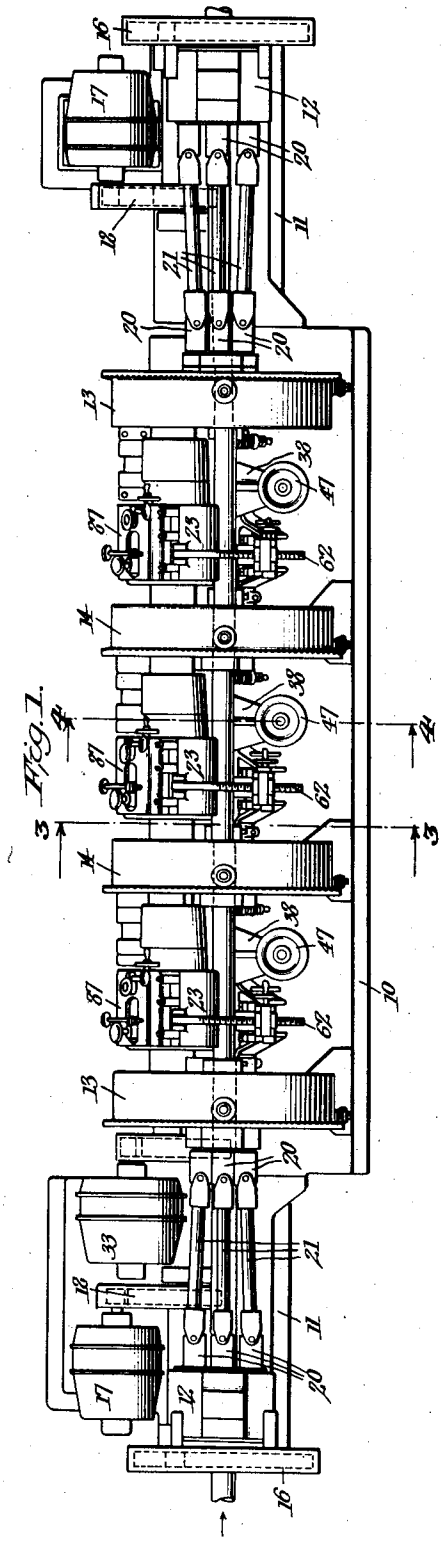


Fig. 1.

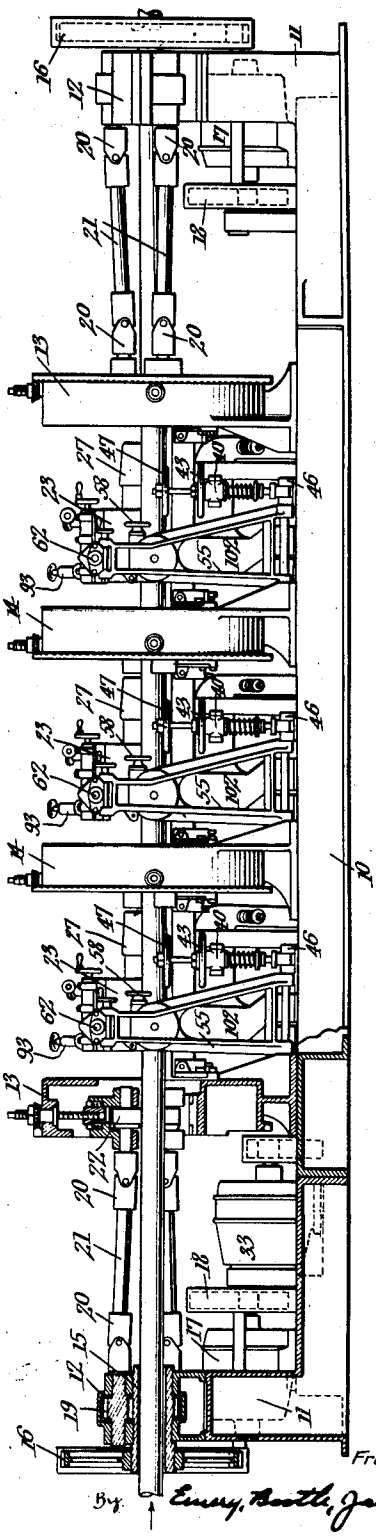


Fig. 2.

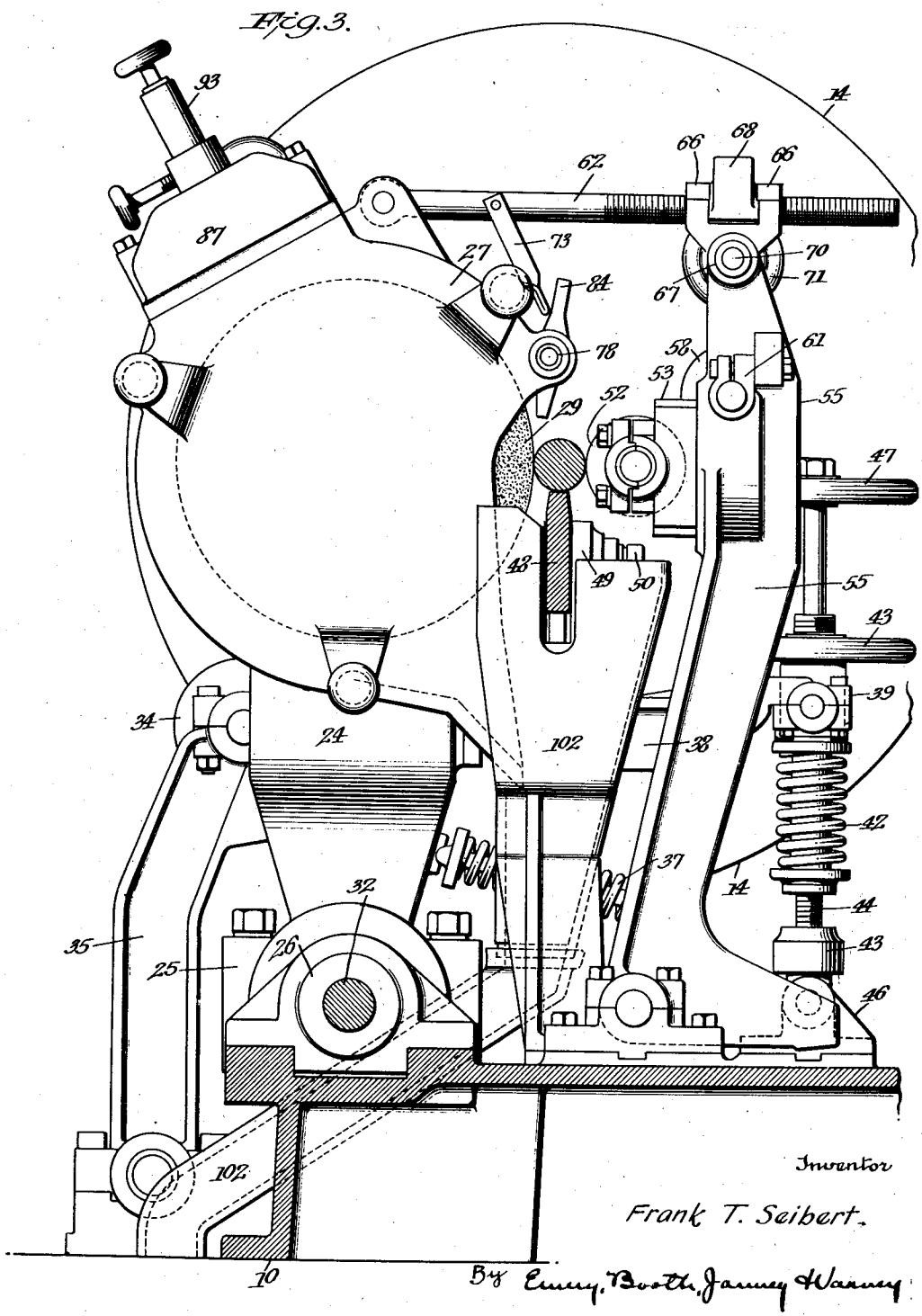
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GRINDING MACHINE

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Fig. 3.




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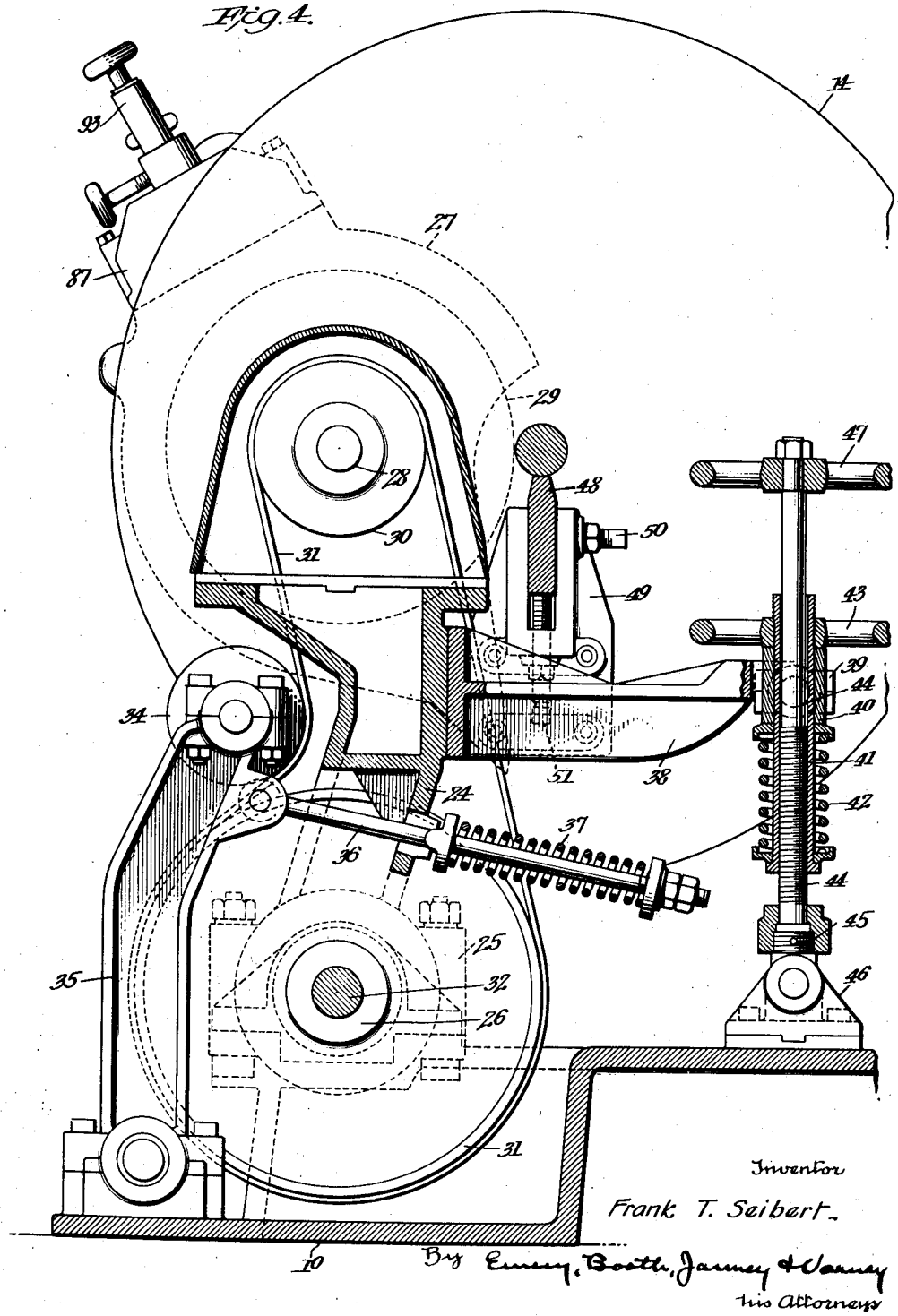
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GRINDING MACHINE

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Fig. 4.




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GRINDING MACHINE

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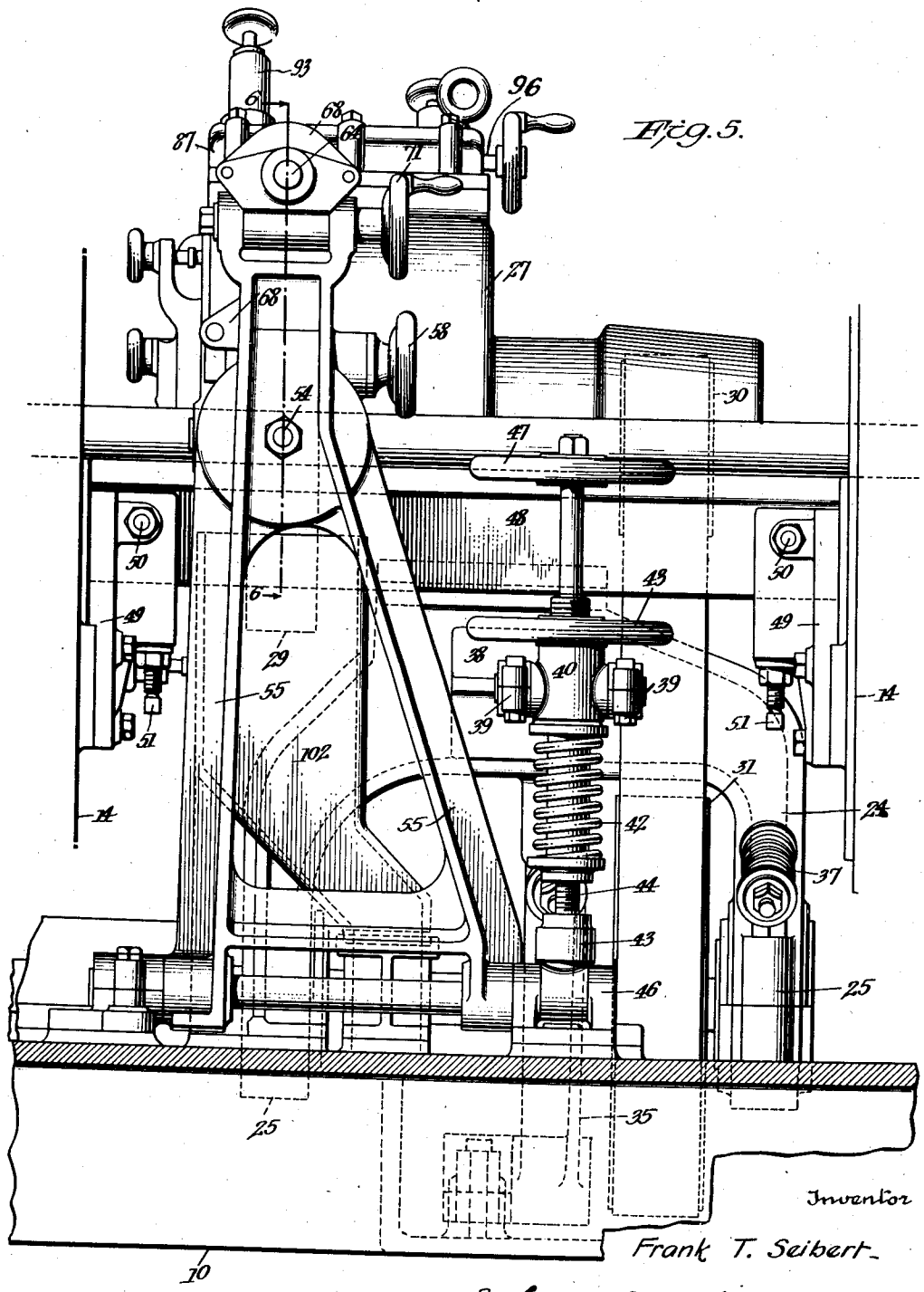



Fig. 5.

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GRINDING MACHINE

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Fig. 6.

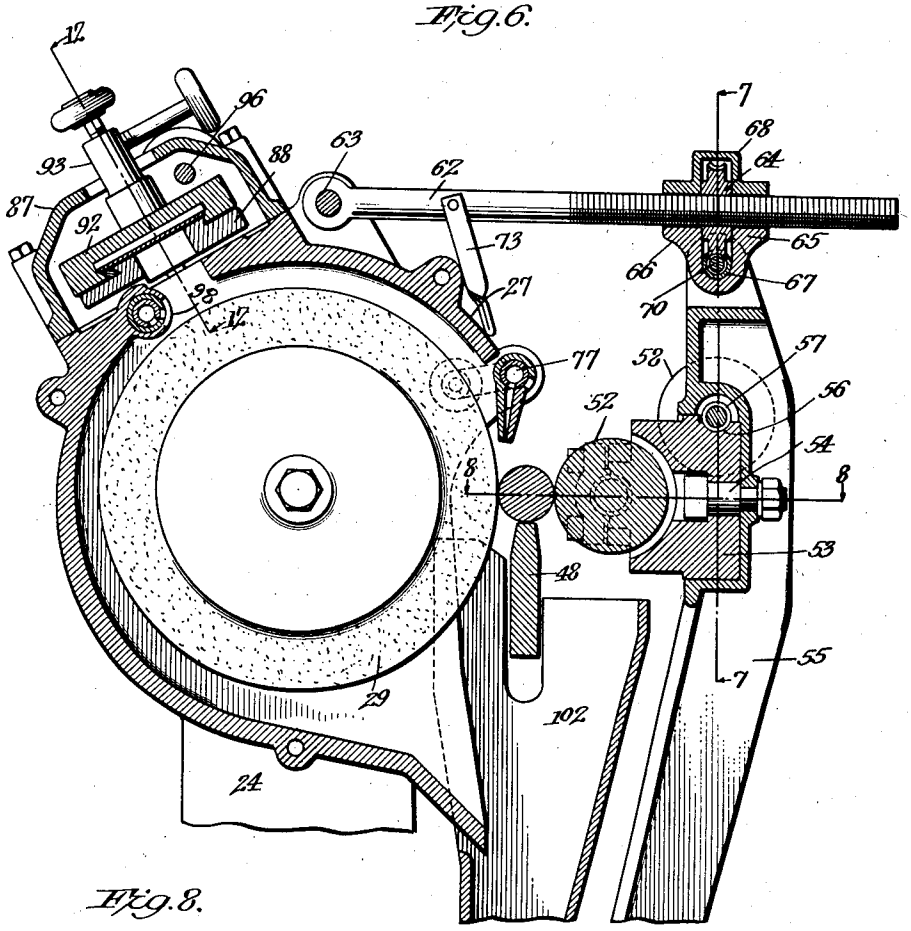
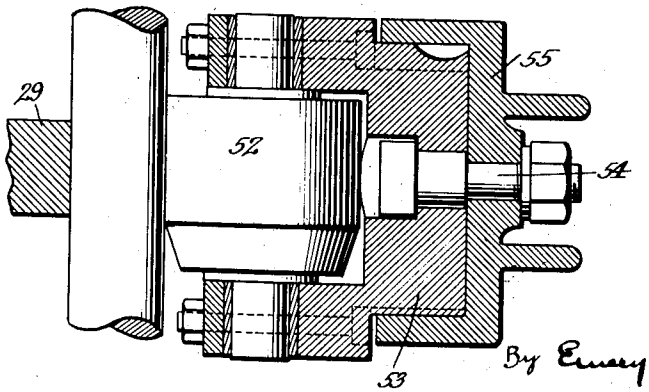



Fig. 8.




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Fig. 7.

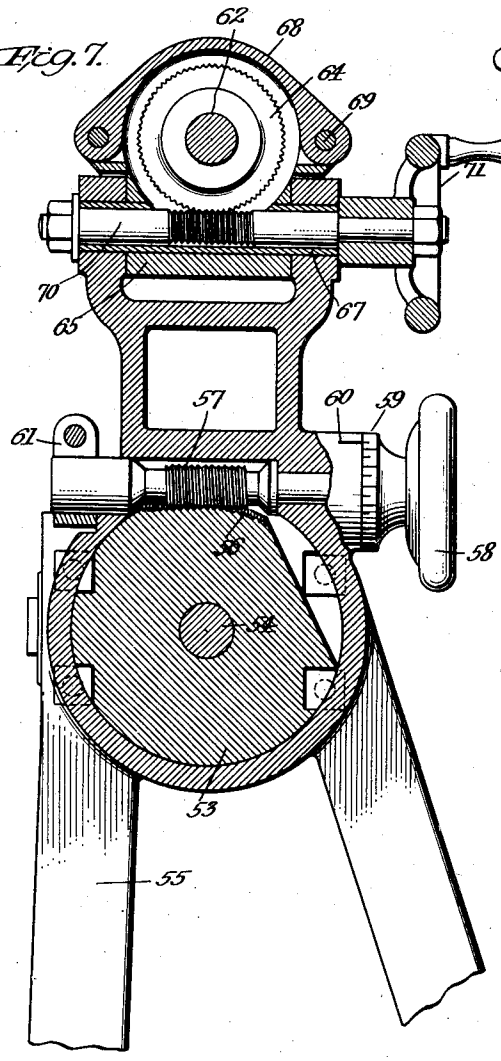



Fig. 13.

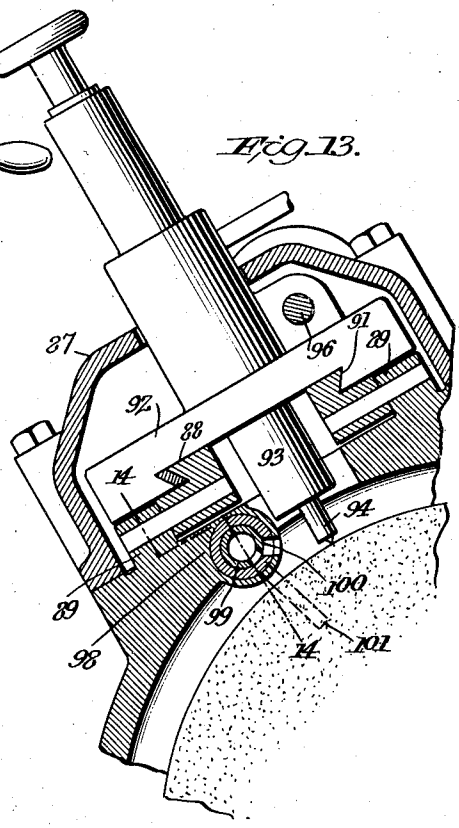
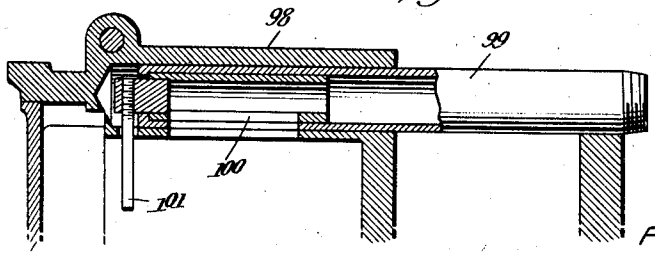



Fig. 14.




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GRINDING MACHINE

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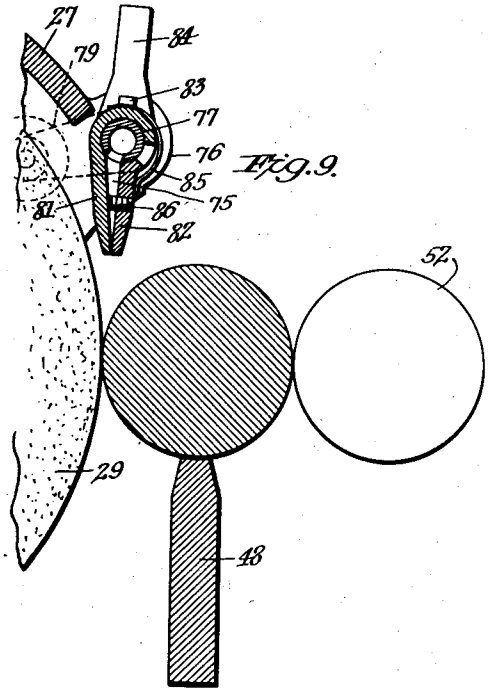



Fig. 9.

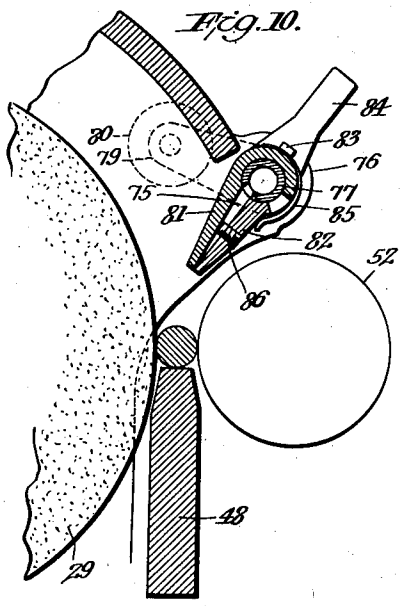



Fig. 10.

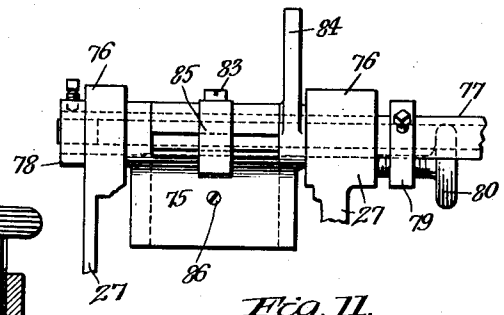



Fig. 11.

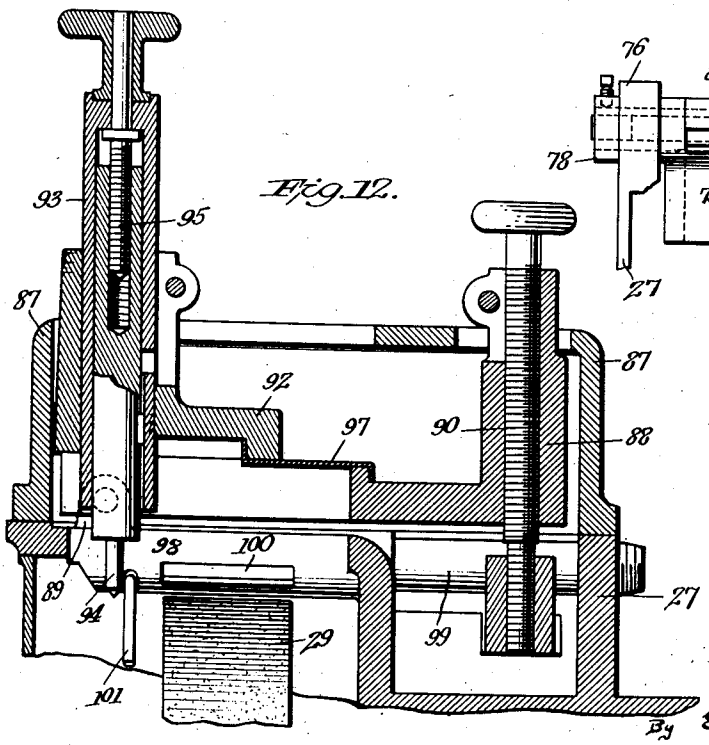



Fig. 12.

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Patented May 21, 1929. 1,714,246

# UNITED STATES PATENT OFFICE.

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## GRINDING MACHINE.

Application filed May 4, 1926. Serial No. 106,710.

This invention relates to metal grinding machines and more particularly to grinding machines of the centerless type adapted for grinding and finishing cylindrical ware, such as shafting or other long objects, and the invention aims generally to improve this type of machines.

Further objects and advantages appear in connection with the following description of an illustrative embodiment of the invention, as shown in the accompanying drawings, wherein

Fig. 1 is a top plan view of a shafting grinding machine;

Fig. 2 is a side elevation of the machine, parts thereof being shown in section to illustrate more clearly the construction;

Fig. 3 is an enlarged sectional view through the grinding unit taken on the line 3—3 of Fig. 1, looking in the direction of the arrows;

Fig. 4 is a similar view taken on the line 4—4 of Fig. 1;

Fig. 5 is a front elevation of a portion of the machine including a grinding unit;

Fig. 6 is a sectional view of the upper portion of the grinding unit, taken on the line 6—6 of Fig. 5, looking in the direction of the arrows, Figs. 3, 4, 5 and 6 being drawn to the same scale;

Fig. 7 is an enlarged detail sectional view taken on the line 7—7 of Fig. 6, looking in the direction of the arrows;

Fig. 8 is a similar horizontal sectional view taken on the line 8—8 of Fig. 6;

Fig. 9 is a detail transverse sectional view of the abradant supply nozzle, showing its relationship to a grinding wheel of large size when grinding objects of comparatively large diameter;

Fig. 10 is a similar view illustrating the relationship of the nozzle to a small grinding wheel when grinding objects of comparatively small diameters;

Fig. 11 is a detail illustration the manner of mounting the abradant supply nozzle for adjustment;

Fig. 12 is a detail transverse sectional view on the line 12—12 in Fig. 6 of the trueing mechanism for the grinding wheel;

Fig. 13 is an enlarged fragmentary transverse sectional view similar to Fig. 6, illustrating the grinding wheel trueing tool and the nozzle for supplying fluid thereto; and

Fig. 14 is a detail fragmentary horizontal sectional view taken on the line 14—14 of Fig. 13.

The illustrative embodiment of the invention shown in the drawings comprises a base 10, of suitable shape and design, which affords a support for the work feeding mechanism, steady rests, grinding units and driving gears. As shown in the drawings (see Figs. 1 and 2), the base 10 may have formed or secured to its ends, brackets 11 for supporting the feed pinion housings 12 and assembled gears. The base 10 also supports the driven steady rests 13 near each end thereof, and the intermediate idle steady rests 14, as clearly shown in Figs. 1 and 2.

Each of the feed gear housings 12 rotatably supports a main feed pinion 15, which is formed as an elongated sleeve, a portion of which projects beyond the housing to receive a main feed gear 16, operatively connected to the feed motor 17 by means of suitable reduction gearing 18. The main feed pinion housing 12 preferably includes journal bearings for a plurality of feed pinions 19, each being operatively engaged with the toothed portion of the main feed pinion 15 and connected by means of universal joints 20 to one of a plurality of feed shafts 21 operatively connected to the driven rolls 22 of the adjacent driven steady rest 13. Thus the electric motors 17 drive the feed rolls 22 of the driven steady rests at constant speed, through the medium of reduction gearing 18, gears 16, pinions 15 and 19, and shafts 21, so that the work may be rotated and fed longitudinally through the machine in the direction of the arrows at the left hand end of Figs. 1 and 2.

The driven steady rests are preferably of the type described and shown in my application for patent filed herewith, Serial No. 106,709. Whether or not the driven steady rests are of the same construction as shown in my copending application referred to, it is desirable that means be employed for adjusting the rolls 22 toward and from each other to accommodate work of various diameters, and to simultaneously change the angularity of the feed rolls 22 with respect to the axis of the work, so as to feed the work through the machine as substantially the same speed per revolution regardless of the diameter of the work. Furthermore the action of the

angularly disposed feed rolls in engagement with the sides of the work, will rotate the work about its axis at constant peripheral speed, as well as feed it longitudinally at a constant rate per revolution, as is well understood by those skilled in the art.

The idle steady rests 14 are preferably of a construction very similar to the construction of the driven steady rests 13 except that the rolls thereof are not driven. They may advantageously be of the type described in my application filed herewith as aforesaid, Serial No. 106,709. It is desirable that the driven and idle steady rests be of the same type of construction, so that the rolls of the two rests will be disposed in the same degree of angularity with respect to the axis of the work when adjusted to work of a given diameter.

According to my invention a plurality of grinding or finishing units 23 are supported upon the base 10, each of which is mounted on the base between opposite steady rests (see Figs. 1 and 5) and associated with backing rolls engaging the work opposite the grinding point so as to prevent lateral vibration or movement of the work with reference to the grinding or finishing tools and assist in maintaining its diameter perfectly true.

Each of the grinding units 23 (see Figs. 3, 4 and 6) consists of a grinding wheel pedestal 24 pivotally secured at its base by means of spaced bearings 25 to tubular journals or supports 26 carried by the base 10. The base 10 is preferably recessed to receive a portion of the grinding wheel driving mechanism, and the pedestals 24 may be yoke-shaped (see Fig. 5) in order to bridge the driving pulleys in the recessed portions of the frame. The grinding wheel pedestal or yoke 24 has mounted on its upper end the grinding head which consists, in the present instance, of a housing 27 rotatably supporting a spindle 28, which has a grinding wheel 29 fixed at one end thereof and at the other end thereof a pulley 30. A belt connects the pulley 30 to a larger pulley 31 fixed on a shaft 32 journalled in anti-friction bearings mounted within the tubular journals or supports 26, the shaft being operatively driven from an electric driving motor 33 through suitable reduction gearing (see Fig. 1). A small pulley 34 is mounted on the upper ends of links 35, the lower ends of which are pivoted to the base 10, and is pressed against the back or slack side of the belt to maintain it in driving contact with the pulleys 30 and 31. An eye bolt 36 and adjustable spring 37 bearing against the pedestal 24 serves to adjust the tension of the belt. By reason of the foregoing construction, as is apparent, the grinding wheel pedestal is capable of tilting movement about the axis of the shaft 32, whereby the grinding head and wheel 29 may be so positioned with reference to the grinding point as to accommodate work of various diameters without disturbing the driving connections and the belt tightener.

Referring to Figs. 4 and 5 it will be noted that means are provided tending normally to hold the grinding wheel away from the work but permitting it to oscillate so as to follow bends or other irregularities in the shafting or other work being finished. As shown in the drawings the grinding wheel pedestal 24 has a laterally extending bracket 38 projecting forward beneath the grinding point and forked at its extremity and fitted with bearings 39 to receive the trunnions of the adjusting sleeve 40. Splined within the sleeve 40 so as to be slidable up and down therein (see Fig. 4) is a tubular spring-carrying member 41, provided at its lower end with a flange and cup to receive one end of the compression spring 42, the other end of which is seated against the cup at the lower end of the hub 40. The tubular spring-carrying member has its upper portion externally threaded to receive a hand wheel 43 which is adapted to contact with and bear against the upper end of the hub 40 to vary the compression in the spring 42. The tubular member is supported in turn upon a rod 44 which is swivelly connected at its lower end to a swivel trunnion fitting 45 mounted in a pivot bearing 46 supported on the base 10. The lower portion of the rod 44 is threaded for engagement with an internally threaded portion of the tubular spring-carrying member 41, and the upper portion of the rod is of slightly reduced diameter and is provided with a hand wheel 47.

By reason of the construction above described, the hand wheel 43 may be rotated to permit the hub 40 to move up and down under the action of the spring 42 thereby to adjust the pressure tending to throw the grinding wheel 29 away from the work being finished. The upper hand wheel 47 may be manipulated to raise or lower the tubular member 41 and parts carried by it, thereby to position the grinding wheel with reference to the work and enable different sizes of shafting to be finished.

The invention contemplates means for supporting the work in the region of the grinding point and for accurately positioning the work support with reference to the grinding wheel 29 so as to finish the work to accurate size by preventing its deflection from the horizontal under the downward action of the grinding wheel. In the illustrated embodiment of the invention (see Figs. 4, 5 and 6) a work supporting bar 48 is positioned lengthwise below the work from one steady rest housing to the next, mounted at its ends for vertical adjustment

in laterally adjustable brackets 49 carried by the steady rest housings. Clamping screws 50 and adjusting screws 51 are provided for the work supporting bar to accommodate work of various diameters.

A backing up wheel 52 (see Figs. 3, 6 and 8) is provided for steadying the work at the grinding point and maintaining an exact distance between it and the grinding wheel 29. This wheel is journalled in bearings carried by a swivel block 53 which is rotatably mounted upon a stud 54 carried by a swinging frame or support 55 pivotally mounted at its lower end upon the base 10, and thereby the backing up wheel is positioned to engage the work on the side thereof opposite to the grinding wheel 29 at such an angle as to suit both the speed of rotation and rate of feed of the work. Preferably the backing up wheel 52 is of the same size as the feed rolls 22 and is swivelly mounted upon the carrier block 53 so that it may be adjusted angularly with respect to the axis of the work, corresponding to the angular position of the feed rolls. For the purpose of carrying out this adjustment (see Figs. 6, 7 and 8) the swivel block 53 which carries the backing up wheel has worm teeth 56 cut around a portion of its periphery, constituting a sector of a worm gear. A worm 57 is journalled in the support 55 with its threaded end in mesh with the worm sector 56, and is provided at its other end with a hand wheel 58 for rotating the worm and swivel block 53 to change the position of the backing up wheel angularly with respect to the axis of the work. The adjusting hand wheel 58 preferably includes a micrometer scale 59 (see Fig. 7) adapted to cooperate with a fixed pointer 60 on the support 55, whereby an accurate angular adjustment of the backing up wheel may be effected. The graduations on the scale 59 may be according to the diameter of the work being ground, so that, when the hand wheel and worm are properly set, the backing up wheel will be accurately adjusted angularly with reference to the work. Suitable clamping means 61 may be provided at a convenient location on the worm shaft to clamp the worm 57 in adjusted position.

The invention contemplates suitable means for accurately spacing the backing up wheel 52 away from the peripheral surface of the grinding wheel 29 whereby to accommodate and hold the work for grinding the different diameters within the limits of the machine, and to prevent chattering of the work being ground. As shown in the drawings (see Figs. 6 and 7), a spacing bar or link 62 is pivotally connected at one end, by means of a pin 63, to the grinding wheel head, preferably to the guard housing 27 above the grinding wheel. The opposite end of the spacing bar or link 62 is threaded to receive an adjusting nut, which in the device shown is a worm wheel 64, threaded thereon. The worm wheel is mounted in a split housing 65 having hubs 66 within which the bar 62 is slidably received. This housing is pivotally secured to the upper end of the backing roll support 55 by means of a bushing 67. The cover section 68 of the housing 65 is hinged at one side and is adapted to be locked in closed position upon said housing by suitable locking means, as for instance a pin 69, thus securely locking the bar 62 and the worm wheel 64 within the housing. A worm shaft 70 is suitably journalled in the bushing 67 in the upper end of the support or carrier 55 for engagement with the worm wheel 64, and is provided at one end with a hand wheel 71 by means of which the worm shaft may be rotated for adjusting the grinding wheel 29 and the backing up wheel 52 toward or away from each other. Thus the operator may readily adjust the two wheels accurately to a position to engage work of a given diameter. When it is desired to make a substantial change in the adjustment of the grinding wheel and backing up wheel, for instance adjustments of one inch or more, the cap section 68 of the housing 65 may be swung to one side, and the bar or link 62, together with the worm wheel 64 may be raised and held in raised position by means of a prop 73 pivoted to the bar and engaging some part of the frame or housing. In this position the operator may quickly adjust the wheel 64 on the bar 62 for approximate size of the work, after which the bar and worm wheel may be lowered into the housing and a finer adjustment may be effected through the wheel. The construction above described is particularly effective in the making of extremely fine adjustments, as for instance from .0001 inches to .001 inches, and holds the grinding wheel and work in proper relative position for grinding the correct diameter notwithstanding that there may be slight irregularities or bends in the shafting so that it does not rotate exactly true.

For the purpose of supplying abrading or cooling fluid to the contacting surfaces of the grinding wheel and work, I have provided a nozzle member 75 mounted in the grinding head housing 27, as is clearly shown in Figs. 9, 10 and 11. As shown, the housing 27 is formed with bearing lugs 76 to support rotatably a slotted fluid conduit 77 held in place in the bearing lugs 76 by means of a collar 78 (see Fig. 11) and an eccentric collar 79, the latter being provided with a screw member 80 adapted for engagement with the sides of the bearing lugs 76 for holding the conduit in adjusted positions so as to direct fluid to the line of peripheral contact between the grinding wheel and the work. The conduit 77 supports a nozzle

member 75 comprising two members 81 and 82 each formed with hollow hub portions adapted to surround the conduit 77, the member 81 being made fast to the conduit by suitable means, such as a screw 83. The other nozzle member 82 is mounted loosely upon the conduit 77 and is adapted to be moved toward and away from the nozzle member 81 by means of a handle member 84. A leaf spring 85, which engages the movable member 82, normally holds the movable member in closed position against the member 81 so as to form a restricted nozzle opening. The width of the nozzle opening and hence the amount of fluid discharged may be regulated by the adjustment of a screw member 86 threaded in one of the nozzle members and abutting the other member, as shown in Figs. 9 and 10. The nozzle member is preferably of a length equal to or greater than the width of the grinding wheels, so that the fluid may be directed across the entire peripheral face of the latter. As is obvious, adjustment of the screw 86 will regulate the flow of fluid to the grinding wheel and work. Should the nozzle become clogged for any reason, the nozzle members 81 and 82 may be separated by actuating the handle 84 to flush out the nozzle. Releasing the handle permits the movable nozzle to be returned to its operative position by the spring 85.

For the purpose of trueing the grinding wheel, I provide a trueing mechanism mounted upon the grinding wheel housing 27. Preferably the trueing mechanism comprises a housing 87 within which is a supporting frame 88 which is pivotally connected to lugs on the housing 27 as by the trunnions 89 and may be adjusted vertically by means of a suitable levelling screw 90, so as to position the trueing mechanism truly parallel or at an angle to the grinding wheel spindle. The trueing mechanism frame 88 is provided with spaced guide or track members 91 and a slide member 92, the latter carrying a vertically adjustable holder 93 for a diamond or other tool 94 projecting down between the track members and which is suitable for dressing the working face of the grinding wheel. Suitable means, as for instance a screw member 95, is provided for adjusting the tool 94 vertically in the holder. A screw 96 is provided for effecting an adjustment of the slide and tool transversely across the grinding face of the grinding wheel. As shown in Fig. 12, a suitable shield 97 is interposed between the slide and track member for preventing the splashing of water, which may otherwise be thrown from the wheel and accumulate upon the adjusting mechanism of the trueing device or which may be splashed upon the operator.

The grinding housing 27 is preferably formed with a tubular portion 98 (see Figs. 6, 13 and 14) near the housing 87 for the trueing diamond 94, adapted to receive a slotted fluid conduit member 99, in which is housed at one end thereof, a slotted nozzle member 100. A portion of the tubular housing 98 is slotted for registry with the slot in the conduit 99, and a handle member 101 serves to plug one end of the nozzle 100 and to adjust it so that the slot therein is in partial registry with the registering slots of the conduit 99 and tubular housing 98, whereby cooling fluid may be directed upon the trueing diamond or other tool, when desired, or in complete registry so as to flush out the nozzle in case it should become clogged. When the trueing tool is not being used the handle 101 may be rotated to bring the slots of the nozzle out of registry with the slots of the conduit and tubular housing portions, thereby to cut off the flow of fluid.

A chute 102 is provided for each grinding unit, for receiving the drippings of abradant compound and grindings, thereby to convey them to a suitable receptacle not shown.

Obviously my invention is not restricted to the details of construction shown and described.

I claim:

1. In a machine for grinding and finishing long cylindrical work, such as shafting, means for simultaneously feeding longitudinally and rotating the work, a grinding unit adapted for operation upon the work, said grinding unit comprising a pivotally supported grinding wheel and backing up roll independently mounted to engage the work on opposite sides, means normally urging the grinding wheel away from the work, and adjustable means for connecting said backing up wheel for movement in a direction transversely of the work in unison with said grinding wheel.

2. A machine for grinding and finishing cylindrical objects such as shafting as it is simultaneously fed longitudinally and rotated, comprising spaced steady rests adjustable to accommodate work of different diameters, means adjustably supported by said steady rests and bridging the span therebetween for engaging the under side of the work, thereby to support it, and grinding means positioned between said steady rests adapted to act upon the peripheral face of the work.

3. A machine for grinding and finishing cylindrical objects such as shafting as it is simultaneously fed longitudinally and rotated, comprising spaced steady rests adjustable to accommodate work of different diameters, a grinding wheel positioned between said steady rests, means for adjusting the position of said grinding wheel to accommodate work of different diameters, and a work support adjustably supported by

said steady rests and bridging the span therebetween, said work support being mounted for vertical adjustment whereby to support work of different diameters with the axis of the work in the horizontal plane of the axis of the grinding wheel.

4. A machine for grinding and finishing cylindrical objects such as shafting as it is simultaneously fed longitudinally and rotated, comprising spaced steady rests adjustable to accommodate work of different diameters, a grinding wheel positioned between said steady rests, means for adjusting the position of said grinding wheel to accommodate work of different diameters, brackets mounted on said steady rests, a work supporting bar bridging the space between and mounted in said brackets for vertical adjustment for adapting it for supporting work of different diameters with the axis of the work in the same horizontal plane as the axis of the grinding wheel.

5. In a machine for grinding long cylindrical objects such as shafting, the combination of means for longitudinally feeding and simultaneously rotating the work, spaced steady rests for guiding the work, a grinding unit comprising a pivotally mounted grinding wheel and an opposed backing up wheel connected so as to be movable laterally as a unit with respect to the work, and a work rest supported by said steady rests for engaging and supporting the work throughout its length.

6. In a machine for grinding long cylindrical objects such as shafting, the combination of means for longitudinally feeding and simultaneously rotating the work, spaced steady rests for guiding the work and adjustable to accommodate work of different diameters, a grinding unit comprising a pivotally mounted grinding wheel and an opposed backing up wheel connected so as to be movable as a unit with respect to the work, and adjustable to accommodate work of different diameters, and a work rest adjustably supported by said steady rests for engaging and supporting the work throughout its length.

7. In a machine for grinding long cylindrical work such as shafting, in combination, means for feeding the work longitudinally and simultaneously rotating it, steady rests for guiding the work and adjustable to accommodate work of different diameters, a grinding unit comprising a grinding wheel and a backing up roll pivotally mounted for movement in a direction transversely of the work, means adjustably connecting said grinding wheel and backing up roll whereby to hold them apart to accommodate work of the desired diameter between them and to permit of their movement relatively to the work as a unit, and a work rest adjustably supported by said steady rests for supporting the work between said grinding wheel and backing up roll.

8. A grinding unit for cylindrical work such as shafting, comprising a grinding wheel support and backing up roll support arranged on opposite sides of the work and each mounted for movement relatively to the work, and means adjustably connecting said grinding wheel and backing up roll supports for spacing them one from the other a predetermined distance according to the diameter of the work to be finished, said means comprising a threaded bar pivotally connected to one of said supports, a worm wheel threaded upon said bar and journalled for rotation upon the other support, and means for rotating said worm wheel.

9. A grinding unit for cylindrical work such as shafting, comprising a grinding wheel support and backing up roll support arranged on opposite sides of the work and each mounted for movement relatively to the work, and means adjustably connecting said grinding wheel and backing up roll supports for spacing them one from the other a predetermined distance according to the diameter of the work to be finished, said means comprising a threaded bar pivotally connected to one of said supports, a worm wheel threaded upon said bar, means for journalling and rotating said worm wheel in the other support, whereby to effect fine adjustments of the supports toward and from each other, and means for readily releasing said worm wheel from said support whereby it may be quickly rotated by hand upon the bar for effecting coarse adjustments.

10. A precision adjustment for grinding machines adapted for grinding cylindrical work such as shafting, comprising individual grinding wheel and backing up roll supports, a grinding wheel and a backing up roll mounted in their respective supports, means for connecting said wheel and roll for adjustment according to the diameter of the work being ground, said means comprising a threaded bar pivoted to one of the supports, a worm wheel threaded upon said bar and journalled for rotation in the other support, and a worm journalled in said last named support in mesh with said worm wheel.

11. A precision adjustment for grinding machines adapted for grinding cylindrical work, such as shafting, comprising a base, grinding wheel and backing up roll supports pivotally mounted on said base, a grinding wheel and backing up roll mounted in their respective supports, means for connecting said wheel and roll for adjustment according to the diameter of the work being ground, said means comprising a threaded bar pivoted to one of the supports, and reduction gearing mounted in the other

support and operatively engaging said bar.

12. A precision adjustment for grinding machines adapted for grinding cylindrical work, such as shafting, comprising individual grinding wheel and backing up roll supports, a grinding wheel and a backing up roll mounted in their respective supports, means for connecting said wheel and roll for adjustment according to the diameter of the work being ground, said means comprising a threaded bar pivoted to one of the supports, and reduction gearing mounted in the other support and operatively engaging said bar, and readily detachable means for releasing said reduction gearing from its support.

13. A grinding unit for grinding cylindrical work such as shafting, comprising a base, a grinding wheel support and a backing up roll support each pivotally mounted on said base for independent movement transversely of the work, means for connecting said supports together whereby they may be moved as a unit, and means for resiliently urging the grinding wheel support away from the work.

14. In a machine for grinding cylindrical work such as shafting, comprising a base, means for supporting the work being fed through the machine, grinding wheel and backing up roll supports pivotally mounted on the base on opposite sides of the work, adjustable means connecting said supports whereby they are movable as a unit, a bracket carried by said grinding wheel support, a hub member pivoted to said bracket, means engaging said hub member for positioning said grinding wheel support with respect to the work, and means engaging said last named means for placing said grinding wheel support under resilient tension, thereby normally to urge it away from the work.

15. In a centerless grinding machine of the type wherein the work is moved longitudinally through the machine, comprising a base, a grinding wheel, a support for the grinding wheel pivoted to the base, and means pivotally connected to the base and acting directly upon said grinding wheel support for resiliently urging and for limiting its movement in a direction away from the work.

16. In a centerless grinding machine of the type wherein the work is moved longitudinally through the machine, comprising a base, a grinding wheel, a support for the grinding wheel pivoted to the base, a bracket secured to said support, a hub member on said bracket, a threaded shaft swivelly connected to said base, a sleeve member threaded to said shaft and extending through said hub member, a spring between said sleeve and hub members, means on said sleeve members for limiting the moving of said grinding wheel away from the work, and means for rotating said shaft for regulating the tension upon said grinding wheel support normally to urge it away from the work.

17. A grinding unit for machines for grinding cylindrical work such as shafting which is fed longitudinally and simultaneously rotated, comprising a grinding wheel and a regulating wheel connected together and mounted for mutually dependent movements relatively to the work as a unit, and means for adjusting the position of the regulating wheel angularly to the work in accordance with the rate of longitudinal movement of the work through the machine.

18. A grinding unit for machines for grinding cylindrical work such as shafting which is fed longitudinally and simultaneously rotated, comprising a grinding wheel and a regulating wheel connected together and mounted for mutually dependent movements relatively to the work as a unit, said regulating wheel being adjustable angularly with respect to the work, and means for adjusting the position of the regulating wheel according to the diameter of the work being ground, whereby to position the regulating wheel angularly with respect to the work in accordance with the rate of longitudinal movement of the work through the machine.

19. A grinding unit for machines for grinding cylindrical work such as shafting which is fed longitudinally and simultaneously rotated, comprising a grinding wheel and a regulating wheel connected together and mounted for mutually dependent movements relative to the work as a unit, and means for adjusting the position of the regulating wheel angularly to the work in accordance with the rate of longitudinal movement of the work through the machine, said means comprising a swivel mounting for said regulating wheel, a worm and worm gear mechanism for adjusting said mounting axially.

20. In a machine for grinding cylindrical work such as shafting which is fed longitudinally and simultaneously rotated, comprising a grinding wheel and a regulating wheel disposed on opposite sides of the work, a mounting for said regulating wheel comprising a bearing block having journals, means for rotatably supporting said bearing block on an axis at right angles to the axis of rotation of said wheel, and means for adjusting the angular position of said bearing block and wheel in accordance with the rate of longitudinal feed of the work.

21. In a machine for grinding cylindrical work such as shafting which is fed longitudinally and simultaneously rotated, comprising a grinding wheel and a regulating wheel disposed on opposite sides of the work, a support for said regulating wheel, a bearing member for said regulating wheel on

said support, and a worm and worm gear mechanism for adjusting said bearing member angularly with respect to said work.

22. In a machine for grinding cylindrical work such as shafting which is fed longitudinally and simultaneously rotated, comprising a grinding wheel and a regulating wheel disposed on opposite sides of the work, a support for said regulating wheel formed with a transversely extending cylindrical portion, a bearing for said wheel including a hub portion journalled in said cylindrical portion, said hub member being formed as a worm gear, and a worm journalled in said support in engagement with the worm teeth on said hub portion for effecting an adjustment of the regulating wheel angularly with respect to the work.

In testimony whereof, I have signed my name to this specification.

FRANK T. SEIBERT.