Feb. 25, 1930. C. J. STEUBER 1,748,313

FINISHING DEVICE

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Fig. 1

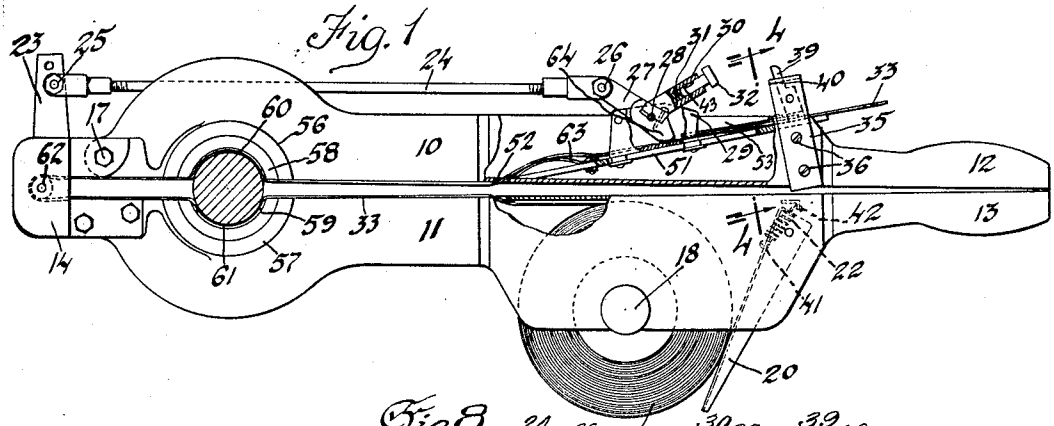
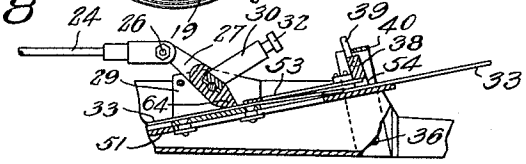


Fig. 8



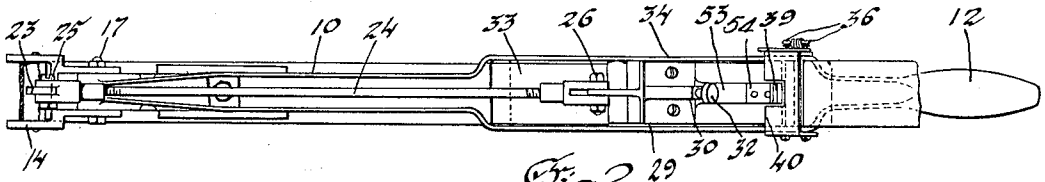


Fig. 2

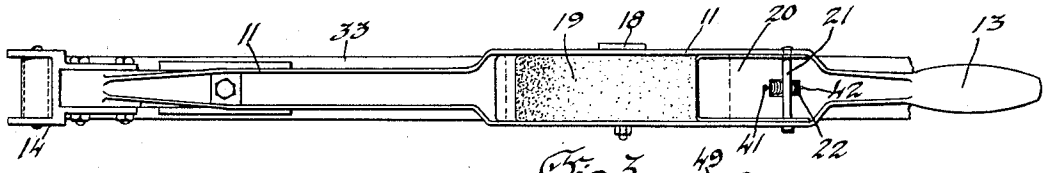


Fig. 3

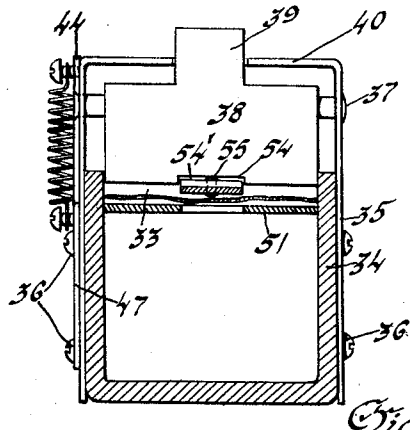


Fig. 4

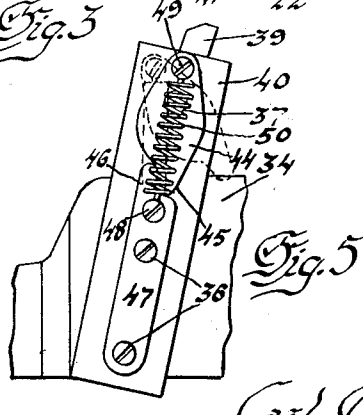


Fig. 5

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FINISHING DEVICE

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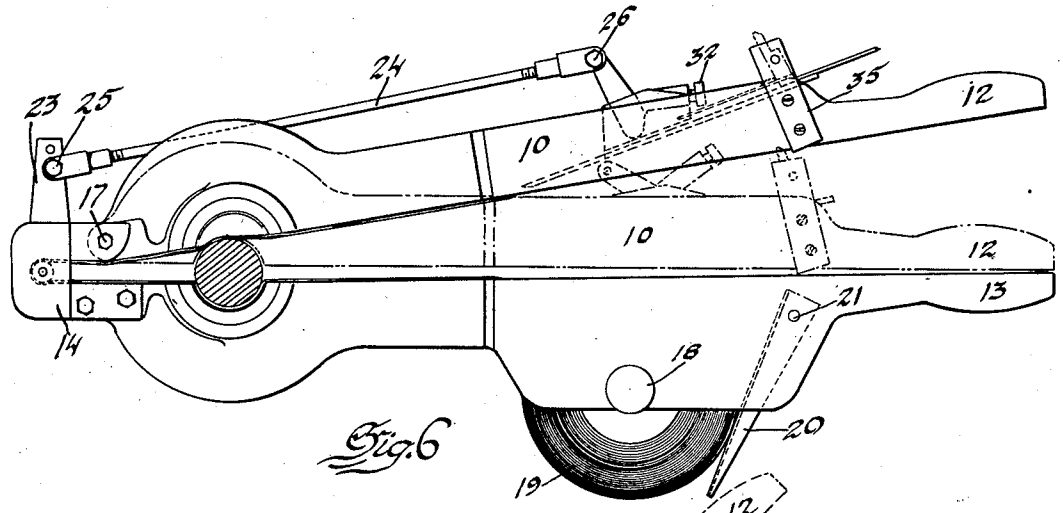


Fig. 6

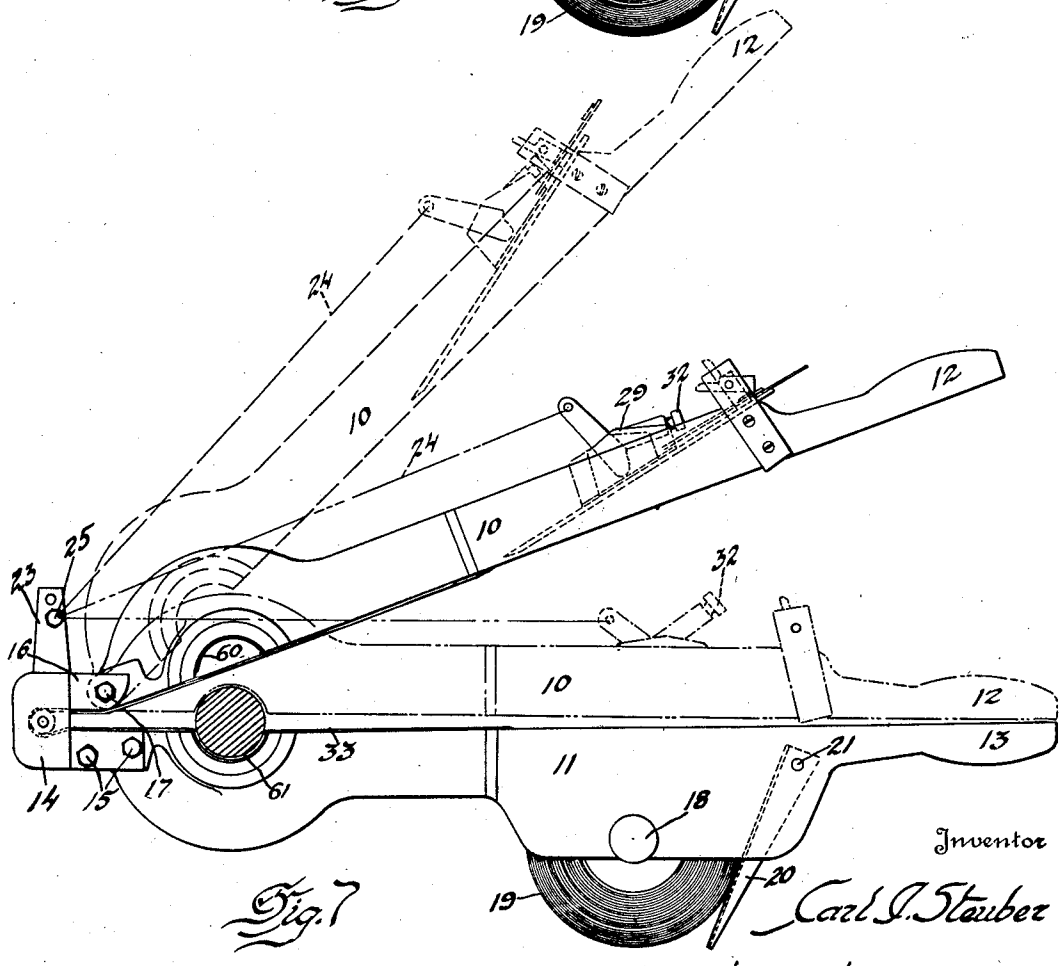


Fig. 7

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Patented Feb. 25, 1930 1,748,313

UNITED STATES PATENT OFFICE

CARL J. STEUBER, OF DETROIT, MICHIGAN, ASSIGNOR TO THE CARBORUNDUM COMPANY, OF NIAGARA FALLS, NEW YORK, A CORPORATION OF NEW YORK

FINISHING DEVICE

Application filed September 16, 1925. Serial No. 56,750.

My device relates particularly to a construction for finishing cylindrical objects such as the crank shafts of internal combustion engines, by means of rotating the same within a piece of abrasive material such as silicon carbide paper.

It is one of the primary objects of my invention to provide a device adapted to accomplish the above result with facility and economy.

It has been common practice in the finishing of the pins and bearings of cylindrical members, such as internal combustion engine crank shafts to provide a device consisting of a clamp-like member adapted to clamp a piece of silicon carbide paper, or the like, around the tubular object to be finished by first placing the silicon carbide paper around the tubular object and then clamping the same in place. This procedure is slow and difficult to accomplish with accuracy. It also requires the use of an excessive quantity of the finishing abrasive material.

In my improved device, I have provided means for feeding through the clamp, a strip of abrasive material, such as silicon carbide paper, in exactly the right proportion, and amount to accomplish the desired end and to do such feeding automatically by the opening and closing of the clamp.

My invention consists in the arrangement, combination and construction of the various parts of my improved device as described in the specification, claimed in my claims and shown in the accompanying drawings, in which:

Fig. 1 is a side elevation of my improved device with certain parts broken away.

Fig. 2 is a top or plan view of the same.

Fig. 3 is a bottom view of the same.

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

Fig. 5 is a detail view showing in side elevation the spring mechanism of Fig. 4.

Fig. 6 is a side elevation of my improved device showing the relative positions of the parts thereof, as the clamping mechanism is partially released.

Fig. 7 is a similar view showing other relative positions of the parts in other positions of the clamping mechanism.

Fig. 8 is a vertical section through the strip feeding device.

I have shown a pair of clamping members indicated generally as 10 and 11, each having a handle 12 and 13 respectively. The clamping member 11 has a member 14 secured on the end thereof, as at 15, the member 14 having a projection 16 on one end thereof to which the clamping member 10 is pivoted, as at 17. Journaled in the bottom of the clamping member 11 is a pin 18, upon which is rotatably mounted a roll 19, formed from a continuous strip 33, of abrasive material, such as silicon carbide paper. A plate 20 is also pivoted to the clamping member 11, as at 21, and is yieldingly held against the rearward periphery of the roll 19 by a spring member 22, secured at 41 to the plate and at 42 to the clamping member, in order to prevent buckling of the strip forming the roll 19.

A vertically extending lug 23 is provided on the member 14 and a rod 24 is pivoted thereto, as at 25. The rod 24 is in turn pivoted, as at 26, to an arm 27, which arm is pivoted as at 28 to the sides of a somewhat U shaped member 29 provided on the clamping member 10. Suitably secured to the arm 27 is a sleeve 30 having a coil spring 31 therein, against which a pin 32, held in the sleeve by a pin 43, bears.

It will be noted that the top of the clamping member 10 is of U shaped formation to provide vertically disposed side members 34. A supporting bridge 35 is secured to the rearward end of the sides 34, as at 36, and a pin 37 is mounted between the sides of the bridge 35. A plate 38 is journaled on the pin 37 and is provided with an upper extension or tongue 39, adapted to bear against the rearward edge of the top portion 40 of the bridge 35. A cam plate 44 is also provided on one end of the pin 37, so as to rotate therewith. The cam portion 45 of the cam plate 44 is adapted to strike a similarly formed portion 46 on a plate 47 secured to the outside of the channel 34 at 36.

A pair of screws 48 and 49 is provided in

the plates 47 and 44 respectively, between which a coiled spring 50 is suspended.

A diagonally extending plate 51 is provided between the sides of the channel 34 extending from an aperture 52 in the clamping member 10, through the bridge 35. A tongue 53 is welded to the end of the U shaped member 29 and normally extends to a point adjacent the slot 54 in the bottom of the plate 38. A small plate 54′ is riveted as at 55, to the tongue 53.

The clamping members 10 and 11 are provided with semispherical recesses 56 and 57 within which are placed semispherical sections 58 and 59 of leather, or other suitable material having a slight amount of give or elasticity. Over the leather portions 58 and 59 are placed thin members 60 and 61 having faces of abrasive or gripping material. The strip 33 is passed along from the roll 19 over the section 57, and its leather and abrasive facings, and thence to the forward end of the clamping member 11 and around a roller 62 secured therein, and thence along the bottom of the clamping member 10 over the section 56 and its leather and abrasive facings 58 and 60, through opening 52 in the bottom of the clamping member 10, over a flat spring 63 under the end 64 of the arm 27 and between the U shaped member 29, and its tongue 53 and thence between the plate 51 and the plate 38.

In the practical operation of my improved device, an object to be finished, such as a pin or bearing of a crank shaft of an internal combustion engine is inserted between the sections 56 and 57 of the clamping members so that the face of the abrasive strip 33 will bear against it, the leather sections 58 and 59 providing somewhat of a cushion without allowing the sections to expand away from pressure exerted upon the pin or bearing by the clamping members and the abrasive faced strips 60 and 61 gripping the plain and unengaged sides of the strip 33 in the sections.

It will be apparent that when the crank shaft is rotated, the pin or bearing portion thereof, which is engaged between the sections 56 and 57 will be finished by the abrasive portions of the strip 33 disposed in such sections. After this has been accomplished, the clamping members 10 and 11 are swung open in sections 6 and 7 to permit the moving of the crank shaft either entirely away from the clamping members or to dispose another pin or bearing between the sections 56 and 57.

Upon the opening of the clamping members 10 and 11, the rod 24 will be moved to push the arm 27 forwardly until the forward tip on the end thereof engages that portion of the strip 33, which is under it, at which time further movement of the rod 24 will cause an outward movement of the arm 27 to push the U shaped member 29, and its tongue 53 outwardly. As the tongue 53 moves outwardly, the small plate 54′ thereon engages the top of the slot 54 to push the plate 38 upwardly and permit the strip 33 to move outwardly, thus slightly unwinding the roll 19 and providing fresh portions of the strip within the sections 56 and 57. The plate 38 moves away from the strip 33 only a sufficient amount to clear the strip, being stopped from further movement by engagement of the cam portion 45 of the plate 44 with the portion 46 of the plate 47. As the clamping members 10 and 11 are moved to full open position, the pin 32 strikes the portion 39 of the plate 38 to force the plate 38 downwardly on its pivot to again engage the strip 33 to hold it against further engagement or against the formation of slack in the strip.

The clamping members are again brought together on their pivot point 17 with the result that the U shaped member 29 and its tongue 53 are brought back to their normal positions and the operation of rotating the crank shaft within the sections 56 and 57 is again repeated.

The flat spring 63 tends to keep the strip 33 in a constantly taut position and at the same time permit of a sufficient elasticity to provide for the depression of the strip 33 within the sections 56 and 57 when the strip is engaging the portion of the crank shaft or other object to be finished.

It will be obvious from the foregoing that I have provided means whereby different objects or portions of objects may be continuously finished with fresh pieces of abrasive material, such material being continuously and automatically fed as the clamping members are moved toward and away from each other to engage the different objects, or portions of objects.

It will be obvious that various changes may be made in the arrangement, combination and construction of the various parts of my improved device without departing from the spirit of my invention and it is my intention to cover by my claims such changes as may be reasonably included within the scope thereof.

What I claim is:

1. In combination, a pair of clamping members hinged together at one end and having portions for enclosing an object to be finished, a strip of abrasive material passed along said members and within said engaging portions, means for feeding said strip to change the portion thereof within said engaging portions of the clamp, and means engaging said strip on opposite sides of said portions for maintaining the strip constantly taut.

2. In combination, a pair of clamping members hinged together at one end and having portions for enclosing an object to be finished, a single continuous strip of abrasive material passed along one of said members

and reversely bent along the other of said members and passing within said engaging portions, and means for automatically feeding said strip to change the portion thereof within said engaging portions of the clamp as the portions of the clamp are moved to clamp and unclamp them.

3. In combination, a pair of clamping members hinged together to permit clamping and unclamping thereof, a roll composed of a continuous strip of abrasive material secured to one of said members, object engaging portions on said members, said strip being extended into contact with the walls of both of said portions, and means for feeding the material of said roll to change the portion thereof extended within the engaging portions.

4. In combination, a pair of clamping members hinged together to permit clamping and unclamping thereof, a roll composed of a continuous strip of abrasive material secured to one of said members, object engaging portions on said members, said strip being extended into contact with both of said portions, and means automatically operated by the movement of said clamping portions on their hinged connection for feeding the material of said roll to change the portion thereof extended within the engaging portions.

5. In combination, a pair of clamping members hinged together, object engaging portions on said members, a strip of abrasive material passed within said engaging portions and along one of said members, means for fixing the strip against movement on both sides of said portions and means for releasing said fixing means to permit movement of said strip for changing the portion thereof within said engaging portion.

6. In combination, a pair of clamping members hinged together, object engaging portions on said members, a strip of abrasive material passed within said engaging portions and along one of said members, means for fixing the strip against movement on both sides of said portions, and means operated by the movement of said clamping members on their hinged connection for automatically releasing one of said fixing means, moving said strip to change the portion thereof in the engaging portion and again fixing said strip against movement.

7. In combination, a pair of clamping members hinged together, object engaging portions with said members, a roll composed of a continuous strip of abrasive material secured to one of said members, said strip passing within said engaging portions and then along the other clamping member, means on said other member for fixing the movement of said strip in at least one direction, and means operated by the movement of said clamping members for automatically releasing said fixing means, moving said strip to change the portion thereof in the engaging portion and again fixing said strip.

8. In combination, a pair of clamping members hinged together, said members being provided with matching depressions adapted to receive a cylindrical piece of work, and a single strip of abrasive material carried by said members in a position to simultaneously engage more than 180 degrees of the circumference of said work, and means operated by swinging movement of one of said members relative to the other thereof for advancing said strip in said depressions.

9. In combination, a pair of clamping members hinged together and provided with matching depressions adapted to receive a cylindrical piece of work, a strip of abrasive material carried by said members positioned to engage more than one half of the circumference of said work, and means for automatically advancing said strip to change the portion thereof in engagement with said work.

10. In combination, a pair of clamping members hinged together and provided with co-operating work receiving depressions adapted to receive a piece of work, a roll of strip abrasive material carried by one of said members the material of which is adapted to be fed into at least one of said depressions in contact with said work, and means frictionally engaging said material on opposite sides of said work and at points spaced therefrom for positively maintaining said material against movement in said depressions.

11. In combination, a pair of members hingedly connected and provided with matching work engaging depressions, a roll of strip abrasive material carried by one of said members the strip of which is extended into contact with said depressions, common means for manually supporting said members and causing movement thereof to clamp a piece of work between them, and means carried by at least one of said members and operated by movement thereof relative to the other of said members for automatically advancing said strip in said depressions.

12. In combination, a pair of members hingedly connected and provided with matching work engaging depressions, a roll of strip abrasive material carried by one of said members the strip of which is extended into contact with both of said depressions, common means for manually supporting said members and causing movement thereof to clamp a piece of work between them, and means engaging said strip beyond said depressions from said roll for automatically drawing said strip a predetermined amount through said depressions upon each separation of said members.

13. In combination, a pair of clamping members hingedly connected together, a work

receiving depression in one of said members, a roll of strip abrasive material carried by one of said members, said strip of abrasive material extending into said depression, means frictionally engaging said strip on either side of said depression and at points spaced therefrom when said clamping members are in closed position, and means for releasing said friction means on one side of said strip from strip engaging position upon opening of said clamping members.

14. In combination, a pair of clamping members hingedly connected together, a work receiving depression in one of said members, a roll of strip abrasive material carried by one of said members, said strip of abrasive material extending into said depression, means frictionally engaging said strip on either side of said depression when said clamping members are in closed position, means for releasing said friction means on one side of said strip from strip engaging position upon opening of said clamping members, and other means moved into frictional engagement with said strip upon opening movement of said clamping members and movable by said movement of said clamping members to advance said strip in said depression.

15. In combination, a pair of clamping members hingedly connected together and provided with matching depressions adapted to receive a piece of work, a strip of abrasive material extending along one of said members and into contact with the walls of the corresponding depression and then extending along the other of said members and in contact with the walls of its corresponding depression, and means carried by each of said members for frictionally locking said strip against movement on opposite sides of said work when said members are in work engaging position.

16. In combination, a pair of clamping members hingedly connected together and provided with matching depressions adapted to receive a piece of work, a strip of abrasive material extending along one of said members and into contact with the walls of the corresponding depression and then extending along the other of said members and in contact with the walls of its corresponding depression, means carried by each of said members for frictionally locking said strip against movement on opposite sides of said work when said members are in work engaging position, and means for constantly exerting a tightening effort on said strip between the first mentioned means when said members are in work engaging position.

17. In combination, a pair of clamping members hingedly connected together, matching work receiving depressions in said members, a roll of abrasive material carried by one of said members the strip of which extends into said depressions and forms a substantially closed loop when said members are in closed position, said loop opening up when said members are separated whereby to receive a piece of work through said opening, and means operated by the opening movement of said members for automatically advancing said strip through said depressions.

CARL J. STEUBER.