June 4, 1940. H. WEBER ET AL 2,203,003

BUFFING MACHINE

Filed Aug. 5, 1939 2 Sheets-Sheet 1

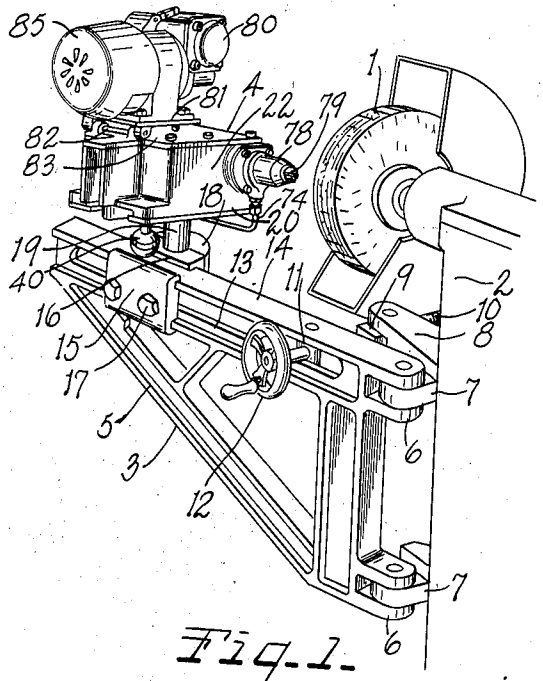

Fig. 1.

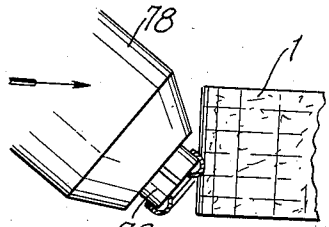

Fig. 3.

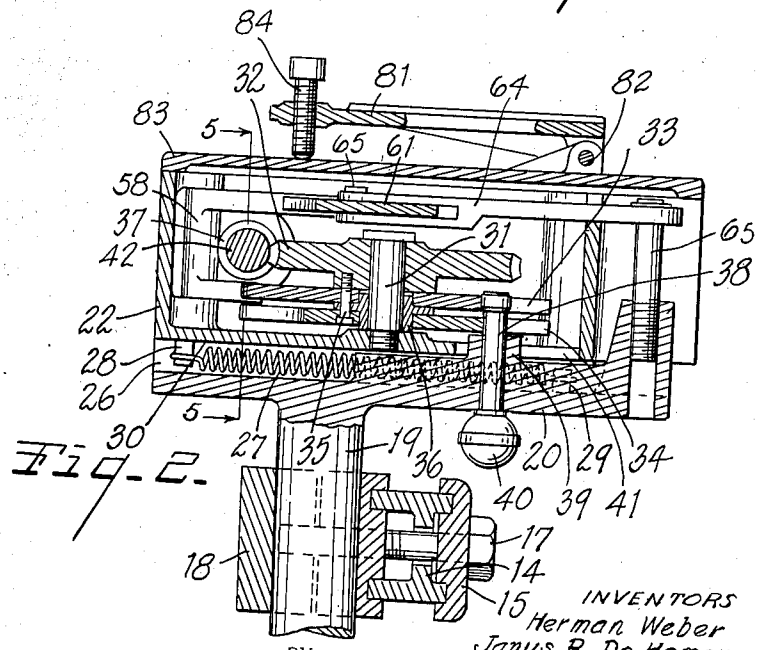

Fig. 2.

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June 4, 1940. H. WEBER ET AL 2,203,003

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Filed Aug. 5, 1939 2 Sheets-Sheet 2

Fig. 4.

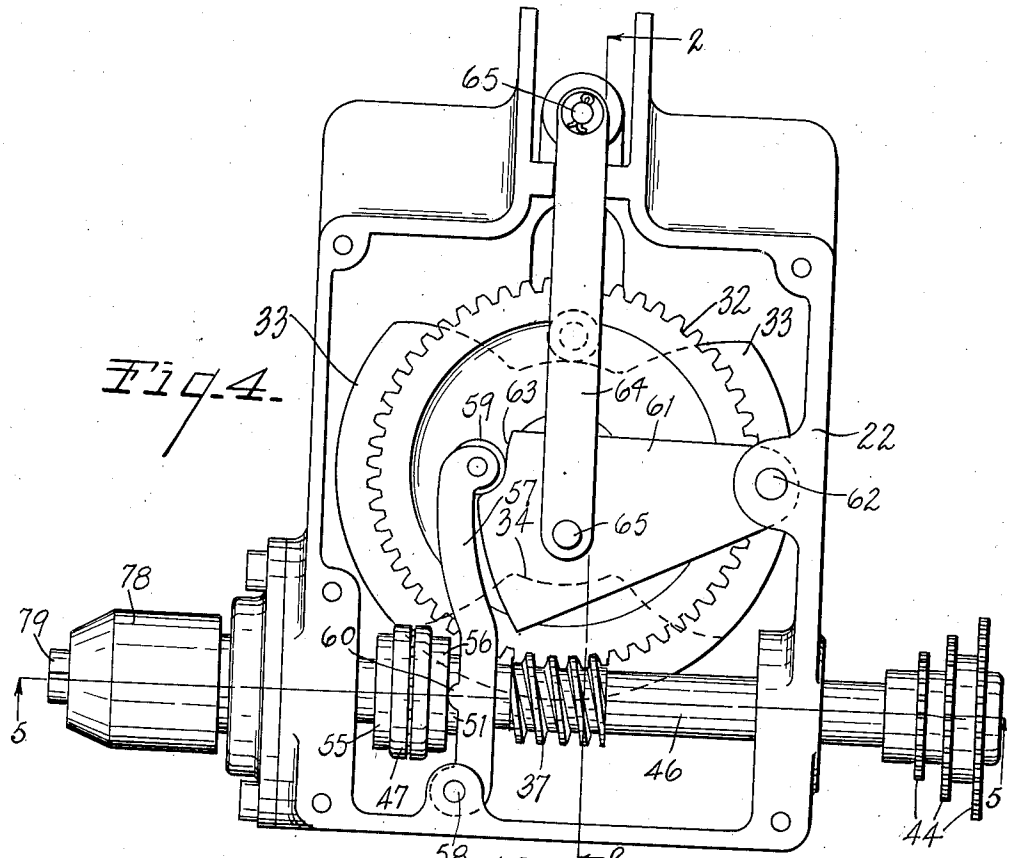
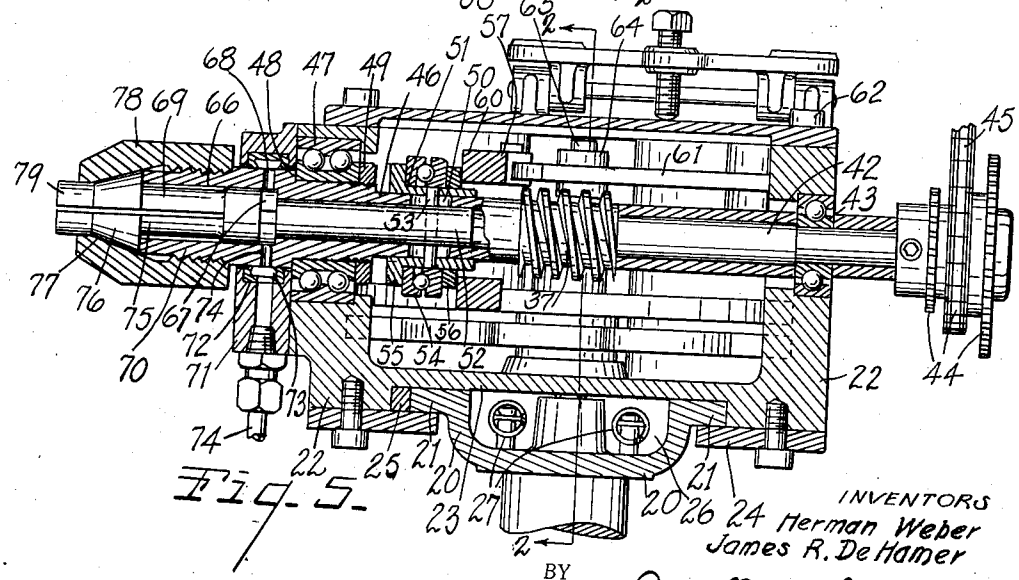


Fig. 5.



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BUFFING MACHINE

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12 Claims. (Cl. 51—232)

This invention relates to improvements in buffing machines.

The main objects of our invention are:

First, to provide a buffing machine having a novel work holding and feeding device adapted to advance the work radially into operative relation to the buffing wheel and normal to the periphery thereof to thereby buff all parts of the contour of the element being operated on without sliding the same transversely of the buffing wheel surface.

Second, to provide a buffing machine having a work holder of the type described, wherein the buffing angle can be readily and quickly set as desired.

Third, to provide a work holder for a buffing machine performing a contour buffing of small metal or plastic parts, having automatic provisions for advancing and retracting the work relative to the wheel.

Fourth, to provide a device of the type described having provision for holding the part to be buffed in engagement with the wheel for different periods of time as may be required for work of different character or varying degrees of buffing desired.

Fifth, to provide a device of the type described, which is self-contained and adapted for use in connection with and buffing lathe and which is capable of operation to shift or rotate the part while it is buffed at a number of different speeds.

Sixth, to provide a buffing machine work holder and feeder making possible an exceedingly high production by reason of the fully automatic operation thereof.

Further objects relating to details and economies of our invention will definitely appear from the description to follow. The invention is defined in the claims.

A structure embodying the features of our invention is illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view illustrating a portion of a buffing machine with the work holding and feeding device of our invention operatively associated therewith.

Fig. 2 is an enlarged fragmentary view mainly in section on line 2—2 of Figs. 4 and 5, illustrating details of construction of the work feeding device.

Fig. 3 is a fragmentary view illustrating the work holding spindle nose and chuck or collet of the work holding device in operative relation to the polishing wheel, illustrating the path in which the former travels during feeding of the work.

Fig. 4 is a top plan view of the holding and feeding device with the cover plate thereof removed, further illustrating the construction and relative arrangement of the parts thereof.

Fig. 5 is a fragmentary view in vertical section on line 5—5 of Figs. 2 and 4, still further illustrating our invention.

The present invention deals in general with buffing machines and in particular with work holding and feeding means therefor whereby the work is securely held and automatically advanced into engagement with the buffing wheel on a line radial to the said wheel and without any movement laterally or transversely thereof such as would cause the work to slide across the face of the wheel. It is a primary object thereof to advance the work quickly and directly into its final operative position relative to the wheel and to retract the work in the same manner. With such a construction, the buffing wheel quickly shapes itself to the work so that contour parts may be buffed with equal pressure on all surfaces or portions thereof.

The invention includes further means for rotatably feeding annular work while in engagement with the wheel so as to complete the buffing thereof and also means for selectively varying the length of the period of contact of the work and wheel as will be hereinafter pointed out in detail, all of the aforesaid operations of feeding and withdrawing the work, rotating the same while in engagement with the wheel, and the further operation of ejecting the work from the chuck or collet of the device being automatically performed with the greatest possible expedition and efficiency. The device is entirely self-contained and requires the supervision of a single operator to place the work in position on the chuck or collet prior to each buffing operation and remove the work therefrom.

Referring to the drawings and in particular to Fig. 1, we illustrate the wheel 1 of a conventional buffing machine, which wheel is mounted on the arbor of the machine, the arbor being mounted in suitable manner on the machine frame 2 and suitably driven.

The reference numeral 3 indicates an adjustable mounting for the work holding and feeding device 4 of our invention, consisting of a supporting bracket 5 having a pair of pivot forks 6 pivotally connecting the same to projecting ears 7 on the frame. It it desirable that the supporting bracket be adjustable relative to the frame and to be capable of being held in any given adjusted position so as to position the device 4 rela-

tive to wheel 1, and to this end we provide on the machine frame 2 a projecting bracket or abutment 8. This abutment, like the ears 7, may be easily bolted or riveted to the machine frame 2, these being the only additions thereto necessary to enable the same to receive the device of our invention. The bracket 8 has swiveled thereon a nut member 9 threadedly receiving a screw threaded adjusting member 10 rotatably carried by a block 11 on the supporting bracket 5, said screw threaded member 10 being held from longitudinal movement by the said block. A hand wheel 12 is provided for the said adjusting member 10 and it will be apparent that rotation of this hand wheel 12 and member 10 results in pivoting of the supporting bracket 5 relative to the frame and a corresponding advance or retraction of the work holding device relative to wheel 1. This adjustment is made only in setting up of the device for a given job. The actual feed of the work into and out of engagement with the wheel is automatically effected by the provisions of our invention to be hereinafter described.

When it is desired to perform hand buffing on the wheel 1, the supporting bracket 5 may be fully swung to one side by actuation of adjusting member 10 to permit access to the buffing wheel.

The bracket 5 has an elongated slot 13 formed in the upper transverse arm 14 thereof, which slot, incidentally, accommodates the screw threaded adjusting member 10. The work feeding device 4 is mounted for lateral adjustment on the said transverse arm by means of a pair of opposed clamping jaws or blocks 15, 16 coacting with opposite sides of said arm and adapted to be clamped thereagainst by means of bolts 17 passing through the slot 13. One of the blocks 16 coacts with a further outer block or jaw 18 to constitute a split clamp for engaging a vertical supporting post 19 on the bottom of the device 4, whereby the latter is adjustable vertically and angularly as well as horizontally on arm 14. Preferably, the means for loosening the post for vertical adjustment are independent of the bolts 17, so that any desired positioning or setting of the device 4 relative to the wheel, whether an angular adjustment of the post 19 to vary the angular disposition of the device relative to the wheel, or a vertical adjustment, or a lateral adjustment or a combination of any of these, may be readily made as desired.

With reference to Figs. 1, 2, and 5, the post 19 is connected, preferably integrally, to a fixed platform or guide track member 20 having a pair of elongated lateral flange-like guides or ways 21 and supporting a collet supporting casing or housing 22 on its upper surface for sliding movement in the direction of said guide ways. The part 22 constitutes a carriage. This casing has a recess 23 receiving the platform guide ways 21 and is provided with a pair of inwardly projecting shoulder members 24 underlapping the ways 21 and thus constituting ways for permitting sliding movement of the casing or slide 22 on the aforesaid track or platform 20. A gib 25 is included in one of the ways to take up for wear.

The track 20 is made hollow at 26 to receive a pair of coil springs 27 for retracting the housing 22 and the work holding chuck or collet carried thereby (and to be hereinafter described) on the track at predetermined times, these coil springs being connected at one end to lugs or pins 28 depending from housing 22 and at the other end to upstanding lugs or pins 29 disposed on platform 20 in the recess 26.

The housing or casing 22 has a floor 30 on which is centrally disposed a fixed upstanding spindle 31, being preferably threaded into the floor. This spindle has rotatably mounted thereon a worm wheel 32 which drives a pair of selective cams designated 33, 34, through the agency of a connecting pin or screw 35. The cams are spaced axially and rotatably mounted on spindle 31 by means of a flanged sleeve 36.

Referring to Fig. 2, the worm wheel 32 is in mesh with a worm 37. The worm 37 is adapted to be driven by means which will be hereinafter described to thereby drive worm wheel 32 and the cams 33, 34 at predetermined speeds.

Lateral advancing movement of the casing 22 on track 20 in opposition to springs 27 is effected by the selective engagement of cams 33, 34 with a laterally fixed, but axially slidable, vertical abutment pin or member 38 disposed in the track or platform 20 and projecting upwardly through a boss 39 therein for selective engagement by cams 33, 34. The cam which is engaged by the pin is determined by the vertical positioning of the latter, which in turn is effected by manually manipulating a knob 40 thereon below the track or platform. As illustrated in Fig. 4, the cams 33, 34 are different in nature. The former has but a single lobe, while the latter has two lobes, and it will be evident that when the upper cam 33 engages the fixed pin 38, the movable cam carrying housing or casing 22 is thrust in the direction of the wheel 1 for operative engagement of the work with the latter and is held in such position for a substantial portion of a complete revolution of gear 32 and the cams, whereas when the pin 38 is withdrawn downwardly for engagement by cam 34, the casing on which the latter is mounted is projected twice in a single cam revolution for periods each approximately one-third as long. In this manner, the extent of the buffing taking place in each operation may be regulated broadly and a multiple speed drive for worm 37 to be hereinafter described permits still closer regulation thereof.

The casing floor 30 has a recess 41 at the rear thereof, which accommodates the boss 39 and pin 38 on the track or platform during the longitudinal movements of the casing.

The drive for the worm 37, which also rotates the work while in engagement with the buffing wheel, and effects actuation of the work holding chuck or collet will now be described. Referring to Figs. 4 and 5, the driving worm 37 is coaxial with and preferably integrally connected to a rotatable spindle shaft 42 mounted in a ball bearing 43 in one side of housing 22, this shaft being driven at selective speeds by one of a plurality of sprockets 44 fastened thereto through a motor driven chain 45. By this expedient, the spindle shaft and worm wheel 32 are capable of being driven at three different selective speeds; hence the device enables six different types of buffing to be attained by shifting of chain 45 on the sprockets 44 and/or manipulation of knob 40 to selectively engage the pin 38 with either of the cams 33, 34.

Referring to Figs. 4 and 5, the worm 37 drives a hollow spindle shaft extension 46 mounted for rotation at the side of the housing 22 opposite from bearing 43 in a ball bearing 47. Axial play of this extension is prevented by an enlarged shouldered portion 48 thereon disposed at one side of and engaging the inner race of bearing 47 and a retaining nut 49 threaded on the said extension at the opposite side of the bearing. In such

manner, the spindle shaft 42 and extension 46 are rotatably driven as a unit with a minimum of friction and without end play.

The hollow extension 46 has elongated diametrically opposed slots 50 extending through the wall thereof and slidably receives a flanged sleeve 51 adjacent said slots. A collet actuating plunger 52 is slidably mounted in the bore of hollow extension 46, the said plunger having a diametrically extending pin 53 fixed thereto which extends through the elongated slots 50 and has a press fit at its extremities in sleeve 51 and may also be press-fitted to the plunger. Accordingly, the plunger 52 is shifted axially in response to axial shifting of said sleeve. The sleeve has an end thrust ball bearing 54 mounted therein in engagement with the flange 55 thereof and a retaining and thrust receiving ring 56 disposed on the sleeve beside bearing 54 completes the thrust assembly for axially shifting the plunger.

As illustrated in Figs. 2, 4, and 5, the casing 22 has pivotally mounted on the front wall thereof a forked follower arm 57 with a roller type follower 59 on its free end. This arm is provided with a pair of tappets or shoulders 60 for engagement with the thrust ring 56 to actuate the thrust assembly and plunger 52 to the left as viewed in Figs. 4 and 5 when the follower arm 57 is shifted in counterclockwise direction. To obtain such shifting of the follower arm, we provide a horizontally disposed plate cam 61 pivoted at 62 to the side wall of casing 22 and having a cam portion 63 engageable with the aforesaid follower 59. This plate cam is connected by a forked link 64 to a fixed post 65 mounted on the rear of the fixed platform or track 20, see Figs. 2 and 4, the connection being such that as the casing 22 is shifted forwardly through the engagement of cams 33 or 34 with the fixed pin 38, carrying with it the follower arm 57, a relative movement of the plate cam and follower arm occurs. The latter, since the roller 59 thereof is in engagement with the restrained plate cam 61, travels up the rise of plate cam portion 63 and is caused to move in counterclockwise direction as viewed in Fig. 4, with the resultant shifting of the thrust assembly and plunger 52 to the left as viewed in Figs. 4 and 5. This axial shifting movement is employed to expand an expansible work holding chuck, collet or mandrel, or to compress a similar contracting element, as the case may be, in the manner to be described. Accordingly, we desire that the term "collet" employed in the claims be interpreted broadly.

Referring to Fig. 5, the hollow spindle shaft extension slidingly receives the plunger 52 and has a somewhat enlarged bore 66 at enlarged portion 48 and to the left of the bearing 47, the said enlarged bore receiving a segmentally flanged head 67 on the plunger. This head has a plurality of radial axially extending grooves or recesses 68 in the flange thereof to communicate air pressure with the interior of a hollow split collet 69 which is disposed in end abutting relation with the head 67 immediately to the left thereof, as illustrated in Fig. 5. The radial depth of the grooves 68 is such that they communicate with the interior of the aforesaid hollow collet. Immediately adjacent the casing 22, the enlarged portion 48 of the shaft extension 46 is surrounded by an air chamber member 71 which is preferably secured to the casing. This member has a bore provided with a countersunk annular recess 72 adapted to receive an annular manifold member 73 opening to the periphery of the enlarged portion 48. The said enlarged portion has radial holes 74 in communication with the said manifold member 73 and also in communication with the flanged head 67 on plunger 52 and the recesses 68 therein.

Air chamber member 71 has a passage communicating the interior of the said manifold member 73 with an air supply tube 74, whereby at intervals a blast of compressed air may be supplied through said tube and the above described passage, manifold openings and recesses to the interior of collet 69 for the purpose of ejecting a buffed article from the latter.

The collet 69 includes a plurality of flexible split spring sections 75 each of which has a conical portion 76 engageable with a continuous internal conical cam surface 77 of the spindle nose 78, which latter is threaded for adjustment on the forward portion 70 of the sleeve extension 46. With this construction, when the plunger 52 is urged to the left as viewed in Fig. 5 by the follower 57, the former abuts collet 69 and forces the split sections thereof against cam surface 77 to compress the projecting work engaging jaws 79 of the collet and clamp the work thereon in the manner illustrated in Fig. 3. When, on the return of casing 22 to the rear, the plate cam 61 releases follower 57, the spring of the collet sections 75 is sufficient to effect loosening or disengagement of the work at this time and a blast of air directed interiorly of the collet against the work strips the same automatically from the collet jaws. This blast of air through tube 74 may be produced and timed by any desired valve mechanism coacting with the above described device in a manner which will occur to those skilled in the art.

Although we have shown and described a collet or chuck which is contractile in action to hold the work thereon, it will be apparent that by a few simple changes an expansible mandrel may also be employed and actuated to expand or contract the same in a manner similar to that described above.

A selective drive for shaft 42, whereby six different speeds and feeds of the work on collect 69 are attainable, has been referred to, the aforesaid selective speed arrangement including the selectively acting cams 33, 34 and the sprocket wheels 44. These sprockets are driven by chain 45 from a corresponding set of three sprockets (not shown) on the shaft of a motor 80 disposed atop casing 22, see Fig. 1. In order to enable the chain 45 to be conveniently shifted from one set of sprockets to another, we provide an adjustable mounting for the motor in the form of a plate 81 pivoted adjacent its rear edge 82 to the removable cover 83 for casing 22 and adjustably supported adjacent its front edge by means of a set screw 84 threaded in the plate and engaging cover 83. The motor 80 is mounted on this plate, as well as a motor driven fan or blower 85 which may be employed for producing the work ejecting blast of air mentioned above. It will be apparent that by backing off the set screw 84 the motor is lowered sufficiently to enable the convenient shifting of chain 45 relative to the spindle shaft sprockets 44 and the motor sprockets, after which the set screw is then restored to original position to take up the slack in the chain.

In operation, a piece of work to be buffed is placed against the work engaging chuck portions of collet 69 and, assuming that a short buffing period is required, the knob 40 is manipulated downwardly to place pin 38 in position for en-

gagement by lowermost cam 34. Motor 80 is then started to rotate spindle shaft 42, worm 37, worm wheel 32, and cams 33, 34. When the rise of cam 34 strikes fixed pin 38, it causes the cam and the casing on which it is mounted to be shifted forwardly on a straight line to advance the work toward the buffing wheel 1. At the same time, follower 59 travels up the rise of plate cam 61, with the result that the follower arm 57 is pivoted in counterclockwise direction and tappets or shoulders 60 on that arm engage ring 56 of the thrust assembly on the hollow shaft extension 46 to shift the plunger 52 to the left. The plunger in turn engages collet 69 to contract the same and grip the work, all of the collet actuating functions being performed prior to engagement of the work with the buffing wheel 1. The work is held in engagement with the wheel during the period that the highest portion on cam 34 engages fixed pin 38. When this engagement terminates, the coil springs 27 retract casing 22 on its fixed track 20, at the end of which movement the follower arm 57 is released by plate cam 61 and the work is automatically loosened from the end chuck jaws of the collet by the spring action of the latter. At this time a blast of air through the interior of the collet insures the removal of the finished part.

In the event that a longer period of buffing operation is desired, knob 40 is actuated to elevate pin 38 into position to be engaged by cam 33. Various alterations in the collet rotating speed available during the period of operation of either of these cams may be effected by shifting of drive chain 45. The foregoing device is entirely automatic in operation and produces exceedingly fine work in outputs up to 1440 pieces per hour. It requires little power to operate the same, and the change-over from one speed to another is effected with very little delay. The buffing angle can be adjusted quickly and accurately and in adjusted position equal buffing pressures are exerted on all sides of the work, allowing the buffing of plastics as well as metal parts. The only operation required on the part of the operator is that of placing the work in position on the chuck.

Although we have shown and described our machine specifically in connection with a buffing lathe, it will be apparent that it is well adapted for the work holding and feeding functions in connection with other related types of machines, for example, grinding or polishing machines or lathes, or similar forms of automatic milling or forming tools, and therefore we do not wish to be unduly restricted in this particular.

We have illustrated and described our improvements in an embodiment which is very practical. We have not attempted to illustrate or describe other embodiments or adaptations as it is believed this disclosure will enable those skilled in the art to embody or adapt our improvements as may be desired.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A work holding and feeding attachment for buffing and like machines, comprising a swingable bracket adapted to be attached to the machine and having means for adjustably positioning the same relative thereto, a way supporting post, means for mounting said post on said bracket for lateral, vertical, and angular adjustment, a fixed guide way member on said post, a casing having means engaging said guide way member for guiding the casing for lateral rectilinear sliding movement into and out of engagement with an operating wheel of said machine on a line normal and radial to the periphery of the wheel, a work holding collet rotatably mounted in said casing, means for rotating said collet at a plurality of speeds including a motor on said casing, a driving spindle drivingly connected to the collet and selective chain and sprocket drive means connecting said motor and spindle, and means for imparting said lateral rectilinear movement to said casing, comprising a worm on said spindle, a worm wheel rotatably carried by said casing and adapted to be driven by said worm upon rotation of said spindle, a pair of different cams rotatably mounted on the casing and rotatable with said worm wheel and a laterally fixed pin carried by said guide way member selectively engageable with said cams, whereby rotation of the cams and engagement of one or the other thereof with said pin causes sliding movement of the casing and parts carried thereby relative to the pin and guide way member and holds work on said collet against the wheel for selectively variable periods, and means for actuating said collet to work clamping position, comprising a plate cam pivotally mounted on said casing, means for restraining pivotal movement of said plate cam during movement of said casing, a follower mounted on said casing and engageable with said plate cam, a thrust member engageable by said follower when actuated by said plate cam, a plunger mounted for sliding movement axially of said spindle and connected to said thrust member, said plunger being in thrust transmitting relation to said collet to actuate the latter, and means connecting said plate cam with said fixed guide way member, whereby movement of the casing to which the plate cam is pivoted causes actuation of said follower, thrust member, plunger, and collet.

2. A work holding and feeding attachment for buffing and like machines, comprising a fixed guide way member, a casing having means engaging said guide way member for guiding the casing for lateral rectilinear sliding movement into and out of engagement with an operating wheel of said machine on a line normal and radial to the periphery of the wheel, a work holding collet rotatably mounted in said casing, means for rotating said collet, and means for imparting said lateral rectilinear movement to said casing, comprising a worm on said spindle, a worm wheel rotatably carried by said casing and adapted to be driven by said worm upon rotation of said spindle, a pair of different cams rotatably mounted on the casing and rotatable with said worm wheel and a laterally fixed pin carried by said guide way member selectively engageable with said cams, whereby rotation of the cams and engagement of one or the other thereof with said pin causes sliding movement of the casing and parts carried thereby relative to the pin and guide way member and holds work on said collet against the wheel for selectively variable periods, and means for actuating said collet to work clamping position.

3. A work holding and feeding attachment for buffing and like machines, comprising a fixed guide way member, a casing having means engaging said guide way member for guiding the casing for lateral rectilinear sliding movement into and out of engagement with an operating wheel of said machine on a line normal and radial to the periphery of the wheel, a work holding collet rotatably mounted in said casing, means for ro-

tating said collet, and means for imparting said lateral rectilinear movement to said casing, comprising a pair of different cams rotatably mounted on the casing, means for rotating said cams, and a laterally fixed pin carried by said guide way member selectively engageable with said cams, whereby rotation of the cams and engagement of one or the other thereof with said pin causes sliding movement of the casing and parts carried thereby relative to the pin and guide way member and holds work on said collet against the wheel for selectively variable periods, and means for actuating said collet to work clamping position.

4. A work holding and feeding attachment for buffing and like machines, comprising a supporting bracket adapted to be pivotally mounted on the machine, a normally fixed supporting member on said bracket, means for mounting said supporting member on the bracket for vertical, lateral, and angular adjustment relative to the operating wheel of the machine, a casing mounted on said supporting member for rectilinear movement in a direction normal and radial to the periphery of the wheel, said casing having a work holding collet journaled thereon, means for rotating said collet with the work in engagement with the wheel, and means for actuating said casing for said sliding movement comprising a gear rotatably mounted on the casing and carried thereby, a pair of cams carried by the casing and secured to the gear for angular movement therewith, a gear driven by said collet rotating means and engageable with said first named gear to rotate the same, and an adjustable pin mounted on said supporting member and engageable with either of said cams, said pin being restrained from lateral movement whereby the cams and casing are periodically shifted when engaged by the former, said cams being of different shape whereby to selectively vary the period of engagement of the work with the wheel depending on which thereof is in engagement with the pin.

5. A work holding and feeding attachment for buffing and like machines, comprising a normally fixed supporting member, means for mounting said supporting member for vertical, lateral and angular adjustment relative to the operating wheel of the machine, a casing mounted on said supporting member for rectilinear movement in a direction normal and radial to the periphery of the wheel, said casing having a work holding collet journaled thereon, means for rotating said collet with the work in engagement with the wheel, and means for actuating said casing for said sliding movement comprising a gear rotatably mounted on the casing and carried thereby, a pair of cams carried by the casing and secured to the gear for angular movement therewith, a gear driven by said collet rotating means and engageable with said first named gear to rotate the same, and an adjustable pin mounted on said supporting member and engageable with either of said cams, said pin being restrained from lateral movement whereby the cams and casing are periodically shifted when engaged by the former, said cams being of different shape whereby to selectively vary the period of engagement of the work with the wheel depending on which thereof is in engagement with the pin.

6. A work holding and feeding attachment for buffing and like machines, comprising a normally fixed supporting member, means for mounting said supporting member for vertical, lateral and angular adjustment relative to the operating wheel of the machine, a slide mounted on said supporting member for rectilinear movement in a direction normal and radial to the periphery of the wheel, said slide having a work holding collet journaled thereon, means for rotating said collet with the work in engagement with the wheel, and means for actuating said slide for said sliding movement comprising a gear rotatably mounted on the slide and carried thereby, a cam secured to the gear for angular movement therewith, a gear driven by said collet rotating means and engageable with said first named gear to rotate the same, and an adjustable pin mounted on said supporting member and engageable with said cam, said pin being restrained from lateral movement whereby the cam and slide are periodically shifted when engaged by the former.

7. A work holding and feeding attachment for buffing and like machines, comprising a normally fixed supporting member, a slide mounted on said supporting member for rectilinear movement in a direction normal to the periphery of the wheel, said slide having a work holding collet rotatably mounted thereon, means for rotating said collet with the work in engagement with the wheel, and means for actuating said slide for said sliding movement and for holding work on the collet against the wheel for variable periods, comprising a gear rotatably mounted on the slide, a pair of cams secured to the gear for angular movement therein, a collet driving member on said slide having a gear thereon engageable with side gear to rotate the same, and an adjustable abutment member mounted on said supporting member and engageable with either of said cams for actuation thereby, said abutment member being restrained from lateral movement by said cams, whereby the cams and slide are periodically shifted by engagement of the cams with the abutment member, said cams being of different shape whereby to selectively vary the period of engagement of the work with the wheel.

8. A work holding and feeding attachment for buffing and like machines, comprising a normally fixed supporting member for said attachment, means for mounting said member for lateral, vertical, and angular adjustment, a casing having means engaging said supporting member for guiding the casing for lateral rectilinear sliding movement into and out of engagement with an operating wheel of said machine on a line normal and radial to the periphery of the wheel, a work holding collet rotatably mounted in said casing, means for rotating said collet, and means actuated by said last named means for imparting said lateral rectilinear movement to said casing, comprising a cam carried by the casing and rotatable therein, means for rotating said cam from said collet rotating means, and an abutment member supported by and laterally fixed relative to said supporting member, said member being engageable with said cam, whereby rotation of the latter causes rectilinear sliding movement of the casing and parts carried thereby relative to said abutment member and supporting member, and means actuated by said rectilinear movement imparting means for actuating said collet to work holding position, comprising a further relatively fixed cam in said casing, a follower carried by said casing and engageable with said last named cam, said follower moving relative to said last named cam during said rectilinear movement, and means engageable by said follower when the latter is actuated by said cam, said means being in thrust engagement with said

collet to actuate the latter, said rectilinear movement of the casing to which the plate cam is pivoted causing actuation of said follower, thrust means, and collet.

9. A work holding and feeding attachment for buffing and like machines, comprising a normally fixed supporting member for said attachment, a slide member having means engaging said supporting member for guiding the same for lateral rectilinear sliding movement into and out of engagement with an operating wheel of said machine on a line normal and radial to the periphery of the wheel, a work holding collet rotatably mounted on said slide member, means for rotating said collet, and means actuated by said last named means for imparting said lateral rectilinear movement to said slide member, comprising a cam carried by the slide member and rotatable thereon, means for rotating said cam from said collet rotating means, and an abutment member supported by and laterally fixed relative to said supporting member, said member being engageable with said cam, whereby rotation of the latter causes rectilinear sliding movement of the slide member and parts carried thereby relative to said abutment member and supporting member, and means actuated by said rectilinear movement imparting means for actuating said collet to work holding position.

10. A work holding and feeding attachment for buffing and like machines, comprising a normally fixed supporting member, a slide having means engaging said supporting member for guiding the same for sliding movement into and out of engagement with an operating wheel of said machine, a work holding collet rotatably mounted on said slide, means for rotating said collet, and means actuated by said collet rotating means for imparting said movement to said slide, and means actuated in response to said movement of the slide for actuating said collet to work holding position, comprising a relatively fixed cam pivoted on said slide, means for restraining said cam during said movement of the slide, a follower carried by said slide and engageable with said cam, said follower moving relative to said last named cam during said movement of the slide, and means engageable by said follower when the latter is actuated by said cam, said means being in thrust transmitting relation to said collet to actuate the latter, said movement of the slide to which the cam is pivoted causing actuation of said follower, thrust transmitting means and collet.

11. A work holding and feeding attachment for buffing and like machines, comprising a normally fixed supporting member, a slide having means engaging said supporting member for guiding the same for lateral rectilinear sliding movement into and out of engagement with an operating wheel of said machine on a line normal and radial to the periphery of the wheel, a work holding collet rotatably mounted on said slide, means for rotating said collet, and means actuated by said collet rotating means for imparting said lateral rectilinear movement to said slide, and means actuated in response to said rectilinear movement of the slide for actuating said collet to work holding position.

12. A work feeding device of the type described having a work holding chuck and adapted to feed work on the chuck into and out of engagement with an operating wheel, comprising a fixed support, a member mounted on said support for sliding movement in a rectilinear path toward and from the wheel, said sliding member having said chuck rotatably mounted therein, means on the sliding member for rotating the chuck at a plurality of speeds, means actuated by said chuck rotating means for intermittently actuating the sliding member to advance and retract the chuck relative to said wheel, and means actuated in response to said sliding movement for effecting actuation of said chuck to work clamping and work release position.

HERMAN WEBER.
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