July 2, 1935. A. KLOS 2,006,953

SHOE FINISHING MACHINE

Filed Aug. 3, 1933 5 Sheets-Sheet 1

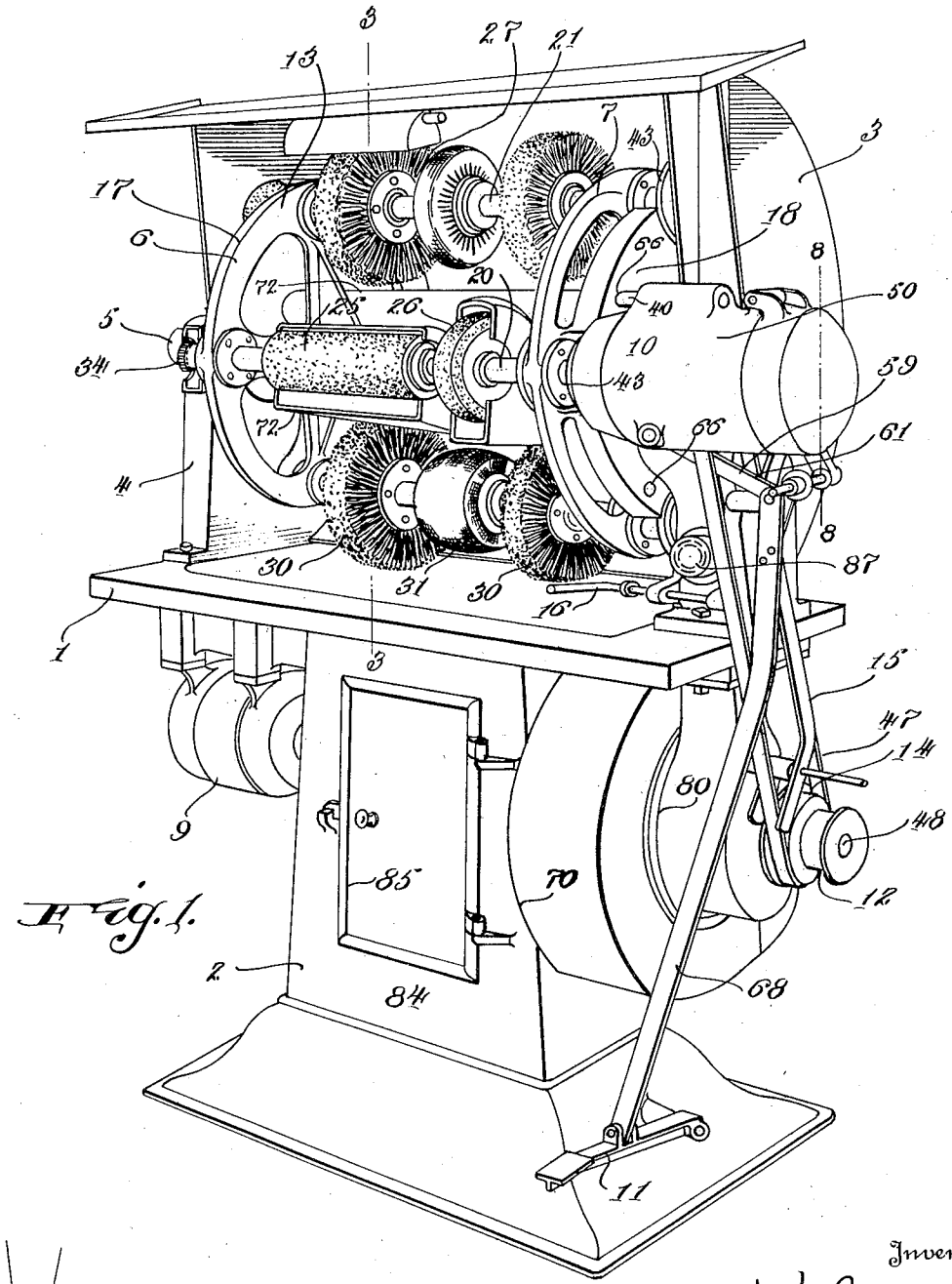


Fig. 1.

Witnesses

Inventor

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SHOE FINISHING MACHINE

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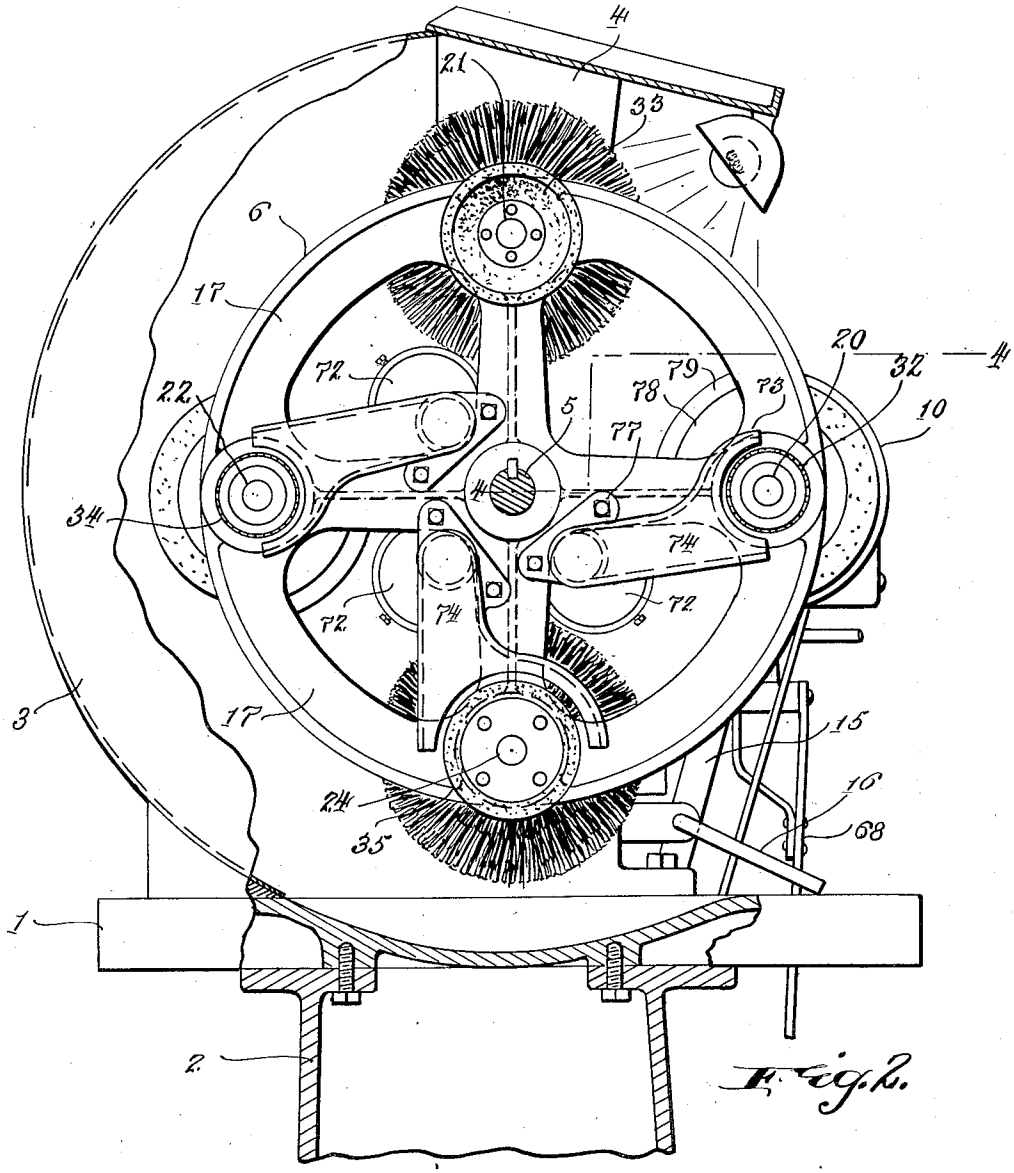


Fig. 2.

Witnesses

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SHOE FINISHING MACHINE

Filed Aug. 3, 1933 5 Sheets-Sheet 3

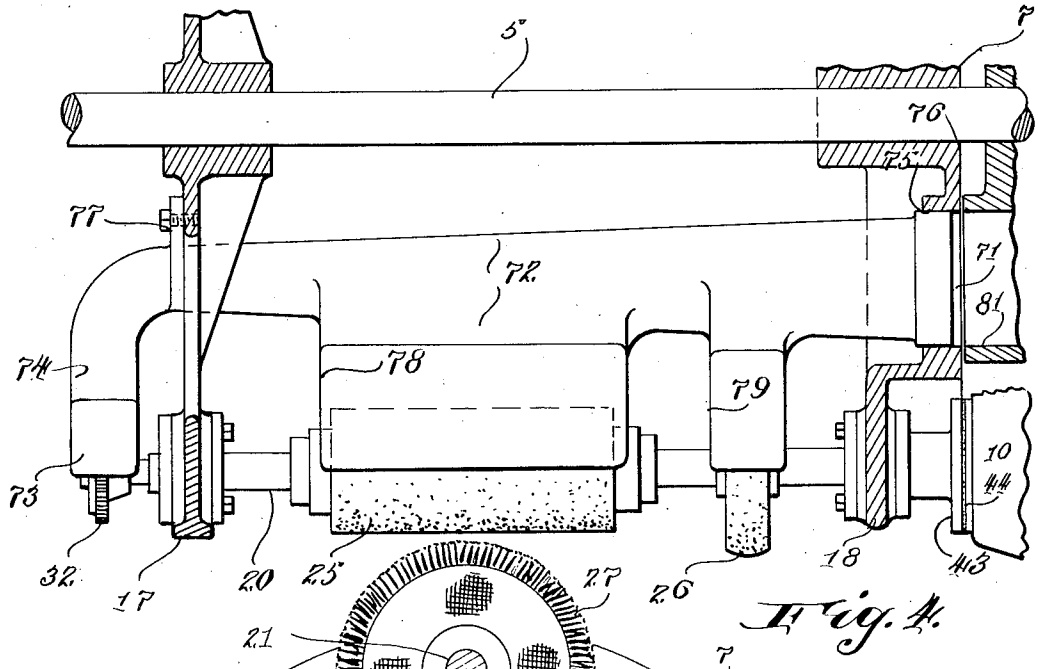


Fig. 4.

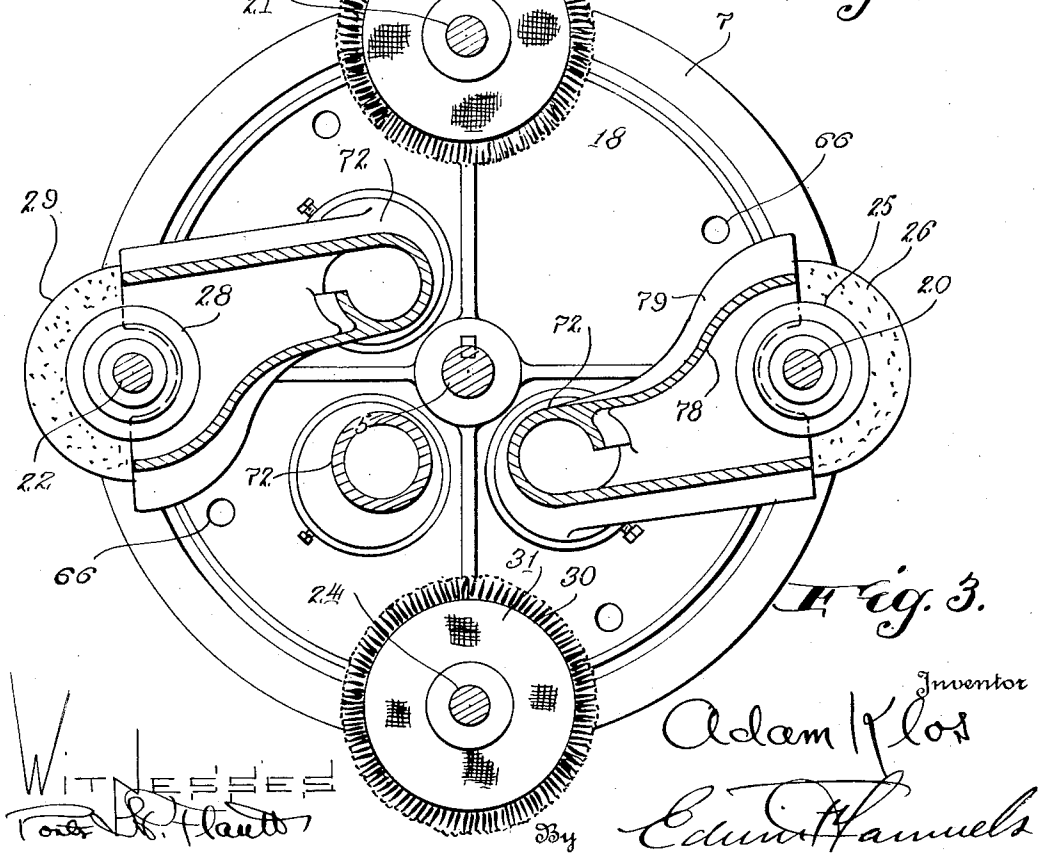


Fig. 3.

Witnesses

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SHOE FINISHING MACHINE

Filed Aug. 3, 1933 5 Sheets-Sheet 4

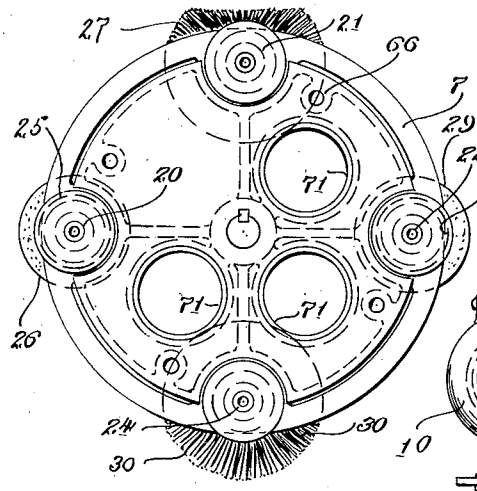


Fig. 5.

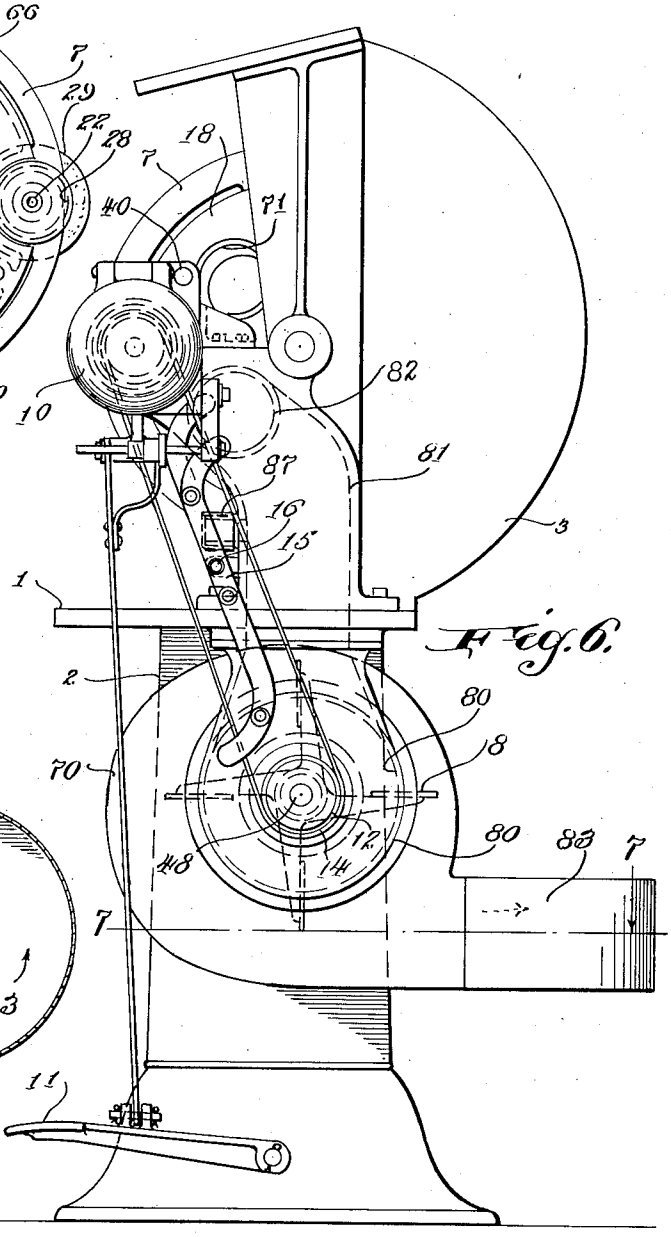


Fig. 6.

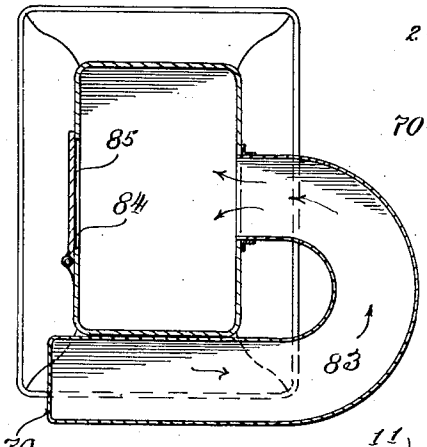


Fig. 7.

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Witnesses

[illegible]

July 2, 1935. A. KLOS 2,006,953

SHOE FINISHING MACHINE

Filed Aug. 3, 1933 5 Sheets-Sheet 5

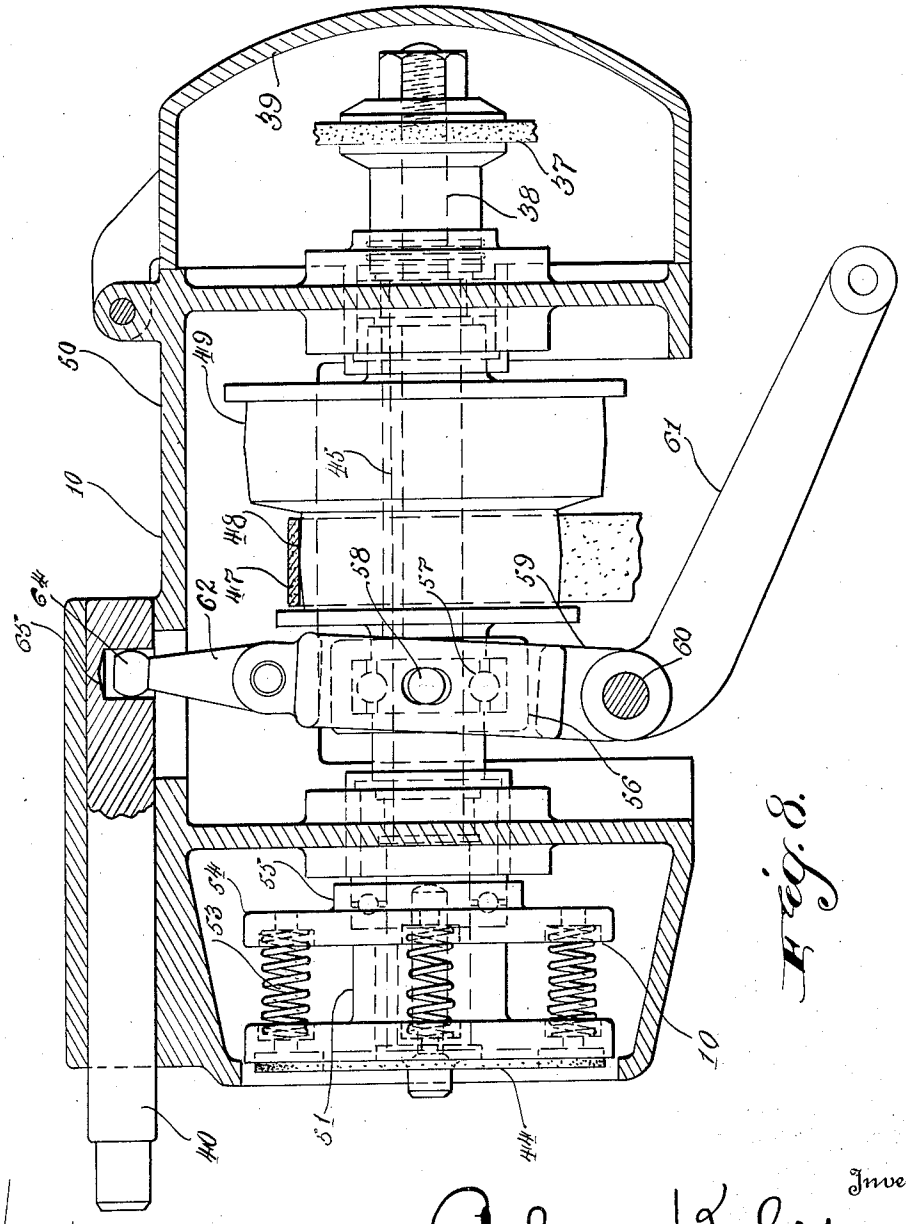


Fig. 8.

Witnesses:

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Patented July 2, 1935 2,006,953

UNITED STATES PATENT OFFICE

2,006,953

SHOE FINISHING MACHINE

Adam Klos, Baltimore, Md.

Application August 3, 1933, Serial No. 683,424

13 Claims. (Cl. 12—1)

The invention relates to a shoe finishing machine for grinding, buffing, brushing, edge finishing, etc., in which the various finishing agencies are grouped in such a way that they are accessible to the workman without requiring him to move from a single position in which it is convenient for him to work. The tools are mounted on a single planetary device or turret on which they are rotated to and from working position, moving in turn into operative position in front of the workman. In this position they are operatively driven in rotation, each tool in turn being preferably locked in operative position by a device which performs the locking operation simultaneously with the engagement of a clutch which drives the tool or tools to operate them at the will of the workman. In addition to the arrangement of the machine in this way, a feature of the machine of almost equal importance is a dust collecting device which cooperates with each tool in working position, providing a more efficient takeup or collection and withdrawal of the dust than has been accomplished in any machine of this general type whereby the diffusion through the atmosphere of the dust resulting from the grinding and similar operations which has been a very objectionable feature of this work has been completely eliminated.

In the accompanying drawings I have illustrated the machine of the invention in the preferred form.

In the drawings:

Figure 1 is a perspective view of the entire machine.

Figure 2 is a side view looking from the left in Figure 1, the right side of the frame and housing or hood being removed for convenience of illustration.

Figure 3 is a section on the line 3, 3 in Figure 1.

Figure 4 is a fragmentary horizontal section on the line 4, 4 in Figure 2.

Figure 5 is an end view of the turret looking from the right in Figure 1.

Figure 6 is an end elevation of the machine looking from the right in Figure 1.

Figure 7 is a horizontal section on the line 7, 7 in Figure 6.

Figure 8 is a vertical section on line 8, 8 in Figure 1 showing the clutch and the co-operating lock or bolt.

Referring to the drawings by numerals, each of which is used to indicate the same or similar parts in the different figures, the machine shown comprises a machine base 1, supported on an upright standard 2, on which is mounted a hood 3, including a bracket or frame member 4, on which the turret shaft 5 is supported in suitable bearings at both ends. The turret 6 carries the various rotary tools referred to. This turret may be rotated by hand by the workman who engages manually the hand ring 7, or in any suitable manner. The respective finishing tools are thus located by the workman in operative position as needed. The machine also includes a suction fan 8 and an electric motor 9 for driving the machine. This motor in the preferred form illustrated is mounted on the fan shaft or the fan is mounted on the motor shaft.

The machine is controlled, stopped and started and the selected tool on the turret is driven and the turret is held in the operative position of each tool or tool shaft in turn by means of a clutch unit 10 which in the form of the invention shown is controlled by a clutch pedal 11. This in the preferred form in addition to operating the clutch serves to shift simultaneously with the engagement of the clutch a bolt by which the clutch is driven. The construction also includes a change speed belt shifting device comprising low speed pulley 12 and high speed pulley 14, the belt being shifted in any suitable manner by hand or otherwise. A belt shifting lever and fork are shown at 15 operated by a hand controlled belt shifting belt rod 16.

More specifically described, the turret includes left hand head 17 and right hand head 18, on which are mounted shafts 20, 21, 22, 24. These shafts, in turn, carry respectively a sole surface grinder 25 and a buffer 26, brushes 27, grinder and buffer 28, 29 and brushes 30 and buffer 31 and other tools to be further described.

The turret shafts also carry outside the turret at the left in Figure 1, having reference to the shafts 20, 21, 22 and 24 in turn, the top lift trimmer 32, edge setter stone 33, sole trimmer 34 and heel breast wheel 35, the members 32, 33, 34 and 35 being preferably so arranged that they co-operate with the tools inside the turret on the same shaft in the sense that the tools placed on any single shaft are tools which the workman would be apt to use successively or nearly at the same time, as for instance, the sole trimmer 34, the grinder 25 and the buffer 26.

The machine also includes a grinding stone 37 mounted on a clutch shaft 38, Figure 8, from which stone the workman is protected by a hinged cover 39.

Referring again to the turret 6, this is rotated from the driven position of one shaft 20, 21, 22, or 24 in which position the tools thereon are rotated so that they can be used in the operative sense by the workman, to the next selected operative position, by rotating the turret in any suitable manner. In the form shown, the turret is rotated by manual engagement of the hand wheel 7. The turret is located in the operative position of each of the respective shafts just referred to by means of a bolt 40, see Figure 8, which in the preferred form illustrated is advanced simultaneously with the closing of the clutch 10 as hereinafter more fully described.

In the preferred form of the invention shown, each of the tool shafts 20, 21, 22, 24, carried by the turret is provided on its end next to the clutch 10 with a clutch disk or driven friction disk 43, see particularly Figures 1 and 4, to be engaged and driven by the driving disk 44, Figure 8, carried by the clutch shaft 45 and shifted longitudinally thereof, into and out of operative or engaging position at the will of the operator as aforesaid. The clutch shaft 45 and the clutch disk 44 thereon, which is keyed to the shaft to slide relatively thereto, are driven continuously from the motor shaft 48 which also carries the fan 8 by means of a belt 47 which is driven from the high speed pulley 14 or the lower speed pully 12 on the motor shaft, the change of speeds being optional with the operator. The pulleys 14 and 12 correspond to the high and low speed pulleys 48 and 49 on the clutch shaft which are driven by the belt 15 as aforesaid driving the clutch shaft and the tool which is in operative position at the high or low speed selected by the operator.

Referring particularly to the details of the clutch mechanism as shown in Figure 8, the clutch shaft 38 is mounted in suitable bearings in the clutch housing 50. This shaft carries the driving disk 44 on a sliding sleeve 51 keyed to the shaft and slidable along the shaft. A tendency on the part of the driving disk to advance to the left into engagement with the driven disk 43, which happens to be in operative position is imparted thereto by helical springs 53 compressed between the back of the disk 44 and the front of a second or spring abutment disk 54 mounted on a ball thrust bearing 55 rotated with the sleeve 51 and the disk 44. At the right hand end the sleeve 51 carries rotatively mounted thereon a collar 56 which cooperates with the sleeve and engages the same by way of a ball thrust bearing 57. This collar 56 is provided with trunnions 58 projecting laterally and engaging a clutch lever 59 pivotally mounted at 60 in the clutch housing and having an arm 61 which approaches in its position a line parallel to the clutch shaft 45, being adapted to swing downwardly therefrom in the operation of the mechanism to withdraw the disk 45 to disconnect the drive from the shaft 20, 21, 22 or 24, which happens to be in operative position, the clutch driving disk 44 being shown in Figure 8 in its withdrawn position in which it is released.

The clutch lever 59 may be described as of the bell crank type in that the throw of the operating arm 62 is at right angles to the throw of the actuating arm 61. The upper end of the operating arm 62 of lever 59 in the form of the invention shown is provided with a ball 64 which fits in a pocket or slot 65 in the sliding bolt 40 which engages selectively at the will of the operator any one of a series of holes 66, see Figure 5, in the adjacent surface of the right hand head 7 of the turret or planetary member 13. The actuating arm 61 of the clutch lever 9 is connected to the foot pedal 11 by means of a strap or connecting rod 68, see Figure 1, and in the operation of the machine the operator having first pressed the pedal and then rotated the turret to bring any particular tool, selected by him for use, into operative position, the pedal is then released and the springs 53 advance the driving disk 44 into engagement with the corresponding disk 43 on the shaft 20, 21, 22 or 24, which carries the tool to be used and the bolt 40 being advanced by the arm 62 of the lever 59 due to the action of the springs engages the corresponding positioning hole 66. It is necessary to rotate the turret until the corresponding hole registers with the bolt and positions the disk in exact alignment before the clutch can be engaged, giving an automatic positioning of the turret in operative relation to the clutch before the clutch can be engaged or the tool shaft operatively rotated.

The dust collecting system whereby diffusion of the dust from the buffing, grinding and brushing operations, is prevented, is an important feature of the machine. For this purpose a suction fan 8 is mounted on the motor shaft 48 in the fan housing or casing 70, see Figure 1.

Referring to Figure 5, it will be noted that the right hand turret head 7 is provided with a series of dust laden air openings 71 arranged around the axis of the head and spaced outwardly by an equal radius. These openings may be provided in any suitable manner, one for each tool shaft 20, 22, 24. The dust laden air opening corresponding to the shaft 21 is omitted because this is a brush shaft and comparatively little, if any dust is generated by the brushes, although suitable provision may be made for the takeup of the dust from the brushes if desired without departure from the principles of the invention or the teachings of this disclosure.

Referring now to Figure 4, it will be noted that there is a dust hood for each of the tools which is regarded as generating dust or sufficient dust to merit the provision of means for taking up the dust and discharging it to the outside. In Figure 4, there is shown one of three dust laden air ducts 72. This duct extends along the turret parallel to the axis spaced outwardly therefrom by a convenient distance, the duct being preferably located between the corresponding tool shaft 20 which is shown in this instance, and the turret shaft 5.

In the form of the invention shown the air duct 72 is of increasing tapering cross section from the left. At this point it is provided with a hood 73 enclosing the top lift trimmer 32, the end portion of the duct being offset radially at 74. The increasing taper extends to the right hand head 7 of the turret to which the duct is secured by a flange 75 which is bolted to a corresponding boss on the head 7 in which boss the corresponding one of the openings 71 already referred to is formed. At the left the small end, i. e. the duct 72 passes through the head 6 and joins the radial passage 74 carrying the hood 73 which is secured to the face of this head or disk by means of a flange 77, which is bolted or fastened in any suitable manner.

The tapered duct 72 carries the hoods or housing 78 enclosing the corresponding elements or

tools 25, and 79 enclosing the tool 26, and the other air ducts 72 of which there are three in all, in the form of the invention shown, carry hoods cooperating with finishing tools which require this provision or all of the tools or finishing elements may be thus provided with hoods.

Referring now to Figure 6, it will be noted that the fan housing 70 is provided with a suction chamber 80 preferably concentric therewith and surrounding the shaft 48. This vacuum chamber 80, see Figure 6, is connected at the top by a passage 81 to an opening 82 in the face of the turret head 7. The opening 82 and pipe 81 are stationary and the discharge openings 71 of the dust laden air ducts 72 which rotate with the turret, register in turn with this opening 82 in the operative positions of the head, i. e., the operative positions of the corresponding tools mounted on shafts 20, 22, 24. In this way a relatively high vacuum with an inward rush of air is established at the hoods 73, 78, 79, enclosing the various operative members or tools 32, 25, 26, etc., having reference to all the tools which are thus protected. This air draft picks up and carries all of the dust generated at the tools inwardly through the hoods to the duct 72 and downwardly to the vacuum chamber 80 whence it passes to the fan chamber 8, being ejected by the fan through the lateral passage 83. Figures 6 and 7, into a suitable chamber 84 in the base 2 whence it may be removed through the door 85 or carried downwardly into the basement or otherwise disposed of. The illustration also includes a nipple 87, see Figure 1, for the attachment of the hose of a vacuum cleaner or the like whereby any dust which accumulates in the system may be withdrawn and the brushes, etc., may be cleaned. The air is discharged from the base through a suitable separating screen which is not shown and which is no part of the invention.

The vacuum arrangement described is of considerable advantage as compared to other machines of the ordinary turret type having dust hoods and a vacuum system whereby the dust laden air is withdrawn through the turret shaft, as with the arrangement of the present invention the ducts 72 are of unlimited size and any desired taper is permitted whereby a uniform vacuum is maintained throughout the length of the duct as the capacity of the duct increases in proportion to the volume of air admitted. With the present apparatus an absolutely complete absence of dust from the workroom is maintained and the workmen and others entering the room are completely and fully protected from the dust laden air which is known to have exceedingly harmful effects.

I have thus described specifically and in detail a shoe finishing machine embodying the features of my invention in the preferred form, the description being specific and in detail, in order that the manner of constructing, applying, operating and using the same may be fully understood, however, the specific details herein are used descriptively rather than in a limiting sense, the scope of the invention being defined in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. The combination in a shoe finishing machine of a turret mounted to rotate on a horizontal axis, a plurality of finishing shafts thereon parallel to the axis, the tools to be used by the workman in operations which are close together in point of time being grouped together on a single shaft, each shaft having at one end a driven disk, a clutch member having a driving disk and a bolt for positioning the turret with each of the respective driven disks in registration with the clutch disk and with the finishing tools on the corresponding shaft in operative position, means for withdrawing the driving disk and the bolt simultaneously and means for advancing the same simultaneously, the bolt having cooperating means on the turret which it engages to position the turret, the driving disk moving at the same time into operative engagement with the driven disk on the shaft which is in operative position.

2. In a machine for finishing shoes, a turret having a series of finishing tool shafts thereon parallel to the axis, supports for the turret on which it is mounted to rotate, finishing tools on the shafts and in the turret and trimming tools on the shafts outside the turret, each shaft having driven engaging means at one end, a clutch having clutch driving means to cooperate with the driven means, and positioning means with cooperating means on the turret to position the turret with the respective finishing mechanisms selected by the operator in operative position with the driving means on said shaft in registration with the driving means on the clutch, means for advancing and withdrawing the positioning means and operating the clutch simultaneously at the will of the operator.

3. In a machine for finishing shoes, a turret having a series of finishing tool shafts, finishing tools thereon, the tool shafts being parallel to the axis of the turret and adapted to move as the turret is rotated bringing the respective tool shafts in turn to operative position, supports for the turret on which it is mounted to rotate, each tool shaft having driven engaging means at one end, a clutch having driving engaging means to co-operate with the driven means and positioning means with co-operating means on the turret to position the turret with the respective finishing tool shafts and the finishing mechanisms selected by the operator in operative position and the driven engaging means on each said shaft in registration with the driving means on the clutch in each operative position and means for advancing and withdrawing the positioning means and operating the clutch simultaneously at the will of the operator.

4. In a machine of the type described a turret mounted to rotate and having a series of finishing tool shafts carried by the turret and arranged about the turret parallel to the axis and rotatively mounted thereon to move to a series of operative positions corresponding respectively to each shaft, air ducts mounted on the turret extending in the general direction of its axis and spaced outwardly therefrom to rotate with the turret about its axis, dust take-up means, each co-operating with one of the respective finishing tools and connected to the said air duct, a motor for driving the machine, exhaust means having a vacuum passage open at one end, the turret having an opening connected to each said air duct and the vacuum passage having an opening registering with the air openings in the turret in the respective operative positions of the machine, and means for positioning the turret in a plurality of angular positions in each of which one of the shafts with the tools thereon is in operative position with

the corresponding duct in registration with the vacuum passage and means for driving each respective tool shaft in its operative position.

5. In a machine of the type described a turret mounted to rotate and having a series of tool shafts arranged about the turret parallel to the axis and rotatively mounted thereon to move to a series of operative positions corresponding to the respective shafts, air conducting means mounted eccentrically on the turret and spaced outwardly from the axis to rotate with the turret about its axis and extending in the general direction of said shafts, dust takeup means co-operating with the respective finishing tools and connected to the said air conducting means, air exhaust means having a vacuum passage, the turret having discharge means connected to said air conducting means and the vacuum passage having means registering with the discharge means of the turret in the respective operative positions of the turret and tools, and means for driving each respective tool shaft in its operative position.

6. In a machine of the type described a turret mounted to rotate and having a series of tool shafts arranged about the turret parallel to the axis and rotatively mounted thereon to move to a series of operative positions corresponding to the respective shafts, air conducting means mounted eccentrically on the turret and extending in the general direction of said shafts, dust takeup means co-operating with the respective finishing tools and connected to the said air conducting means, air exhaust means having a vacuum passage, the turret having discharge means connected to said air conducting means and the vacuum passage having means registering with the discharge means of the turret in the respective operative positions of the turret and tools, and means for driving each respective tool shaft in its operative position, the air conducting means being of increasing cross-section in the direction of the discharge, the dust takeup means being connected thereto in correspondence with its increasing capacity.

7. In a machine of the type described a turret mounted to rotate and having a series of finishing tool shafts arranged about the turret to move to their respective operative positions as the turret is rotated, said tool shafts being parallel to the axis and rotatively mounted thereon, air ducts eccentrically mounted on the turret extending in the general direction of said shafts, dust takeup means co-operating with the respective finishing tools and connected to a corresponding air duct, a motor for driving the machine, air exhaust means having a vacuum passage, the turret having an opening for said air ducts and the vacuum passage having an opening registering with the air opening of the turret in the operative positions of the machine, and means for positioning the turret and driving each respective tool shaft in its operative position, the vacuum passage having a nipple for the connection of an auxiliary suction device to clear the system of dust in case of clogging or accumulation.

8. In a machine of the type described a turret mounted to rotate and having a series of finishing tool shafts arranged about the turret parallel to the axis and rotatively mounted thereon to move by rotation of the turret to a series of operative positions, one corresponding to each shaft, separate air ducts mounted on the turret eccentrically thereof and extending in the general direction of said shafts, dust takeup means co-operating with the respective finishing tools and connected to the said air ducts, means for driving the machine, exhaust means having a vacuum passage, the turret having openings in its outer face connected to each said air duct and the vacuum passage having an opening registering with the air openings of the turret in the respective operative positions of the machine, and means for positioning and driving each respective tool shaft in its operative position, the air ducts being of increasing cross section in the direction of exhaust to provide capacity for the air taken up by the respective hoods of which a plurality are connected to some of the respective ducts, there being a corresponding number of finishing tools on the respective shafts.

9. In a shoe finishing machine, a turret mounted to rotate at the will of the operator, a plurality of finishing tool shafts mounted thereon parallel to the axis, some of the respective shafts being provided with a plurality of tools, means for positioning the turret in a series of angular positions in each of which one of the respective tool shafts with the tools thereon is in operative position, driving means for each shaft in operative position, means for taking up the dust laden air from some of the tools comprising an air duct carried by the turret and eccentrically located as to the same, vacuum creating means and a vacuum passage with an opening, the air duct having an opening to register with said vacuum passage, in the operative position of the tools, said opening being eccentrically located as to the turret and a plurality of hoods, each co-operating with one of the respective tools and connected to the air duct.

10. In a shoe finishing machine, a turret mounted to rotate at the will of the operator, a plurality of finishing tool shafts mounted thereon parallel to the axis, some of the respective shafts being provided with a plurality of tools, means for positioning the turret in a series of angular positions in each of which one of the respective tool shafts with the tools thereon is in operative position, driving means for each shaft in operative position, means for taking up the dust laden air from some of the tools comprising an air duct carried by the turret and eccentrically located as to the same, vacuum creating means and a vacuum passage with an opening, the air duct having an opening to register with said vacuum passage, in the operative position of the tools said opening being eccentrically located as to the turret and a plurality of hoods, each co-operating with one of the respective tools and connected to the air duct, the duct being of increasing cross-section in the direction of discharge.

11. In a machine for finishing shoes having a turret, a series of shafts arranged about the turret parallel to the axis of the turret which is mounted to rotate to place the tool shafts in turn in operative position, each tool shaft having clutch means at one end, a clutch mechanism and positioning means, a control for operating the same simultaneously, said positioning means being adapted to hold the respective tool shafts with the tools thereon in operative position, driving means connected to the clutch, a belt therefor, change speed pulleys on the clutch mechanism and on the drive shaft, and

means for shifting the belt from one speed to the other.

12. In a machine of the type described, a rotary turret, tool shafts with shoe finishing tools thereon rotatively mounted on the turret, each shaft having driven engaging means, stationary driving means and positioning means for the turret and a single control for the driving means and positioning means, the turret having cooperating positioning means whereby the turret is held in a series of operative positions corresponding to the tools on the respective shafts in which position the corresponding driven engaging means is in operative relation with the driving means and driven thereby, an air duct on the turret eccentrically located, hoods connected thereto and enclosing the tools, the turret having an opening connected to the duct and moving with the turret and a stationary exhaust passage having an opening with which the duct opening registers in the operative positions of the tools and the turret.

13. In a machine of the type described, a rotary turret, tool shafts thereon and means for driving the tools and positioning the turret in the various operative positions of the respective tools, an air duct on the turret eccentrically located as to the turret axis to move with the turret as it rotates, hoods connected to the duct and enclosing the tools, the duct having an opening, and a stationary exhaust passage having an opening registering with the duct opening in the operative position of the tools and the turret.

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