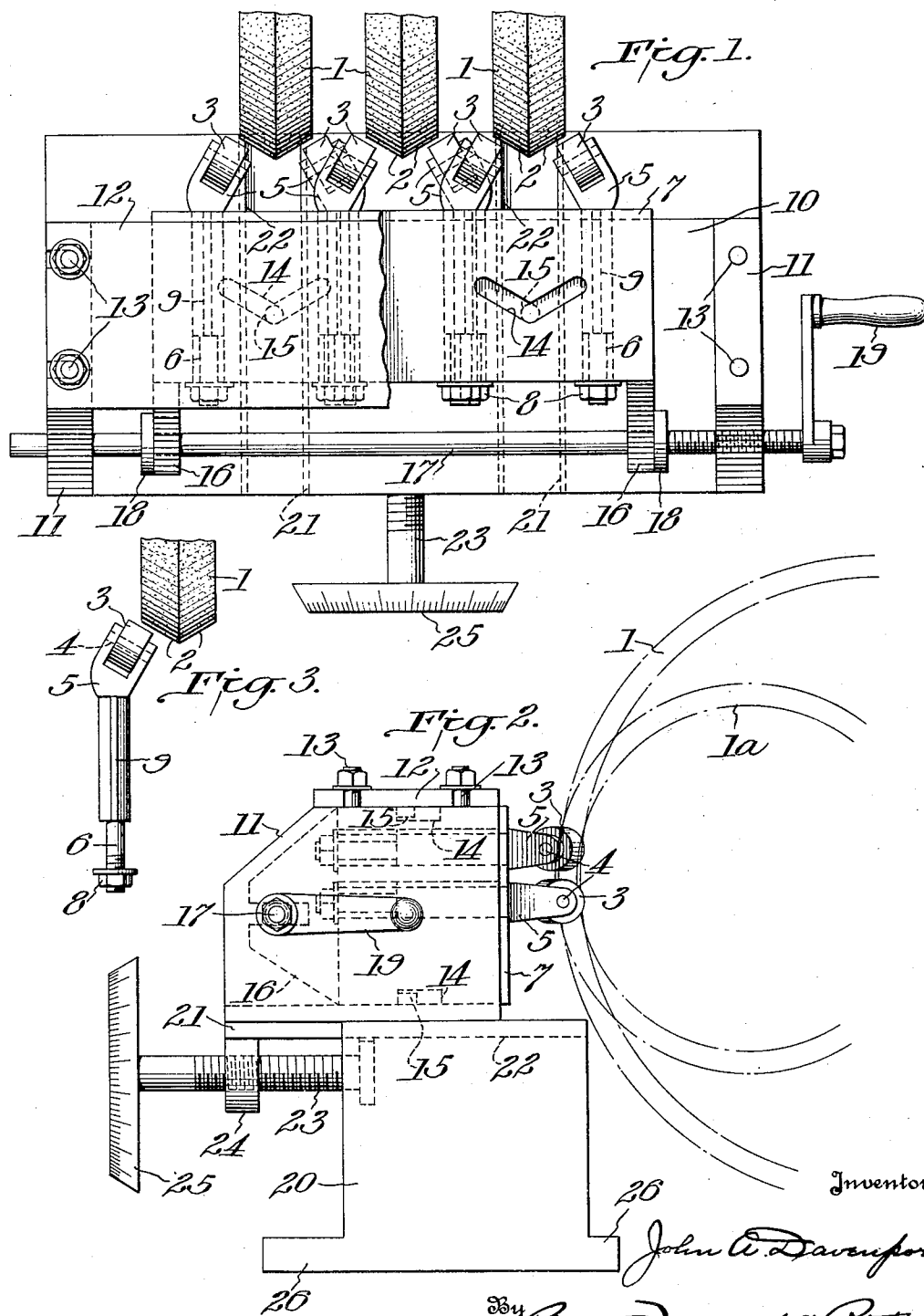


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J. A. DAVENPORT
GRINDING WHEEL DRESSER

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GRINDING WHEEL DRESSER

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This invention relates to a machine, or an attachment for use with a grinding machine, for trueing or dressing grinding wheels. The dressing machine or attachment is generally applicable to grinding machines employing one or more grinding wheels in the form of combinations of frustrums of right cones, or of frustrums of cones and cylinders.

As will be apparent from the following specification, the invention may be employed for dressing a single grinding wheel, but it is particularly useful in the dressing of grinding wheels set in gangs. In trueing grinding wheels set in gangs, it is difficult to finish the active faces of all units exactly to the desired shape and the proper relative position with respect to each other and to the work when a single dressing tool is moved successively into engagement with the several grinding surfaces.

An object of the invention is to provide a dressing machine which includes a separate dressing wheel for each of the active grinding surfaces of one or more grinding wheels. A further object is to provide a dressing machine in which a plurality of dressers are carried by a single holder block which slides upon a fixed base, guiding elements being provided for constraining the holder block to move along such a path that the dressers are all properly presented to and moved along the respective grinding surfaces which are to be trued. More particularly, an object is to provide a machine of the type stated in which the separate dressers, the holder, base and guiding elements are of a simple and rugged construction which facilitates the quick removal and the replacement, in proper position, of any of the parts. Another specific object of the invention is to provide a simple and rugged machine for simultaneously dressing to identical form and size, a plurality of grinding wheels mounted upon a common or upon parallel shafts.

These and other objects of the invention will be apparent from the following specification when taken with the accompanying drawing, in which

Fig. 1 is a plan view of a dressing ma-

chine in position adjacent a gang of grinding wheels,

Fig. 2 is an end elevation of the same, and

Fig. 3 is a fragmentary plan view of a single dresser wheel and its holder.

For clearness of illustration, the dressers are shown out of contact with the grinding wheels in each of the views.

In the drawing, the reference numerals 1 identify grinding wheels having the form of double frustrums of cones, the conical surfaces 2 constituting the active or grinding surfaces of the wheels. A separate dresser 3 is provided for each grinding surface 2, each dresser comprising a set of toothed, hardened steel cutters of cylindrical form or grinding wheels of cylindrical form. For each grinding surface 2, the dresser wheel 3 is mounted on a pin 4 that is carried by a holder 5 that terminates in a threaded shank 6.

The several holders are secured in a holder block 7 by nuts 8 on the ends of the threaded sections 6, and the holders have keys 9 which enter corresponding grooves, not shown, in holder block 7 to prevent rotation of the holders in the block.

The holder block 7 slides upon a frame or bed plate 10 which has side frame members 11 to which a retainer plate 12 is secured by bolts and nuts 13, the retainer plate engaging the upper face of the holder block 7. Both the upper and lower faces of the block 7 are provided with a pair of V-shaped guide slots 14, the axes of the branches of the slots being parallel to the respective grinding faces 2 of the series of identical grinding wheels 1. Pins 15 project into the several slots from the adjacent faces of the bed plate 10 and retainer plate 12, whereby the application to the holder block 7 of a force tending to move the same across the series of grinding wheels constrains the holder block to travel along a path having branches parallel to the grinding surfaces.

Notched arms 16 extend from the rear face of the holder block 7 and a rod 17 extends through the notch in the arms 16 and carries abutments 18 that bear against the outer faces of the arms. The rod 17 is threaded in one side frame member 11 and slides in the other

member, a handle 19 being provided for rotating the rod to move the holder frame across the grinding wheels.

The bed plate 10 is slidably mounted upon the base 20 for movement in a direction normal to the axis of the shaft carrying the grinding wheels, and is constrained to such path of movement by keys 21 which project into grooves 22 in the base 20. A threaded screw 23 is rotatably mounted on the base 20 and extends through a depending lug 24 on the bed plate 10 for moving the bed plate and thereby the dressers toward and from the grinding wheels. The outer end of the screw preferably carries a large index or micrometer dial 25 for use in setting the bed plate to the desired position.

The base 20 is provided with flanges 26 for securing the apparatus to the bed of a grinding machine at the side opposite that occupied by the work piece, or for clamping the apparatus to the grinding machine in place of the work holder during the dressing operation when it is not convenient to make the dressing apparatus a permanent part of the grinding machine.

As indicated in Fig. 2, by the broken line representations of two grinding wheels 1 and 1^a of different diameters, the dressing apparatus will operate effectively upon the grinding wheels from the time of the installation of new wheels until the grinding wheels are worn down so far as to necessitate replacement. The placing of the dresser wheels at different elevations, see Fig. 2, permits a more compact and rugged construction than would be possible if all of the wheel holders 5 were at the same level.

The dressing operation is effected by first adjusting the micrometer dial 25 to place the bed plate 10 at the proper distance from the axes of the grinding wheels, and then rotating the handle 19 to move the holder block across the set of grinding wheels. As the holder block is translated by the rod 17, the transverse movement resulting from the guiding action of slots 14 and pins 15 is permitted by the grooves in the arms 16 on the holder block. The holder block thus carries each series of dressers in a path parallel to the adjacent grinding surfaces, the dressing of all grinding surfaces at the right side of the wheels taking place alternately with the dressing of surfaces at the left of all of the grinding wheels.

Attention is directed to the fact that the machine may be quickly taken apart to substitute other parts if one proves defective, or to adapt the machine for the dressing of other forms or arrangements of grinding wheels. By replacing the holder block by another having grooves of different shape, the machine may be altered to function properly when another set of grinding wheels is substituted on the grinder, or to dress the

wheels on another grinder when the dresser is to be employed with a plurality of grinders. Similarly, a block having another spacing of the sockets for receiving the individual dresser holders may be substituted if the axial spacing of the grinding wheels is to be changed. When the dressing machine is a permanent part of the grinding machine, the wheels may be dressed without interrupting the grinding operations, or the dresser may be taken apart for inspection or repair while the grinder remains in operation.

It is therefore apparent that the invention is not limited to the particular embodiment hereindescribed as many changes which may be made in the several parts, their relative size, shape and location fall within the spirit of my invention as set forth in the following claims. The gauged grinding wheels may be of frusto-conical form, as shown in the drawing, or may include cylindrical and/or radial as well as conical grinding surfaces. In the case of combinations including radial grinding surfaces, the axis of the translating feed screw must lie at such angle to the axis of the grinding wheels that the guide pins will move along those branches of the guide slots which lie normal to the axis of the grinding wheels.

I claim:

1. In a grinding wheel dressing machine adapted to dress a grinding wheel having a plurality of faces, a dresser for each grinding wheel face, a movable holder block adapted to support said dressers against relative movement, and guide means for said holder block to constrain the same to a path of movement effective to guide each dresser over its corresponding grinding wheel face.

2. In a grinding wheel dressing machine adapted to dress a grinding wheel having a plurality of faces, a dresser for each grinding wheel face, a holder block adapted to support said dressers, a plate on which said block slides, a slot in said holder block having the same contour as the grinding wheel, and a pin associated with said slot and fixed to said plate, whereby movement of the holder block in one direction causes the pin to ride in said slot to guide the dressers consecutively from face to face of the grinding wheel.

3. In a grinding wheel dressing machine adapted to dress a grinding wheel having a plurality of faces, a dresser for each grinding wheel face, a holder block adapted to support said dressers, a plate on which said block is movably supported, a slot in said holder block having the same contour as the grinding wheel, a pin associated with said slot and fixed to said plate, and means to move said holder block across the grinding wheel.

4. The device as set forth in claim 3, in combination with means for adjusting the

said plate perpendicular to the axis of the grinder.

5 5. In a machine for dressing a plurality of grinding wheels, all of said wheels having identical profiles and each of said wheels having active grinding portions constituted by at least two different surfaces of revolution; a cylindrical dresser for each of said conical surfaces, a holder supporting each
10 dresser for rotation with its axis parallel to the line of contact between the dresser and its associated grinding wheel, a holder block in which all of said holders are rigidly fixed, a bed plate slidably supporting said holder
15 block, and means for moving said block upon said plate to carry each dresser across the face of its associated grinding wheel.

6. The invention as set forth in claim 5, wherein said means for moving said block
20 comprises means for imparting to said block a force tending to move the same parallel to the axes of said grinding wheels, and guide means constraining said block to move parallel to the axes of said cylindrical
25 dressers.

7. The invention as set forth in claim 5, in combination with a base supporting said bed plate, and means for adjusting said bed plate towards and from the grinding wheels.

30 8. The invention as set forth in claim 5, wherein the holders for the dressers cooperating with one set of grinding surfaces are mounted on said holder block in a line parallel to the axes of the grinding wheels, and
35 the holders for another set of dressers are mounted in line parallel to but spaced from the line of said first holders.

9. In a machine for dressing a plurality of grinding wheels of identical shape and
40 each of which has the form of a double frusto-conical body; a cylindrical dresser for each conical grinding surface, a holder for each dresser and upon which the dresser is mounted for rotation with its axis parallel
45 to the line of contact between the dresser and its associated grinding wheel, a base, and means rigidly supporting said holders upon said base for movement to carry the respective dressers in lines parallel to their respective axes while the said dressers engage their
50 associated grinding wheels.

10. The invention as set forth in claim 9 wherein the holders for the dressers cooperating with one set of frusto-conical grinding
55 surfaces are mounted on said holder block in a line parallel to the axes of the grinding wheels, and the remaining holders are mounted in line parallel to but spaced from the line of said first holders.

60 11. The invention as set forth in claim 9, wherein said supporting means comprises a bed plate carried by said base and supporting said holder block, means for sliding said holder block upon said bed plate, and guide
65 means constraining said holder block to

move in a path having branches parallel to lines of contact between said dressers and said grinding wheels.

12. The invention as set forth in claim 9, wherein said supporting means comprises a
70 bed plate carried by said base and supporting said holder block, means for sliding said holder block upon said bed plate, a slot in said holder block conforming to the contour of the grinding surfaces of said grinding
75 wheels, and a pin fixed to said bed plate and entering the said slot.

In testimony whereof, I affix my signature.

JOHN ADRIAN DAVENPORT.

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