

O. A. SCHMIDT.
MACHINE FOR GRINDING ROLLERS.
APPLICATION FILED DEC. 27, 1910.

1,002,765.

Patented Sept. 5, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

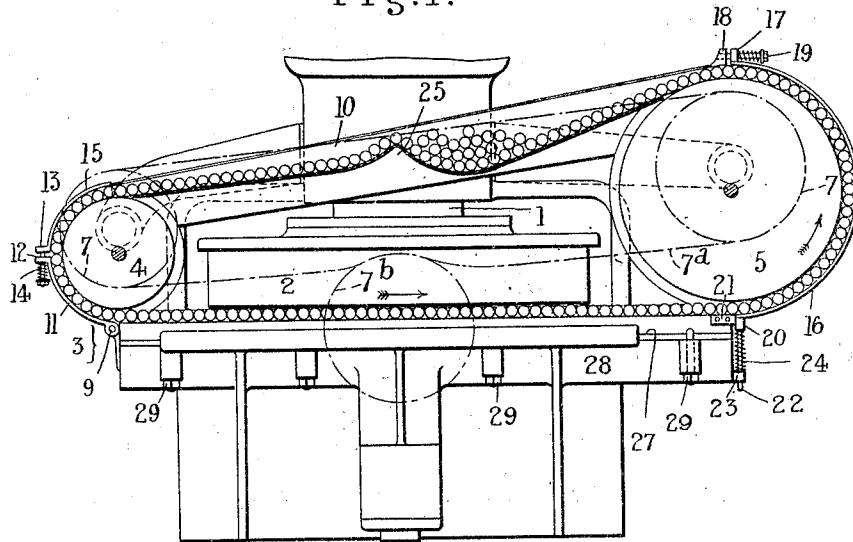
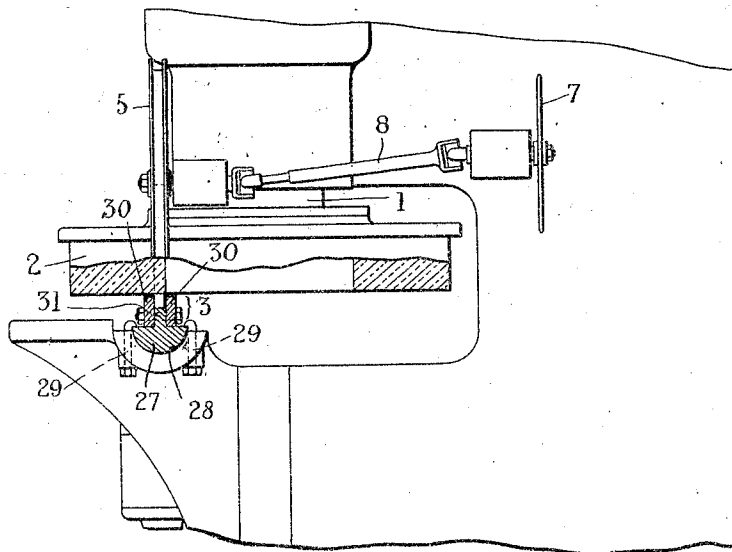


Fig. 2.



WITNESSES

Edward W. Hays
J. S. Ginnata

INVENTOR.

Otto Alois Schmidt
W. H. Williams, John V. Witherspoon
attorneys

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2 SHEETS—SHEET 2.

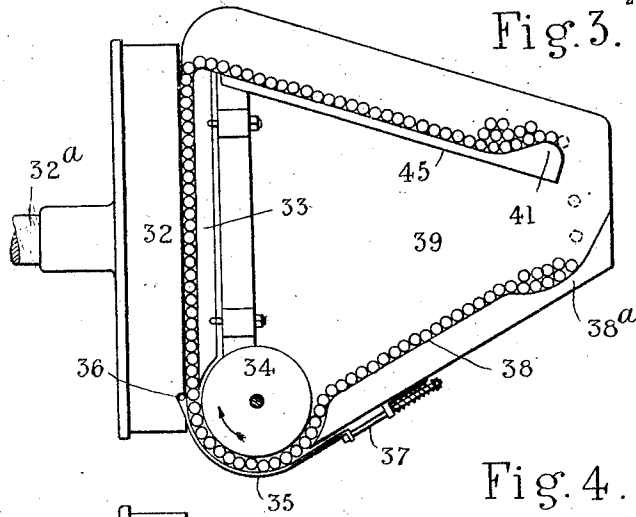


Fig. 4.

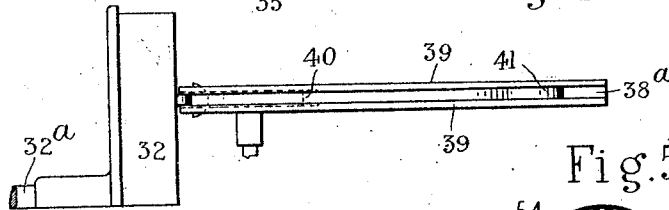


Fig. 5.

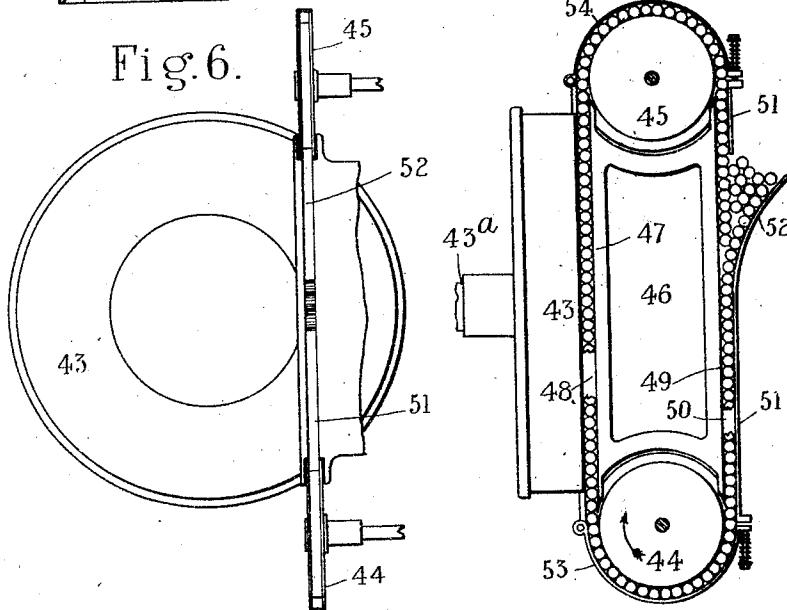


Fig. 6.

WITNESSES.
James M. [illegible]
J. S. [illegible]

INVENTOR.
Otto Alvin Schmidt.
By William J. [illegible] his attorney

UNITED STATES PATENT OFFICE.

OTTO ALWIN SCHMIDT, OF CHELMSFORD, ENGLAND, ASSIGNOR TO THE HOFFMANN MANUFACTURING COMPANY LIMITED, OF LONDON, ENGLAND.

MACHINE FOR GRINDING ROLLERS.

1,002,765.

Specification of Letters Patent.

Patented Sept. 5, 1911.

Application filed December 27, 1910. Serial No. 599,373.

To all whom it may concern:

Be it known that I, OTTO ALWIN SCHMIDT, a subject of the German Emperor, and a resident of Chelmsford, in the county of Essex, England, have invented a certain new and useful Improvement in Machines for Grinding Rollers, of which the following is a specification.

This invention relates to improvements in machines for grinding rollers and in part to such as that described in the specification to an application for Letters Patent filed 4th January, 1910, under Serial No. 536259, in which the rollers have a traveling rolling movement in a guiding device which comprises as a part of it a groove in a straight holder guiding device the exposed cylindrical surfaces of such rollers being while in such groove acted upon by a grinding or abrading disk with which such groove preferably forms the chord of an arc.

The object of the present invention is to improve the construction and to render the machine more efficient.

According to the invention the rollers moving successively through a groove or grooves of such a guiding device in a grinding machine are mixed in a hopper or device, preferably while they are passed or carried by a transferring device so that their relative positions to one another are changed (as is done in a certain ball grinding machine), after which they are again passed or carried back to the same groove or grooves of the guiding device or to different ones as desired, or they may be passed or carried from the exit end of one straight groove or chord to the entrance end of the next (which may be another grinding device or machine if desired) and so on by a suitable channel or channels.

Further according to the invention the rollers are positively propelled in the transferring device, and they are also presented to the grinding member by a guiding device which is adjusted for the purpose of presenting them evenly to the face of the grinding machine.

It is preferred, though it is not essential, where the hopper is employed, to positively carry or propel the rollers preferably after they leave the exit end of the groove or grooves until they reach the hopper (or in addition through the latter) and to subsequently carry or propel them from the hop-

per to the entrance end of the groove or grooves to which they are to be directed, or the rollers could be propelled by a driven disk or member forming a support and a part of the guide as we have previously proposed.

One manner of carrying a part of the invention into effect is to place a driven grooved wheel or wheels at one or both ends of the holder groove or grooves, the wheel or wheels being suitably cased or covered for a part of the way around, to form an inclosed channel in which the rollers may be held in the same position in which they are in the holder groove or grooves, the wheels where two are employed being arranged at either end of the holder groove or grooves and with the hopper between, and preferably elevated above same, so that on leaving a point on one wheel the rollers fall into the hopper and in the case of the other wheel where employed the accumulation of rollers gradually forces them into the grip of same by which they are passed to the entrance end of the groove or grooves. To attain this end the hopper is practically of the same width as the groove or grooves and is preferably inclined from one wheel to the other if the second one is employed or is inclined toward one end so as to assist the rollers in moving (if they are not driven through the hopper) and it is also preferably provided with a ridge or weir rising from the bottom of same at some suitable point so that a pocket is formed, at least on one side, to hold an accumulation of rollers and to afford them the opportunity of mixing with those coming from the delivery wheel, while the ridge or weir checks their movement somewhat and relieves the wheel at the exit end if employed, of a part of their weight.

The gripping of the rollers by the wheel or wheels can be done in various ways as, for instance, by a flexible steel band covering that portion of the wheel in which it is desired to grip the rollers.

In the construction above described the axis of the grinding disk or member is preferably vertical so that the holder is horizontal, but the reverse arrangement may be employed, the grinding member or disk having a horizontal axis. In this latter case the holder groove or grooves might be in a more or less vertical position, the traveling rolling movement imparted to the rollers

by the grinding disk or member driving them upward and discharging them into the hopper in which they would be mixed and discharged by gravity to the entrance end of the holder groove or grooves. If the traveling rolling movement in the holder groove or grooves were downward some mechanical device as above described would be required to elevate the rollers to the hopper or in either case a grooved wheel or wheels might be employed to assist the movement of the rollers. The holder may be further so carried as to be adjustable so that it can present the desired faces of the roller evenly to the grinding disk or member. Such adjustment may be obtained in various ways.

Some examples of the above and other features of the invention are shown in the accompanying drawings in which:—

Figure 1 is a front elevation partly in section of one form of the apparatus in which the grinding member or disk has a vertical axis. Fig. 2 is an end elevation of same also partly in section and with a part removed. Fig. 3 is a diagrammatic elevation showing another form in which the grinding member or disk has a horizontal axis. Fig. 4 is a plan of a part of Fig. 3. Fig. 5 is a diagrammatic side elevation showing a further form in which the grinding disk has a horizontal axis, and Fig. 6 is a front elevation of Fig. 5.

In the form shown in Figs. 1 and 2 the shaft or axis 1 of the grinding disk or member 2 is vertical the latter being in this case mounted above a single groove or roller holder designated generally by 3 and at each end of such groove is placed a grooved wheel 4, 5 respectively suitably driven such as by sprocket wheels 7 and universal shafts 8 (Fig. 2) one only of the latter being indicated, the wheels 7 being preferably connected by a chain 7^a which is in turn suitably driven as by a sprocket wheel 7^b.

The grooves in the wheels 4, 5 are covered in for a portion of the way around their circumference as shown, the cover of the wheel 4 being a curved plate 11 over the groove pivoted at one end to the grooved holder 3 at 9 and at the other end attached to a hopper 10 which connects the wheels 4 and 5 above the grinding disk 2.

The connection of the wheel cover 11 with the hopper is preferably a spring one such as by the flanges 12, 13, and spring surrounded screw bolt 14 so that an adjustment is provided which will enable the rotating wheel 4 to grip and propel the rollers.

The flange 13 may form part of a cover for the hopper either fixed or removable, or as shown in the drawing it may be carried only by a shield 15 at the end of the hopper, the main portion of the hopper being open.

The cover 16 of the wheel 5 has at one end

a flange 17 connected to a flange 18 on the end of the hopper by a spring screw bolt 19 and at the other end it has a spindle 22 movable in an eye 20 of a strap 21 attached to the holder 3 said spindle carrying a spring 24 and passing through an eye 23 on the holder 3. In this way the contact of the cover 16 over all the rollers can be regulated and an inclosed channel in which the rollers are propelled is formed partly around each wheel. There are other ways however, of effecting the gripping of the rollers as for instance, by adjusting the wheel itself to exert greater or less pressure or using other forms of spring covers, or by suitably forming or covering the surface of same.

The hopper guiding device and grooved holder including the wheels throughout are so formed by means of their side plates and bottom plates, that the rollers are a fairly close fit in same and are consequently maintained at right angles to their line of travel or rolling movement.

If the wheel 5 is rotated in the direction of the arrow, the rollers will be driven around one half the circumference of same and discharged into the hopper 10 which in the form shown is inclined toward one end so as to assist the rollers in moving (if they are not positively driven through the hopper). Such hopper is also provided with a ridge or weir 25 rising from the bottom of same so that a pocket is formed on one side to hold an accumulation of rollers and to afford them the opportunity of mixing with those coming from the delivery side of the wheel, while the ridge checks their movement somewhat and relieves the wheel at the exit end if employed of a part of their weight.

The grooved holder 3 is preferably so carried as to be adjustable so that it can present the cylindrical faces of the rollers evenly to the grinding disk or member. Such adjustment may be obtained in various ways, for instance, the grooved holder can be carried by a block 27 having a curved base which seats in a correspondingly curved recess or seat 28 in the frame, bolts 29, 29 being employed as a means for holding the block in position and adjusting it laterally by tilting it in its seat 28.

The groove in the holder may be conveniently formed by clamping plates or bars 30 on each side of a central rib 31 forming part of the block such rib forming the bottom of the groove while the plates or bars form the sides of the grooves. This is a convenient arrangement as the plates can be readily removed and refaced when required.

The construction of grooved holder as hereinbefore described is useful also in the case of a grinding disk having a horizontal

axis but in the latter case a different form of hopper is necessary and some examples of these are shown in Figs. 3 to 6. In Fig. 3 for example the grinding disk 32 is carried by a horizontal shaft 32^a, the grooved holder 33 being in a vertical position and communicating in this instance with a single suitably driven wheel 34 having a cover 35 hinged at 36 and adjustable by a spring controlled screwed rod or bolt 37. The side of the wheel which is farthest away from the disk 32 is fed from an inclined chute or hopper 38, which may consist of a curved inclined strip of sheet metal located between two side plates or walls 39. A part of the strip may form a receptacle 38^a for receiving and mixing the rollers which may drop thereon from an upper oppositely inclined chute or hopper 40 provided if desired with a ridge 41 to give the rollers a further opportunity of mixing. The rollers are forced upwardly by the rotation of the wheel 34 and complete a circuit with a break in a part of same above the receptacle 38^a as shown but such break and receptacle may be dispensed with if desired.

In Figs. 5 and 6 a simple hopper is employed of a type somewhat similar to that proposed in the known ball grinding machine referred to, the grinding disk 43 having a horizontal axis 43^a and there being in this case two suitably driven wheels 44, 45 connected by vertical roller holders formed preferably as a grooved cast structure 46 comprising at the point where it faces the disk, a back plate 47 and side plate 48 (a portion of one only of which is shown in Fig. 5) and at the point where it forms a communication between the opposite sides of wheels 44, 45 comprising a back plate 49 side plates 50 (a portion of one only of which is shown) and a front plate or cover 51 which is cut and flared outwardly at 52 to form a hopper. Each wheel 44 and 45 is provided with a cover 53, 54 respectively, such covers being adjustable by spring screw bolts in the manner previously described.

In place of locating the hopper on the side farthest away from the grinding member, it could be located at a point on the back plate 47 which would be cut away for that purpose but in this case the grinding member would be rotated in the opposite direction.

In all cases it is desirable, to obtain the best results, though not necessary, to employ an excess number of rollers, that is to partly fill the hoppers so as to maintain the continuity of the chain of rollers and consequently their movement past the face of the grinding disk through the holder and guiding device.

In the particular form shown in Fig. 3 while the chain of rollers or continuity is

not complete the desired pressure to effect or assist the travel is maintained by the inclination of the lower chute.

Various forms of and locations for, the hopper have been described and illustrated, but it will be appreciated that many others are possible. Further, a single hopper and a single groove only have been shown but multiple hoppers may be employed, or multiple grooves and a single hopper if the latter is provided with guides for maintaining the rollers at right angles to the sides of same and for directing them to the respective grooves.

What is claimed is:—

1. A machine for grinding rollers comprising in combination a grinding member, a guiding device adapted to present the rollers to the face of the grinding member, and means for mixing the rollers in file order only while maintaining them at right angles to their line of travel.

2. A machine for grinding rollers comprising in combination a grinding member, a guiding device adapted to present the rollers to the face of the grinding member, a transferring device adapted to hold the rollers at right angles to their line of travel, and means located in the transferring device for mixing the rollers in file order only, while maintaining them at right angles to their line of travel.

3. A machine for grinding rollers comprising in combination, a grinding member, a guiding device adapted to present the rollers to the face of the grinding member, a transferring device and a device for propelling the rollers located in the transferring device, both transferring and propelling devices adapted to hold the rollers at right angles to their line of travel.

4. A machine for grinding rollers comprising in combination, a grinding member, a guiding device adapted to present the rollers to the face of the grinding member, a transferring device, a device for mixing the rollers in file order while maintaining them at right angles to their line of travel, such mixing device located in the transferring device, and means for propelling the rollers also located in the transferring device and adapted also to maintain the rollers at right angles to their line of travel.

5. A machine for grinding rollers comprising in combination a grinding member, a guiding device adapted to present the rollers to the face of the grinding member, a transferring device, a wheel in the transferring device, means for driving said wheel, a cover for same and means for assisting the pressure of the wheel on the rollers between same and the cover.

6. A machine for grinding rollers, comprising in combination, a grinding member, a guiding device for the rollers, a transfer-

ring device, a hopper located in the transferring device, and a ridge formed in a part of said hopper, and rising from the bottom of same for collecting said rollers.

5 7. A machine for grinding rollers comprising in combination, a grinding member, a guiding device adapted to present the rollers to the face of the grinding member and means for adjusting such part to present
10 the rollers evenly to such face.

8. A machine for grinding rollers comprising in combination, a grinding member, a guiding device adapted to present the rollers to the face of the grinding member, a
15 curved block carrying such guiding device adjustable in a correspondingly curved seat and means for holding such block in the position in which it is set.

9. In a machine for grinding rollers and
20 in combination a grinding member, and a guiding device adapted to present the rollers to the face of the grinding member, such

guiding device comprising a curved block adjustable in a correspondingly curved seat, a rib carried by such block, side plates on
25 either side of said rib projecting above same, and means for securing the plates to the rib.

10. A machine for grinding rollers comprising in combination a grinding member, a guiding device adapted to present the rollers to the face of the grinding member, a
30 transferring device, a wheel located in the transferring device and forming a part of a cover for said wheel, means for adjusting the pressure between the cover and the
35 wheel, means for propelling the wheel and a hopper located in the transferring device.

In testimony whereof I have set my hand in the presence of two subscribing witnesses.

OTTO ALWIN SCHMIDT.

Witnesses:

WILLIAM HOLMES,

ARTHUR G. GOBELL.