O. G. RIESKE.

DEVICE FOR STRAIGHTENING METAL DISKS.

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Fig. 1.

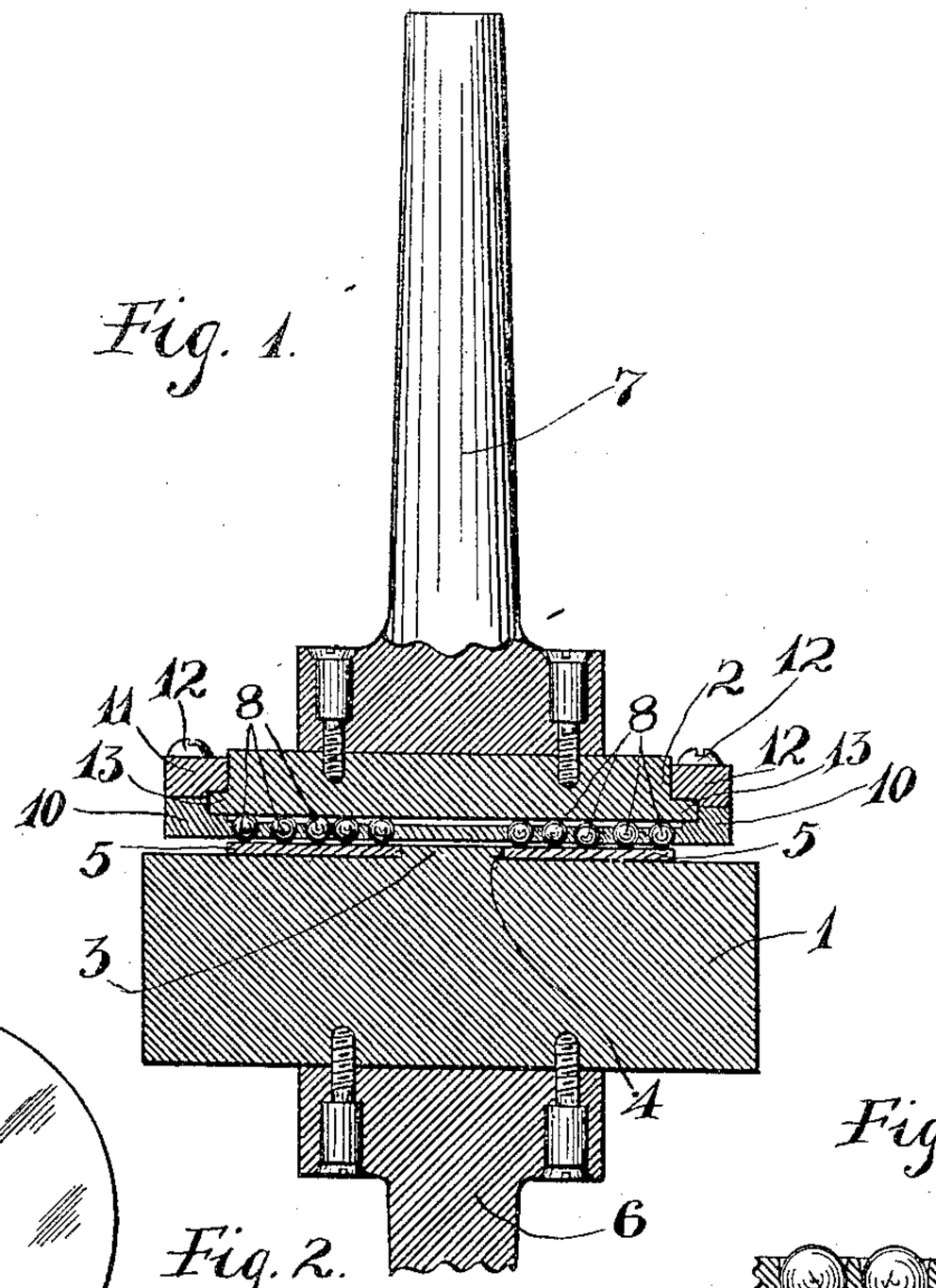


Fig. 4.

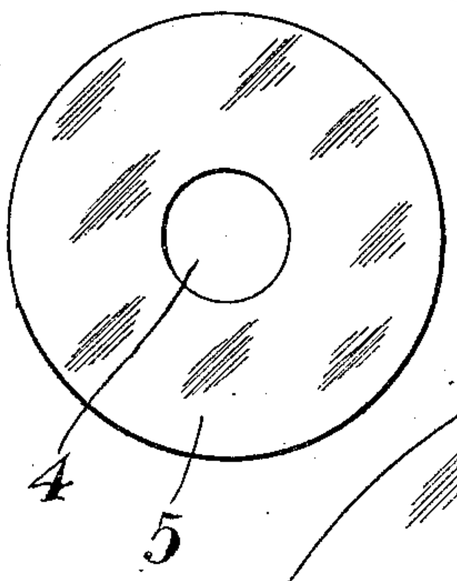


Fig. 2.

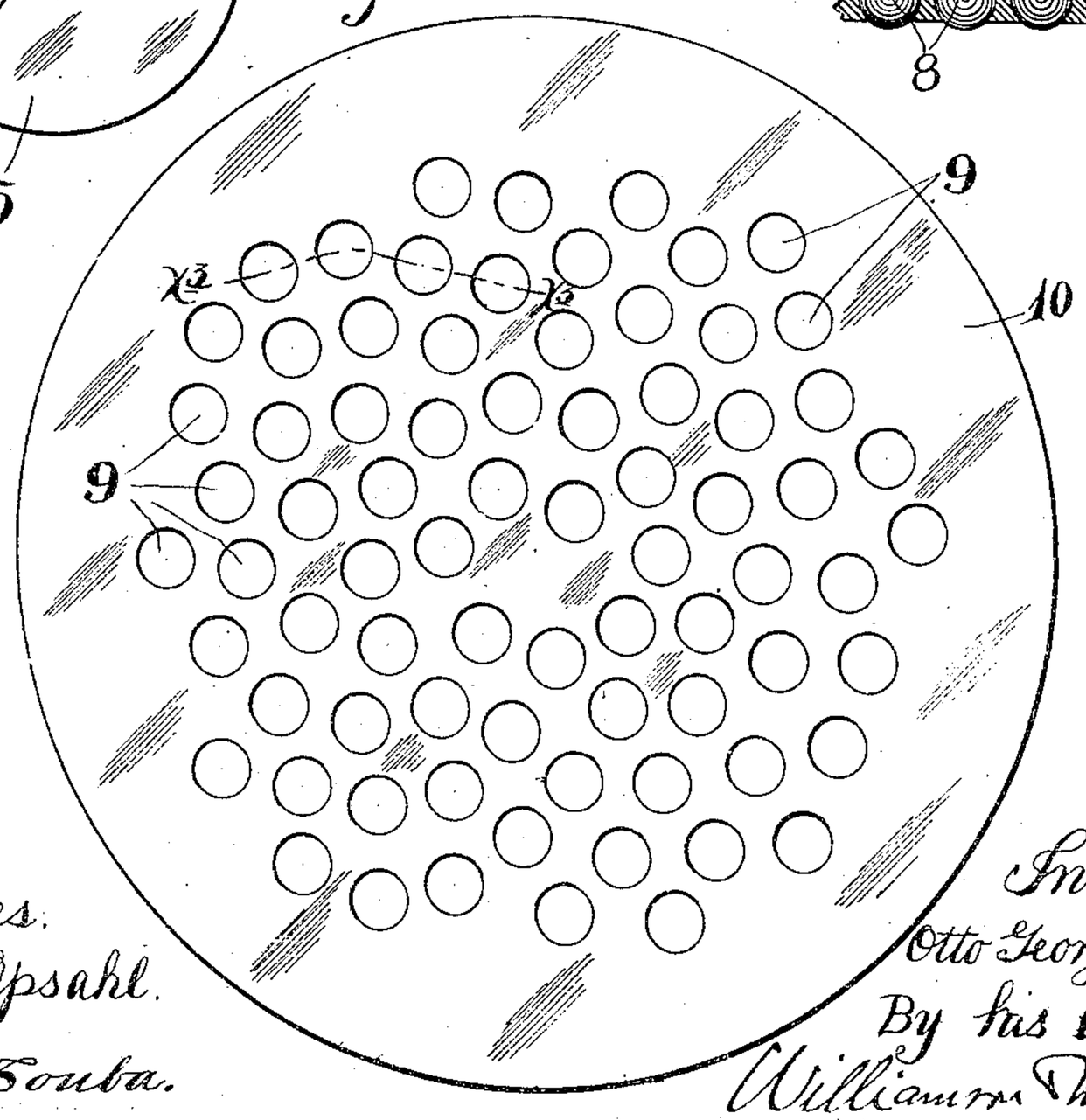
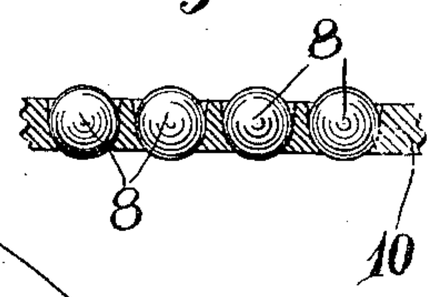


Fig. 3.



Witnesses.
Harry Opsahl.
W. H. Souba.

Inventor.
Otto George Rieske.
By his Attorneys
Williamson Merchant

UNITED STATES PATENT OFFICE.

OTTO GEORGE RIESKE, OF ST. LOUIS PARK, MINNESOTA.

DEVICE FOR STRAIGHTENING METAL DISKS.

No. 921,739. Specification of Letters Patent. Patented May 18, 1909.

Application filed April 3, 1908. Serial No. 425,075.

To all whom it may concern:

Be it known that I, OTTO GEORGE RIESKE, a citizen of the United States, residing at St. Louis Park, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Devices for Straightening Metal Disks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an improved device by means of which metal disks and like bodies, and especially steel disks which must be tempered, such, for instance, as saw disks, drill disks and plow disks, may be quickly and accurately straightened and at the same time put in such condition that they will not warp when tempered.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

The accompanying drawings illustrate my improved so-called disk straightener in a form which in actual practice has been found highly efficient for the purposes had in view.

In said drawings like characters indicate like parts throughout the several views.

Figure 1 is a view chiefly in horizontal section but with some parts left in full plan, showing the improved device. Fig. 2 is a face elevation of a so-called ball spacing device. Fig. 3 is a section taken on the line x^3—x^3 of Fig. 2; and Fig. 4 is a face view showing in detail a disk which has been or is to be straightened by means of the improved device.

The improved device, as illustrated in the drawings, comprises a pair of face plates or platens 1 and 2, the opposing faces of which are perfectly flat except that the face of the face plate 1 is provided with a central hub 3 adapted to enter an axial perforation 4 of the disk 5 which is to be straightened and thereby hold the said disk properly centered. For straightening imperforate disks the hub 3 on the face plate 1 would have to be eliminated and other means would be provided for holding the disk centered on said face plate.

The device illustrated in the drawings is designed to be operated by a lathe and, hence, the face plate 1 is provided with a tapered axial stem 6 and the face plate 2 is provided with a similar tapered axial stem 7; and, in the application of the device to the lathe, the tapered stem 6 is inserted into the socket of the rotary lathe spindle while the tapered stem 7 is inserted into the socket of the tail stock of the lathe.

A multiplicity of presser balls 8 are arranged to roll on the face of the face plate 2 and to hold the same properly spaced and distributed these balls are seated in pockets 9 formed in a spacing plate 10. The outer extremities of the pockets 9 are less in diameter than the extreme diameter of the balls, so that said balls are held against outward displacement, while their outer surfaces are projected beyond the face of the said spacing plate 10, and their inner surfaces are projected for engagement with the face of the face plate 2. Said spacing plate 10 is made disk-like in form and is provided with a marginal clamping ring 11, shown secured thereto by screws 12. The face plate 2 is provided with an outwardly projecting marginal flange 13 that is embraced and held in an annular seat formed by the clamping ring 11 and marginal portion of the spacing plate 10, so that the latter is free to rotate on said face plate 2.

The ball containing pockets 9 in the spacing plate 10 are preferably spirally arranged, so that the axes of the said seats are carried successively but very slightly farther and farther away from the axis of the said face plate. This so arranges the presser balls that in their travel on the disk that is to be straightened they engage the entire surface thereof.

When the disk 5 is placed on the face plate 1 and the presser balls are forced against the face thereof, as shown in Fig. 1, the disk, no matter how crooked, will be quickly and accurately straightened by rotation of either of the two face plates in respect to the other, or by a reverse or differential rotation of the two face plates, any of which movements will cause the presser balls to travel over the face of the disk. In the process of straightening the disk, the pressure thereon from the balls should be gradually increased until the disk has been completely straightened. This pressure may be produced by an axial movement of either of the two face plates in respect to the other; and, in application to the lathe, this pres-

sure may be readily produced by axial movement of the tail stock of the lathe, accomplished by means of its usual actuating screw.

Sheet steel, from which saw disks, drill disks and the like are stamped, have a grain extending in one direction, and this produces in the cut disks uneven tension, which, in tempering, warps the disk. In the operation of my improved disk straightening device, the repeated travel of the presser balls over the entire surface of the disk while under high pressure, tends to change the grain of the metal of the disk by a stretching thereof circumferentially of the disk. This seems to produce even tension in the cut disk and in practice I have found that a disk thus treated has no tendency to warp when tempered. The attainment of this result, aside from the feature of truing up the disk, is of very great importance in the practical construction of disks used for the purpose of making circular saws and disks to be used in agricultural machines, such as disk drills, disk cultivators, and disk plows, and, in fact, for making any and all kinds of disks that must be hardened and which must be true or perfectly flat after being hardened.

Under the above described action, the balls have a true rolling engagement with both of the face plates and when either one of the face plates is rotated while the other face plate is held against rotation, the ball spacing plate 10 will rotate at approximately one-half the speed of the rotated face plate, but is all the time free from pressure and has only a slight frictional engagement with the ball. Consequently the friction, and hence the power required to operate the device in straightening disks, is reduced to a minimum. Also wear on the parts is reduced to a minimum. The presser balls and the faces of both of the face plates, and especially of the face plate with which the balls directly engage, should be made very hard, by tempering.

The device described may, as is evident, be made in any desired size and is capable of large range of modification in its details of construction and arrangement of parts.

In the specification the term "presser balls" has been used in a broad sense to include rolling anti-friction devices, whether or not these devices are spherical or other form. The balls of true spherical form, however, produce greater circumferential displacement of the metal than anti-friction rolling devices of any other form, and for this reason should be employed.

It is important to note that the presser balls are so closely spaced radially of the ball spacing plate 10, that radially adjacent balls in their action on the disk to be straightened and when under pressure, will form overlapping paths or extremely shallow grooves on the face of the disk. This causes the balls to engage with the entire surface of the disk, which is within the zone of action of the innermost and outermost balls. Otherwise stated, the slight annular groove formed by any one presser ball, will be overlapped by the grooves formed by presser balls located just inward and just outward thereof, measured in a direct radial of the retaining plate, so that the surface of the disk acted upon, will, in so far as can be observed by the naked eye, and for practical purposes, be left smooth. At the same time, all of the disk surface acted upon, will be displaced more or less so that its grain will be stretched in a circumferential direction.

What I claim is:

1. Means for straightening and distorting the grain of sheet metal plates, comprising a face plate against which the sheet metal to be straightened is placed, a multiplicity of presser balls arranged to press said metal plate against said face plate, and so closely spaced radially, that radially adjacent balls will form overlapping paths on face of said metal plate, and means for holding said presser balls in the arrangement stated and for causing the same to travel over the face of said metal plate, whereby the said metal plate will be straightened and stretched circumferentially and transversely of its natural grain.

2. In a device for straightening disks and other metal plates, the combination with a pair of face plates, one of which is capable of rotation with respect to the other, of a ball spacing plate rotatably mounted on one of said face plates, a multiplicity of presser balls distributed around the axis of the rotary face plates and so spaced radially, that the radially adjacent balls will form overlapping paths on said disk, the said spacing plate having ball retaining pockets, the outer extremities of which are of less diameter than the diameter of said balls, and the said balls being held by said spacing plate for rolling engagement with the said face plate to which said space plate is applied, and for rolling engagement with the disk applied to the other face plate.

In testimony whereof I affix my signature in presence of two witnesses.

OTTO GEORGE RIESKE.

Witnesses:
E. R. BEEMAN,
LOUIS W. FULLER.