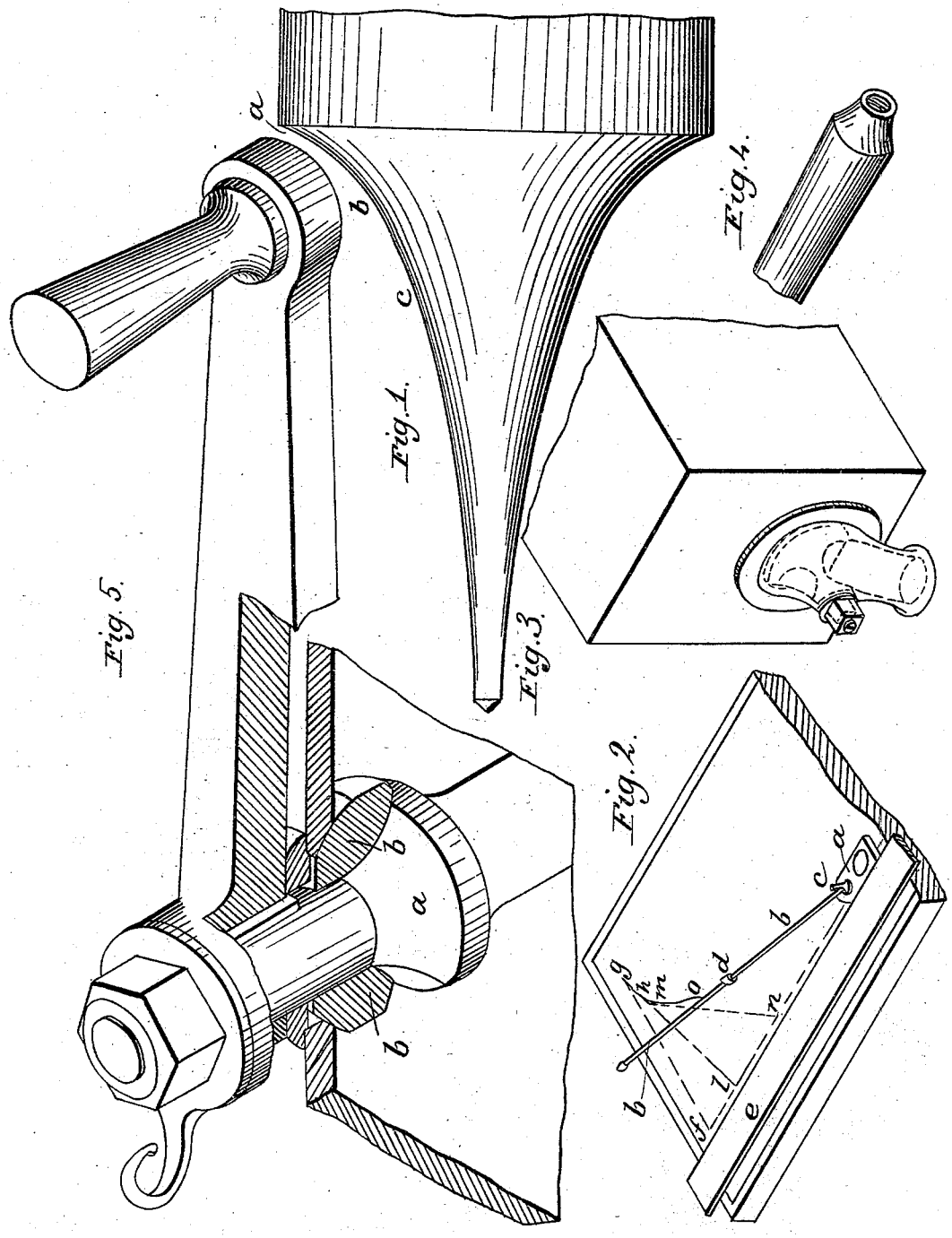
C. SCHIELE.

Lessening Friction of Rubbing Surfaces.

No. 7,385. Patented May 21, 1850.



UNITED STATES PATENT OFFICE.

CHRISTIAN SCHIELE, OF FRANKFORT, GERMANY.

FORM OF RUBBING SURFACE FOR REGULATING ABRASION.

Specification of Letters Patent No. 7,385, dated May 21, 1850.

To all whom it may concern:

Be it known that I, CHRISTIAN SCHIELE, native of the free city of Frankfort-on-the-Main, in Germany, and now resident in Manchester, county of Lancaster, in the United Kingdom of Great Britain and Ireland, have invented a new and improved mode of lessening the friction or regulating the wear of such rubbing surfaces in machinery as act against each other like those of cocks or valves, pivots of upright shafts, millstones, &c.; and I do hereby declare that the following is a full and exact description.

The nature of my invention consists in the application of a certain curved form to the construction of cocks or valves, pivots, millstones or similar parts of machinery in general (where the rubbing surfaces have to bear a pressure in the direction of their axes) in order to lessen the friction or to regulate the wear of their rubbing surfaces.

To enable others, skilled in the art, to make and use my invention, I will proceed to describe its practical application to the above purposes.

I have attached to these presents three sheets of drawings, and have marked the same with figures and letters of reference corresponding with those in the following description thereof:

Figure 1, represents such a curved form, the whole, or part, of which I make use of in the construction of cocks or valves, pivots of upright shafts, millstones, or such rubbing surfaces in machinery in general, as have to bear a pressure in the direction of their axes. The nature of the curved form which I use consists in having every tangent of the same length from the touching point on the curve to the axis of the curve.

Fig. 2, gives a descriptive view of an apparatus for describing such a curve on a horizontal surface.

a is a small wooden slide, to which the rod *b* is jointed by means of a pin *c*. *d* is a drawing pen affixed to a slide or brush, which can be moved upon the rod *b* to the proper distance for the curve required, and is kept in that and in a vertical position by a spring which fits in a groove. The direction of the sharp edge of the pen *d* is in a straight line to the pin *c*.

e is a ruler, along the edge of which the slide *a* is to be guided. If the slide *a* and rod *b* be so placed that the pin *c* shall be at *f* and the pen *d* at the point *g*, the center line at the rod *b* will then be over the dotted line *g f* at right angles with the dotted line *l n* (representing the axis of the curve to be drawn) and if the slide *a* be then guided along the edge of the ruler *e* the pin *c* will move along the dotted line *l n* dragging the pen *d*, after it, the pen *d*, as it moves toward a position in the line *l n*, will describe the curved line *g h m o*.

f g, *l h*, *m n*, represent some of the tangents mentioned as being of equal length. By the revolution of such a curve around its axis *l n*, the curved form as shown in Fig. 1 will be produced.

In the application of the said curved form for rubbing surfaces of machinery, I observe the following rules: 1. Where the pressure acts exclusively in the direction of the axes of such surfaces, I apply the form shown in Fig. 1, or one as much like it as is consistent with the purpose. 2. When part of the pressure is not in the direction of the axis, I commence with that part of the curve, which, in its inclination to the axis would give the best resistance to the middle pressure of the combined forces, or would stand at right angles to the same.

Fig. 3, is a descriptive view of a cock or valve for letting of the fluid from a boiler or reservoir. The pressure acting here against the plug of the cock, tends to keep it tight. As the middle pressure acts in an oblique direction to the axis, I commence with that part of the curved form shown at *b* Fig. 1.

Fig. 4, is a descriptive view of a journal of a turning-lathe spindle. Here the pressure in the direction of the axis is supposed to be less than the pressure from the side and the thicker part of the journal commences with the inclination of the part *c* Fig. 1.

Fig. 5, shows the application of my invention to the journal and bearing of a regulator on a locomotive engine. The drawing gives a descriptive view, partly opened by section to show the journal *a* and its bearing *b*. In this application the pressure is acting in an oblique direction toward the axis, and the thicker part of the journal has an inclination as at *b* in Fig. 1.

Fig. 6 is a descriptive view of a pair of millstones and Fig. 7, is a sectional elevation of the same, showing also the application of the curved form to pivots of upright shafts. The lower pivot at *i* is supposed to bear pressure in the direction of

its axis only and is therefore formed like Fig. 1, commencing at *a*. The top-pivot at *h* is supposed to bear about equal pressure from the side and from below in the direction of its axis, and the inclination of its thicker part is as at *b* in Fig. 1.

For the construction of the rubbing surfaces of the millstones I take an inclination of about 45° (as at *b* Fig. 1) for the larger diameter, this being generally sufficient for the grain &c. to slide down. As I construct the grinding mills with stones so formed, in a different manner from the usual mode, I annex the following description of the drawings, without claiming this arrangement as my invention.

In Figs. 6, and 7, *a* is the upper or inner millstone, *b* the lower or outside one; *c* is the spindle whereon *a* is fastened by means of a nut *d*, which keeps the stone against the outer contour of the pulley *e* (having some projections, as at *f*, for couplings.) The pulley rests against a collar *g* of the spindle *c*. The pivots run in bearings *h* and *i*, which may be raised or lowered by screwing them up or down in the frames *k* and *l*. These frames are fastened to the larger stone by nuts *t* and *v* screwing on bolts *u* and *w*, which are fixed in the stone *b*. *m* is an oilpot in communication with the lower pivot for greasing it. The oil, gathering in the hollow part of *i*, runs off through the pipe *n*, which is fixed in a hole marked by dotted lines on *i*. The bearings *h* and *i* must screw sufficiently tight in the frames for retaining the situation given to them or else they have to be fastened by means of stoppers or any suitable arrangement commonly made use of in similar cases. A canal *o* in stone *b* around the stone *a* serves for receiving and keeping together the grain &c. It should never be allowed to fill up to the top. The space between the rubbing surfaces immediately adjoining the canal *o* should open sufficiently to readily allow the entrance of the material to be ground, which by its weight will be continually descending, until it is sufficiently ground, when it will drop from the bottom end. The feeder must be directed into the canal *o*. The shaking is effected as usual by a lever pressed against the damsel at *p*. This damsel is so constructed as to be serviceable for putting in the stone and for taking it out. The whole is placed on supports *q* and *r*, on which it is movable for drawing the driving band *s* as tight as may be required. The rate of revolutions should not be more than one half of those commonly taken.

In the pivots of upright shafts, *m* the plugs of cocks, in the bearings of valves, or in any conical or plane bearing which sustains pressure in the direction of its axis, the larger part of the circumference travels over a greater surface, and at greater velocity, in its revolution, than the smaller part, consequently the amount of wear by friction is greatest at the largest part and the bearing will become loose, and wear out of line, by which the friction will be increased; but a bearing having the profile of its rubbing surface of the form of a curve, from any point of which, a tangent of a given length will touch the axis, will have the friction so distributed over its surface, by the direction in which each part receives its pressure, that however great the wear may be, the rubbing surfaces will always be kept perfectly close, and the axis always kept in line.

What I claim as my invention, and desire to secure by Letters Patent, is—

The application of the curved form above described to the rubbing surfaces of cocks or valves, pivots of upright shafts, millstones, or other parts of machinery in general, where the rubbing surfaces have to bear a pressure in the direction of their axes.

CHRISTIAN SCHIELE.

Witnesses:
F. Hessemer,
Wm. Rehmer.