JOHN SWITZER.

Improvement in Anti-Friction Bearings for Shafts.

No. 118,297. Patented Aug. 22, 1871.

Fig. 1

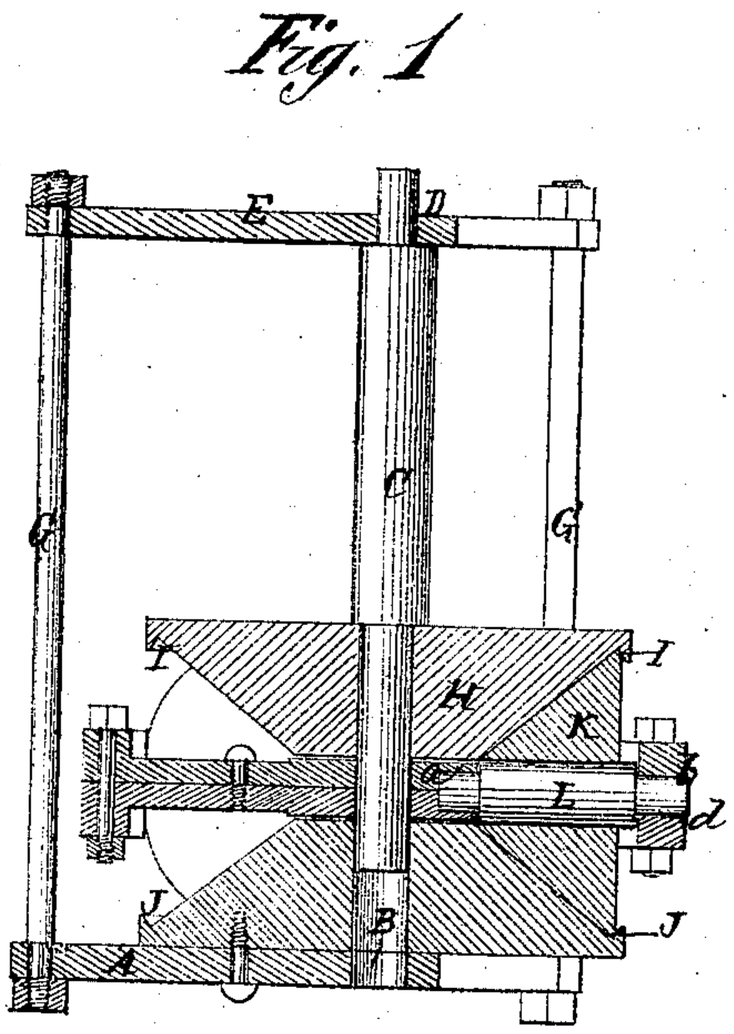
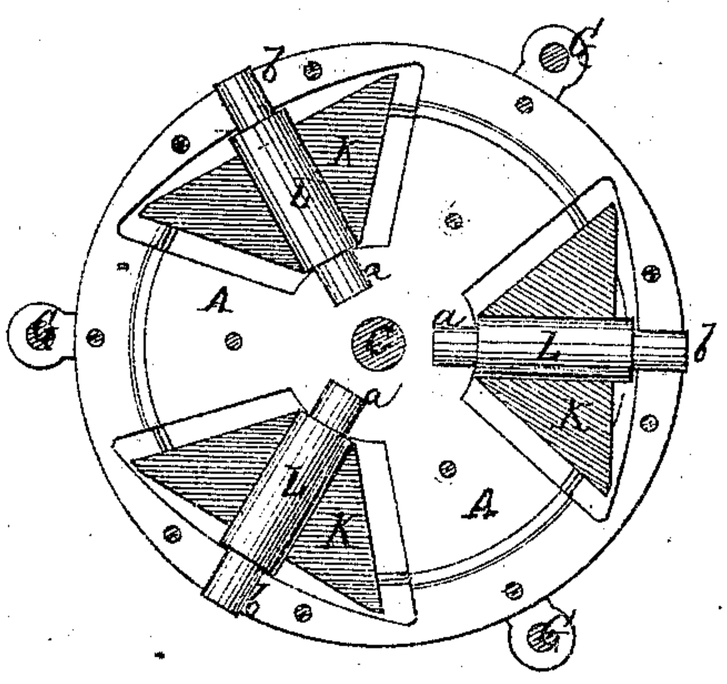


Fig. 2.



John Switzer
by his attorney
A Pollock

Witnesses:
M M Bailey
C. B. Nottingham,

118,297

UNITED STATES PATENT OFFICE.

JOHN SWITZER, OF LYNN, MASSACHUSETTS.

IMPROVEMENT IN ANTI-FRICTION BEARINGS FOR SHAFTS.

Specification forming part of Letters Patent No. 118,297, dated August 22, 1871.

To all whom it may concern:

Be it known that I, JOHN SWITZER, of Lynn, in the county of Suffolk and Commonwealth of Massachusetts, have made an invention of an Improved Anti-Friction Bearing for Shafts; and do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing and to the letters marked thereon.

Figure 1 is a parti-sectional elevation, and Fig. 2 is a horizontal section of a device embodying my invention.

The purpose of this invention is to relieve the end bearing of a shaft or shaft-journal from the great thrusts and wear to which it is now subjected, by lessening the amount of friction between such end and the bearing in which it is stepped; and to carry out my purpose I remove from the extremity of such shaft or journal the step ordinarily employed to receive its end thrust, pressure, or weight, and, in lieu thereof, I adopt a broad, flat collar, encompassing and affixed to the shaft at some distance from the end of the latter; and, in combination with such collar, I employ a series (preferably three) of anti-friction wheels or rollers, which are disposed between the collar and a base-plate, the latter being about equal in size and shape with the collar and constituting a circular path upon which the wheels travel, said plate and shaft being so confined together, by a suitable frame, as to prevent separation or spreading apart of the former and the collar in order that the wheels may not be displaced, the slow rotation of the rollers and their large diameter serving to abolish, to a great extent, the labor and thrusts to which the comparatively small area of the end of the shaft is otherwise subjected.

The drawing accompanying this specification represents at A a stationary flat circular bed-plate or base, having a central orifice, B, in which the shaft, shown at C, or its journal loosely revolves. The shaft C, at some little distance from the base-plate A, is received within a box or bearing, D, making part of a cross-head or frame, E, this frame being disposed opposite to and parallel with the base-plate, and connected rigidly and securely thereto by means of rods or columns G G, &c., these rods being of a strength sufficient to prevent any tendency of the frame E and base-plate A to separate from one another. H in the accompanying drawing represents a circular block or disk affixed to and revolving with the shaft and inside of the frame E, the inner face of this block or disk having an annular channel or groove, I, formed in it near to its periphery, as shown in Fig. 1. The disk H is frusto-conical in form, with its base outermost; and the base-plate A, before named, is of like form, size, and disposition, the annular groove in the latter being shown at J in Fig. 1. In connection with the disk H and base-plate A I employ a series of frusto-conical rollers, K K, &c., of equal size and shape, three of which are employed in the present instance as giving the best results, although this number may be varied if desirable. The rollers K are disposed in a circular path about the shaft C, at equal distances, and with their peripheries inclosed between those of the disk H and plate A, the channels I and J which constitute guides to retain them in place, as well as annular paths in which such rollers must travel, the burden of the labor, however, devolving upon the sloping faces or peripheries of said disk-plate and rollers. To insure the correct relative position of the series of rollers K, each is provided with a shaft, L, the inner end of which is stepped within a bearing, *a*, created in the hub of the disk H, or a collar, making part of the shaft C, as the case may be, while the outer end of each shaft is received and revolves within a bearing, *b*, formed in an annular ring, *d*, which surrounds and is concentric with the shaft C, this ring serving to insure the proper separation of the disks and maintain them at equal distances asunder as well as to retain their axes in radial lines with respect to the axis of the shaft, without which some wear and strain might ensue between their peripheries and the walls of the channels I and J. It will, from the above, be seen that the weight or thrusts which may be received upon the shaft is received by the disk and by it distributed over large slowly-revolving rolling-bearings. The position of an anti-friction, such as is above described, is represented in the accompanying drawing as a horizontal one, and this is the position it would assume when applied to the propeller of a navigable vessel, for which purpose the invention is especially valuable. It will also be found to possess great value when applied to the lower bearings of elevator-screws, water-wheel shafts,

and, in fact, to any bearing-shaft the weight of which is sustained by its lower end.

I am aware that an anti-friction bearing has formerly been employed in steam-ships which contained a series of rollers of a double cone-shape—that is to say, which contained a beveled edge upon both sides, these bearings being termed "cone-thrust" bearings. In these bearings the outer bevel naturally travels the faster of the two, thus producing a slip and friction between it and its path, which naturally polishes the surfaces in contact and permits them to slip upon one another with very injurious results.

My invention naturally obviates this objection, as the slope or bevel of each roller is duly proportioned to its diameter and calculated with respect to its axis and that of the shaft by which an uninterrupted rolling motion is secured.

I claim—

1. As an anti-friction bearing for the ends of heavy shafts, the employment of the frusto-conical roller K in combination with the plate A and disk H, or the equivalent, the said plate A being stationary and loosely receiving the shaft, while the disk H is fixed to and travels with the shaft, the whole being in manner described.

2. In combination with the rollers K, plate A, disk H, and shaft C, the ring or support *d*, or its equivalent, for insuring the proper relative position of each roller.

JOHN SWITZER.

Witnesses:
HORACE SAUNDERS,
EDW. GRIFFITH.