(No Model.)

C. M. DABOLL.

PULLEY SHEAVE.

No. 255,724. Patented Mar. 28, 1882.

Fig. 1.

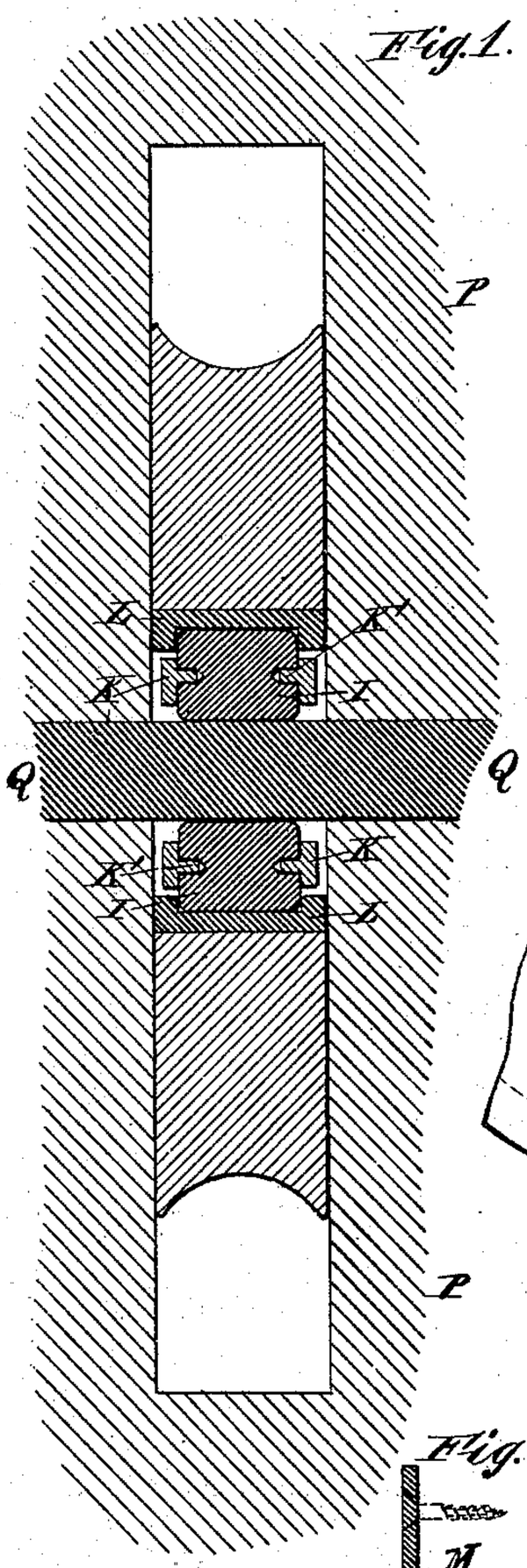


Fig. 2.

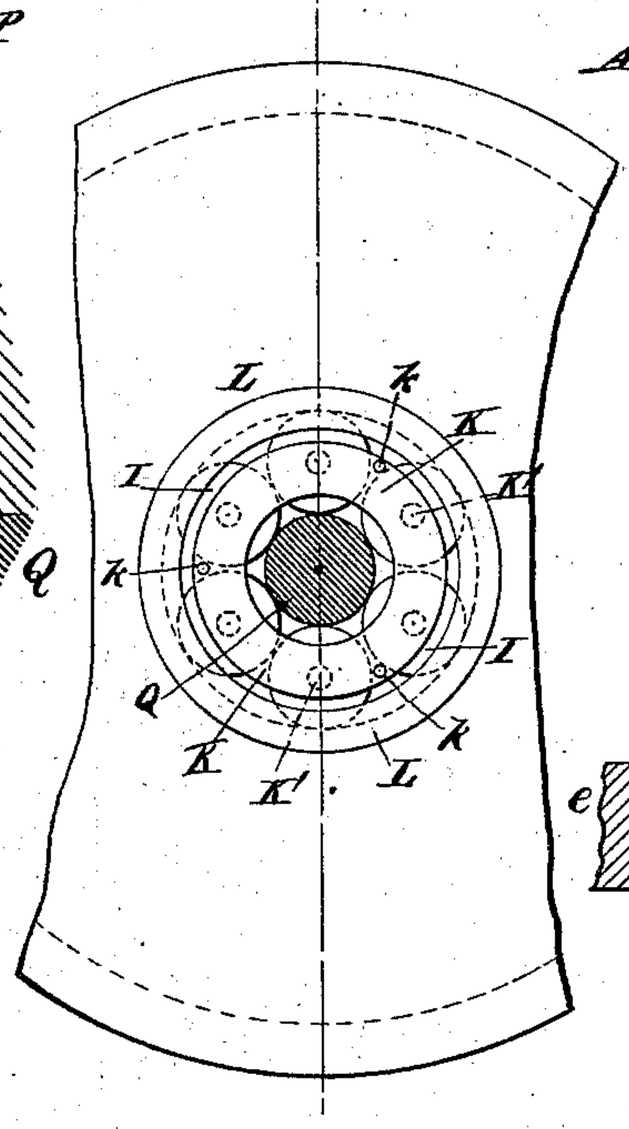


Fig. 3.

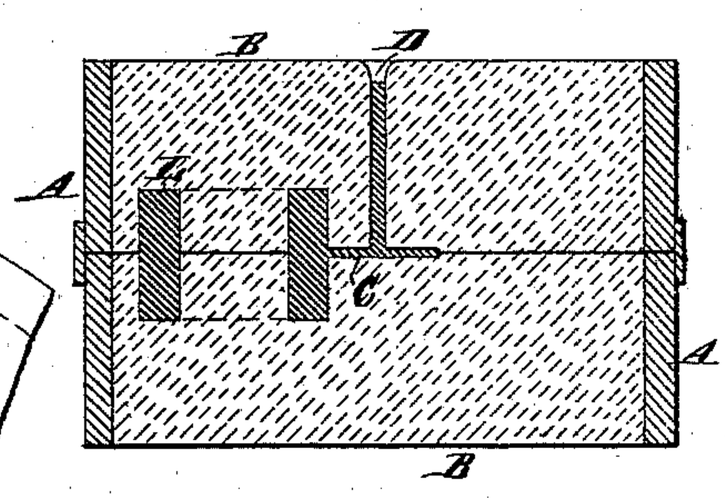


Fig. 4.

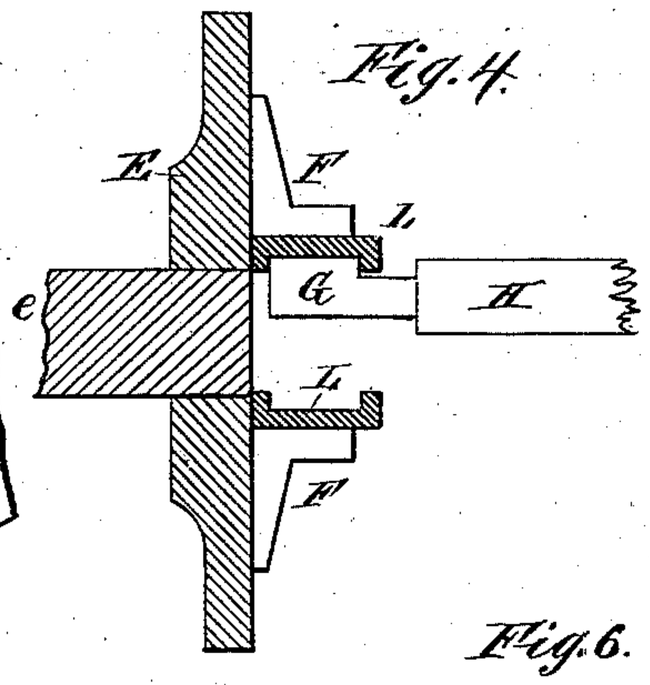


Fig. 6.

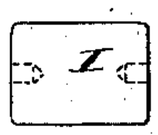


Fig. 7.

Fig. 8.

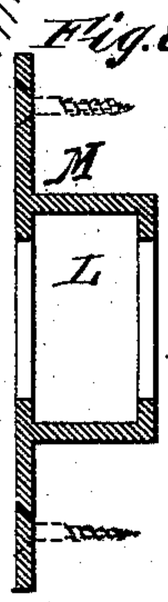


Fig. 9.

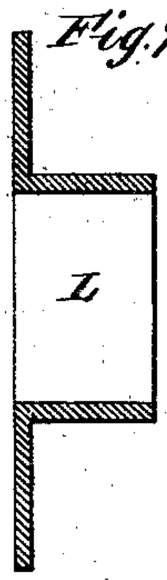


Fig. 10.

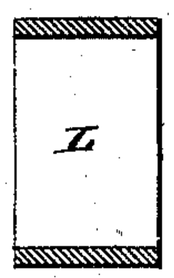
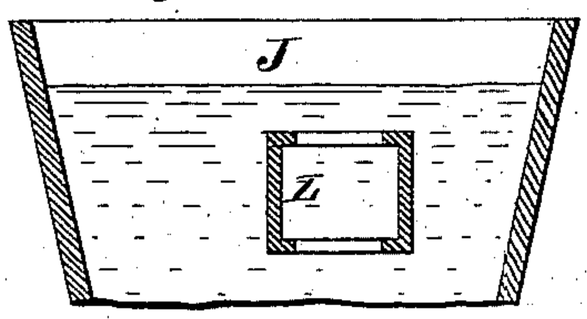


Fig. 5.



WITNESSES

Charles R. Searle.
Charles C. Stetson.

INVENTOR

Charles M. Daboll
by his attorney
Thomas D. Stetson

UNITED STATES PATENT OFFICE.

CHARLES M. DABOLL, OF NEW LONDON, CONNECTICUT.

PULLEY-SHEAVE.

SPECIFICATION forming part of Letters Patent No. 255,724, dated March 28, 1882.

Application filed October 8, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. DABOLL, of New London, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Pulley-Sheaves, of which the following is a specification.

My improvements relate to what are known as "roller-bushings" in the sheaves of pulley-blocks for use on shipboard and in other situations. The usefulness of these bushings depends largely upon the maintaining of the sizes and proportions of the members of the complete structure. Economy requires that the whole be made cheaply. I make all the parts of common cast-iron cast in green sand in the ordinary manner, with the small cost and with the moderate hardness due to ordinary castings thus made. I finish the parts while in the ordinary soft condition. Then, without any long process and without requiring expensive labor, I harden the finished castings without distorting or warping them. The surface produced by the treatment is a good protection against oxidizing influences.

The process of hardening which I prefer to employ forms the subject-matter of a separate application for patent filed by me on the 25th of August, 1881; but I do not, for the purposes of this application, confine myself exclusively to the same, so long as a process is used whereby, besides the hardening of the cast-iron, the metal assumes a surface not or but little subject to oxidation. I will describe so much of the process of manufacture and hardening as is necessary to indicate in what manner the novel bushings can best be produced.

In the accompanying drawings, which form a part of this specification, Figure 1 is a central section in the plane of the axis, showing the bushing in use. Fig. 2 is an end view of the bushing. Fig. 3 is a vertical section showing the production of the casting. Fig. 4 is a horizontal section showing the finishing, and Fig. 5 is a vertical section showing the hardening. Fig. 6 is a side view, and Fig. 7 a central longitudinal section, of a roller. Figs. 8, 9, and 10 are sections showing the principal modifications in the forms of the shells of this class of bushings. My invention applies to all.

Similar letters of reference indicate like parts in all the figures.

A is a flask; B, molding-sand; C the sprue, and D the gate through which the melted iron is poured.

E is a chuck turning on an axis, *e*, and F the fastening-jaws, operated in any approved manner to promptly and strongly hold and truly center the bushing L.

G is a turning-tool operated to produce the circular path for the rollers I.

H is a carriage on which the turning-tool is mounted, with freedom to be moved horizontally and endwise to the proper extent to allow its insertion into the interior of the bushing, and its movement laterally therein enough to bring it into a proper position to turn the entire interior of the bushing L.

All the other parts are correspondingly made—that is to say, each is cast of ordinary iron and then reduced to the exact size and form by tools acting on it in its ordinary or soft condition.

J is a hardening-trough containing a solution compounded as follows: Forty gallons of pure water, fifty pounds of common rock-salt, two pounds of saltpeter, two pounds of cyanide of potassium, five pounds of the ordinary sulphuric acid of commerce. The solution should be kept cold or at as low a temperature as the active use in cooling large numbers of small castings will allow.

Care should be taken to heat the parts separately, or to so support them as not to distort the forms or bruise or in any wise injure the surfaces which require to work together. They should be plunged into the solution endwise and be allowed to lie in the solution a few minutes after the cooling. The hardening is completed at the moment of cooling, but the solution affects the surface more thoroughly by being allowed to remain. It contributes to give more perfectly the fine blue-black oxide, which is one result of my operation. On removal from the hardening-bath they are soaked a considerable time in water containing lime, to neutralize any acid remaining in the pores. They are then dried, applied together, inserted in the sheave, and introduced in the block P.

The pin Q, which is fixed in the block P and serves as a fixed axis, is of my hardened cast-iron similarly made and hardened.

K K are rings of sufficient strength, with pivots K′ on the inner face of each, engaging

in corresponding holes in the ends of the rollers I. The two rings are rigidly united by posts *k*.

Modifications may be made in the forms and proportions of the parts, as also, to some degree, in the chemicals constituting the solution. It is important that all the elements be employed, but the proportions may be varied within considerable limits. I esteem the cyanide of potassium especially important. The proportion thereof should not be much less than above indicated. The cost of the whole is insignificant. Little time is consumed, no expensive furnaces or boxes or packing are required. The whole may be operated with the ordinary tools and appliances of a small foundry and machine-shop.

The body of the sheave N may be of any material—composition cast-iron galvanized or lignum-vitæ or other hard wood.

The shell M may have a flange and fastening-rivets, as indicated by dotted lines in Fig. 8. The hardened bushing may be inserted in the metallic sheave by driving, pressing, pinning, or any other ordinary or suitable way. When the body of the sheave is of iron the shell M may be dispensed with, and the body of the sheave itself cast in the proper form and milled or turned out to receive the rollers directly. In such case the entire sheave should be hardened in my solution. It will be understood that the block P may be wood or metal, and widely varied as to form, number of sheaves, mode of strapping, &c.

The pin Q may be cylindrical steel, hard iron, or any other ordinary material.

The advantages resulting from the use of bushings manufactured as herein described are important and do not exist in any of the bushings heretofore known. A marked economy results from the use of the cheap material employed. The manufacturing may be conducted with great simplicity and rapidity.

A remarkable feature of the novel bushing is that under all ordinary conditions to which the bushing is subjected, and with any ordinary amount of wear, the parts maintain invariably their original sizes and the proper relation of position, thus constituting a device that is always reliable and little, if at all, subject to changes from various causes that would necessitate repairs.

I claim as my invention—

A pulley-sheave having anti-friction rollers I and the surfaces L Q on which they roll, as also the rings K and pivots K′, made and finished in soft cast-iron and subsequently treated at a high temperature with the solution described, so as to both harden and preserve from oxidizing influences, substantially as herein specified.

In testimony whereof I have hereunto set my hand, at New London, Connecticut, this 3d day of October, 1881, in the presence of two subscribing witnesses.

CHARLES M. DABOLL.

Witnesses:
CHARLES ALLYN,
CHARLES B. DOUGLAS.