No. 769,051. PATENTED AUG. 30, 1904.

S. W. BRADLEY.

BEARING BOX.

APPLICATION FILED JAN. 23, 1903.

NO MODEL.

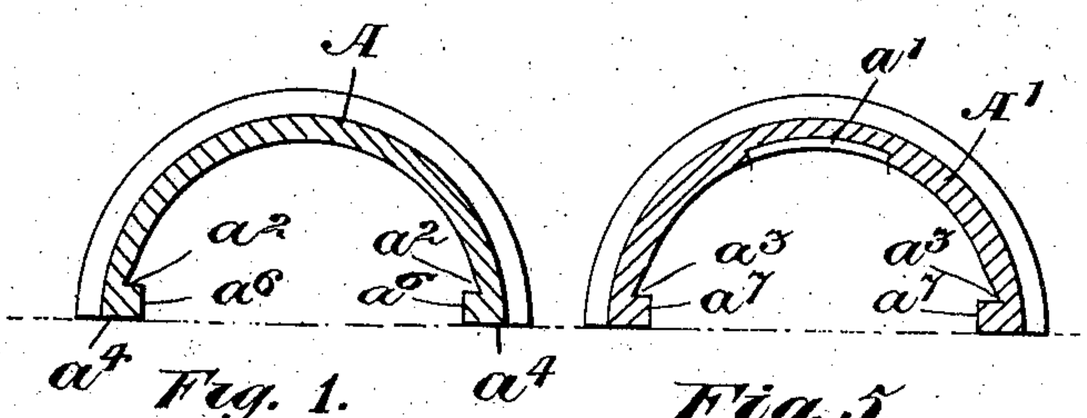

Fig. 1.

Fig. 5.

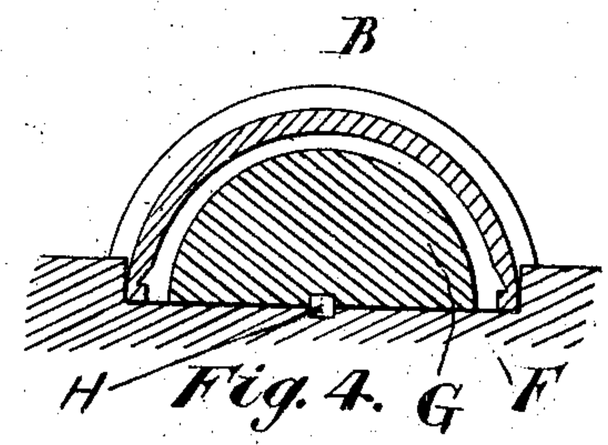

Fig. 4.

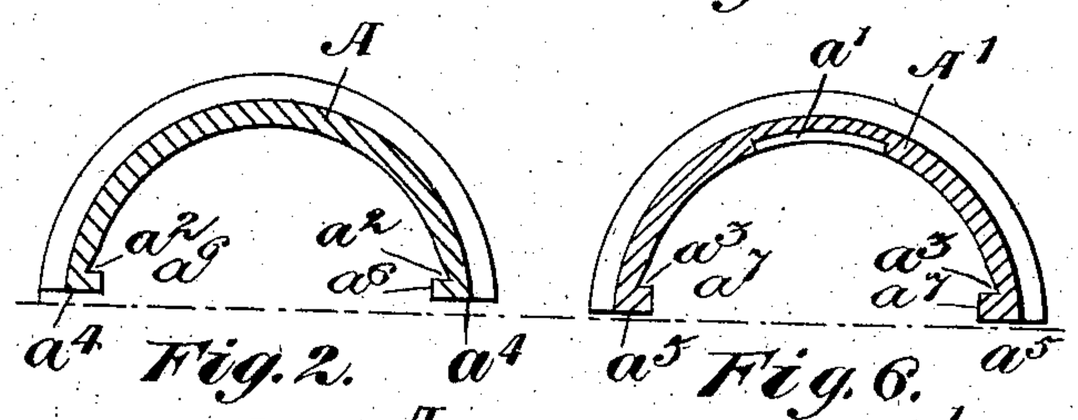

Fig. 2.

Fig. 6.

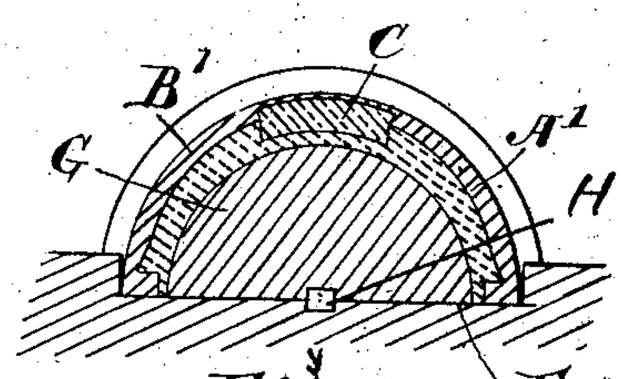

Fig. 8.

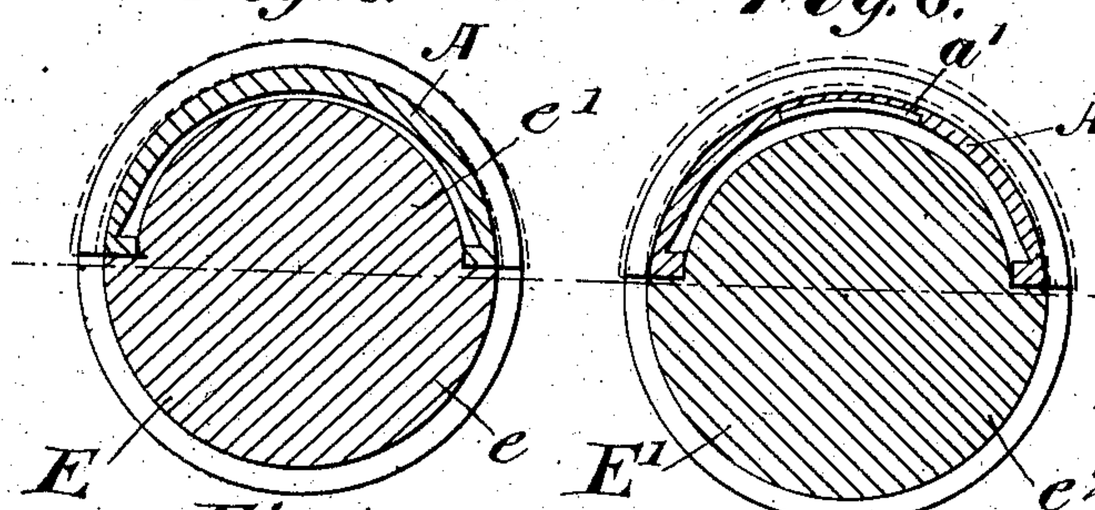

Fig. 3.

Fig. 7.

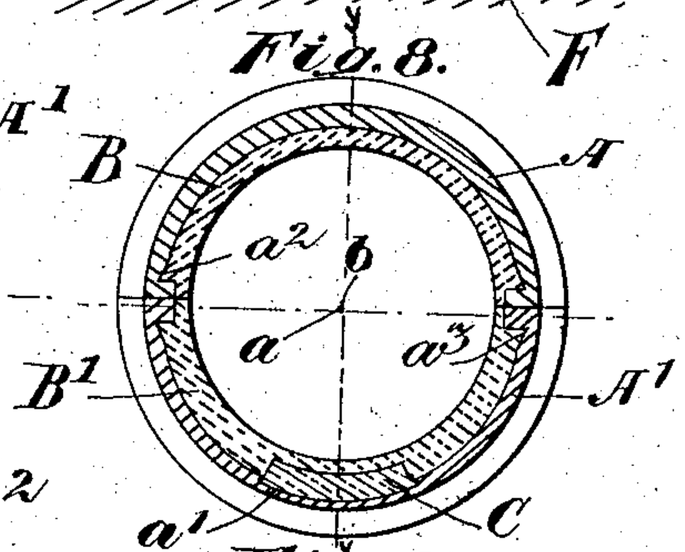

Fig. 9.

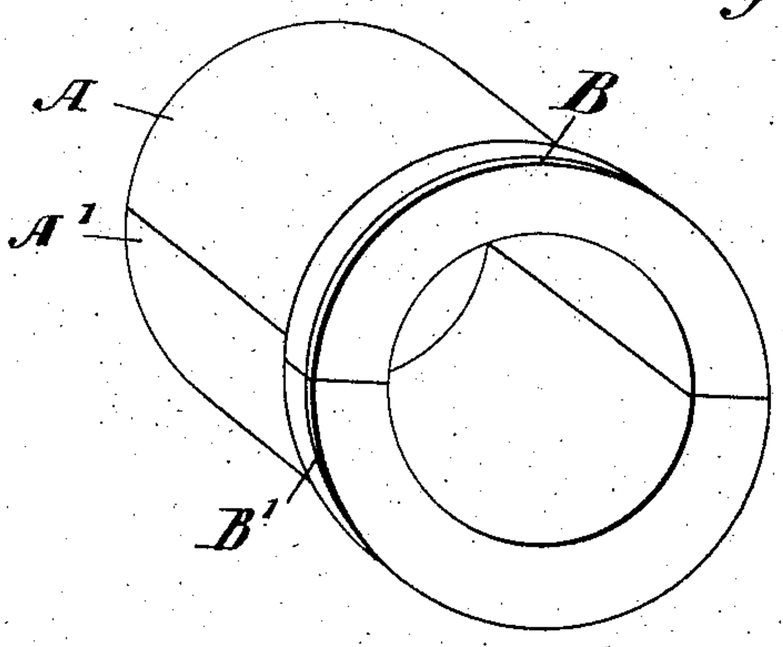

Fig. 10.

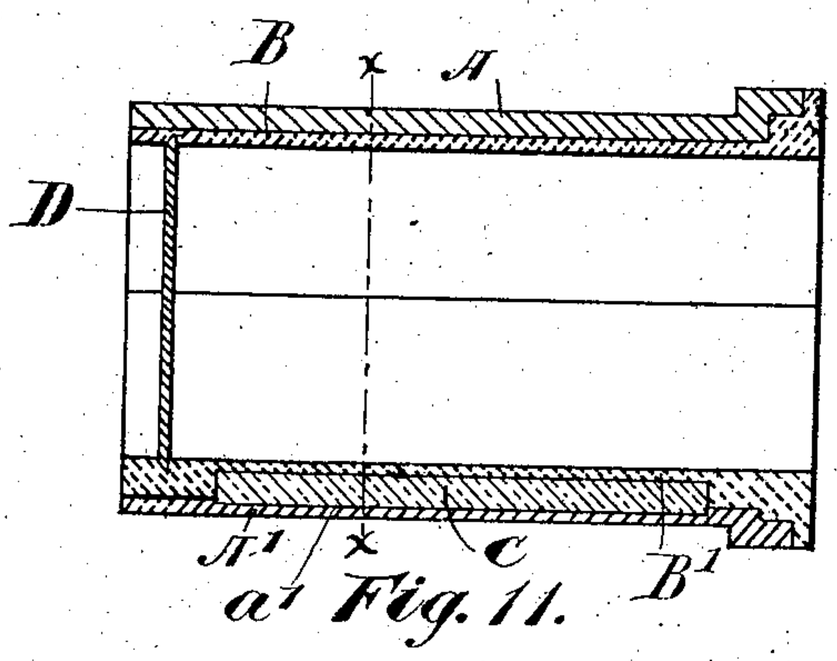

Fig. 11.

Witnesses.

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No. 769,051. Patented August 30, 1904.

UNITED STATES PATENT OFFICE.

SILAS WILLIAM BRADLEY, OF CORNWALL, CANADA.

BEARING-BOX.

SPECIFICATION forming part of Letters Patent No. 769,051, dated August 30, 1904.

Application filed January 23, 1903. Serial No. 140,272. (No model.)

To all whom it may concern:

Be it known that I, SILAS WILLIAM BRADLEY, electrical engineer, of the town of Cornwall, in the county of Stormont, Province of Ontario, Canada, have invented certain new and useful Improvements in Motor-Bearing Boxes, of which the following is a specification.

My invention relates to improvements in boxes for motor-bearings; and the objects of my invention are to provide a box in which the lining of antifriction metal may be replaced with the greatest convenience and smallest loss of time, further objects being to so arrange the lining in the box that the greatest amount of lining will come where there is the greatest wear; and it consists, essentially, of an outer shell of substantially cylindrical form made in two segments, the upper segment being less and the lower segment being greater than a half-circle in cross-section, a lining of Babbitt or other antifriction metal being formed in each segment of the shell, the inner circumference of said lining being an exact semicircle in cross-section in each half, and suitable means being provided in the lower half for preventing the shaft from wearing down too far in the box, the various parts of the device and the method of constructing the same being hereinafter more particularly described.

Figures 1, 2, 3, and 4 represent the successive steps in constructing the upper segment of the shell. Figs. 5, 6, 7, and 8 represent the successive steps in constructing the lower segment of the shell. Fig. 9 is a cross-section through the box on the line X X, Fig. 11. Fig. 10 is a perspective view of the box complete. Fig. 11 is a longitudinal section therethrough on the line Y Y, Fig. 9.

In the drawings like letters of reference indicate corresponding parts in each figure.

Referring now to Figs. 9, 10, and 11, A A′ are the upper and lower segments of the shell. The outer circumferences of these segments when placed together form a complete cylindrical surface; but the upper segment is less and the lower segment is greater than a half-circle, and thus the line of division between the segments will come above the axis *a*, which is the axis of the outside of the box. B B′ are the linings for the upper and lower segments. The inside surface of these linings forms an exact cylinder when the segments are brought together in proper position; but the center or axis *b* of the cylinder is located above the center or axis *a* of the outside of the shell. The object of having the center so placed is to increase the life of the lining, for it will be seen that if the central hole for the shaft in the lining corresponded exactly with the center or axis of the outside when the lining was first used the shaft could only wear down a certain distance before the armature of the motor would come in contact with the fields, and thus cause more or less serious accidents. By having the lining cast with the axis of the shaft-hole as far as possible above the axis of the outside of the shell it will be seen that the shaft will have just twice the amount of lining to wear through before any damage can be done. As an additional safety attachment in the device I may provide a plate C. This plate may be made of any suitable material, such as brass or bronze or the like, and is set in a dovetailed groove *a′*, formed in the lower segment of the shell. The upper surface of this plate is designed to come at such a height as to just hold the shaft above the point which would bring the armature in contact with the fields. This device is useful in case the bearings should become dry and the Babbitt lining should be melted by the friction of the shaft.

It may here be mentioned that the upper segment, B, of the lining is made considerably thinner than the lower segment, B′, as a very small amount of wear comes on the upper portion, and if they were made of equal thickness an unnecessary waste of material would be the result. In order to retain the edges of the babbitt in contact with the shell, I may provide internal longitudinal notches a^2 a^3 in proximity to the edges of the upper and lower segments, respectively. D is a dust-proof plate or disk which is held in a circular groove formed around the inner circumference of the lining and is desiged to exclude dust, &c., from the bearing.

Having now described the construction of the invention, I will proceed to describe the

method which I have invented for constructing the same. The first step is to cast the semicircular segments of the shell of suitable material. These two segments are exactly similar, except that the lower segment may have the dovetailed groove a' if the safety-plate is to be used in the bearing-box. In Figs. 1 and 5 the upper and lower segments in the rough-cast condition above mentioned are shown. In Figs. 2 and 6 the next step is illustrated, which consists in planing off the lower and upper edges a^4 a^5 of the top and bottom segments, respectively, the amount of metal cut off the upper segment being about twice as much as that cut off the lower segment. The inside edges a^6 a^7 are also planed off and are so gaged as to fit tight on two mandrels E E'. (Shown in Figs. 3 and 7.) The mandrels E and E' are constructed to serve as a guide in turning down the outside of the upper and lower segments, respectively, to the proper size. The lower portion, e, of the mandrel E is made of exactly the radius which the outside of the box is to have when completed. The upper part, e', is of such a radius as to just fit tightly between the plane gaged faces a^6 a^6 of the upper half of the shell. The lower portion, e, of the mandrel being slightly greater than a semicircle, when the mandrel and upper segment are placed on a lathe and the upper segment is turned down till its outside surface completes the circle of the mandrel the result will be that the outer surface of the shell will form slightly less than a semicircle and will be of the correct radius for the outside of the complete box. The lower segment of the shell is placed on a similar mandrel and turned down to the radius of the mandrel. The size of the lower part e^2 of the mandrel in this case is such that the lower segment of the shell will be as much more than a semicircle of the correct radius when completed as the upper segment of the shell was less than a semicircle. It will thus be seen that when these two segments of the shell are placed together their outer circumference will together form a complete cylinder having its axis below the line of division between the segments. The next step in the method is to cast the lining in the shell. For this purpose I employ a machine which is fully described in the application which I have signed on even date herewith. It will therefore be unnecessary to describe in detail the machine employed; but in Figs. 4 and 8 I have illustrated the essential feature of this step of the method. This consists in laying one segment of the shell—the upper segment, for example—on a flat surface F and placing a semicircular core G therein, the core being held evenly between the sides of the segment by suitable means, such as a key H. The molten metal is then poured in between the core and the shell, and this, when hardened, will form a semicylindrical lining in the upper segment. The lower segment of the shell is similarly placed with respect to the same semicircular core and the molten metal is poured in between the core and the shell, thus forming another exactly semicylindrical lining, and it will be seen that when the upper and lower segments of the box are put together, as shown in Fig. 9, there will be a hole therethrough which will be exactly cylindrical, but will have its axis above the axis of the outside of the shell.

Having now described the construction and method of constructing my improved bearing-box, I will proceed to point out the method of using the same and its advantages. The practice in the past has usually been to form the two segments of the shell roughly by casting, then to place them edge to edge and turn the complete outer cylindrical surface to the box. When the lining was to be cast, the two halves were placed together and the lining cast in them roughly, and it was then necessary to true the lining on a lathe. This method necessitated a considerable loss of time in renewing the lining when worn, especially in view of the fact that the segments of the shells had to be kept together, as they could not be interchanged, as each segment corresponded with one other segment and no other. With my device it may first be pointed out that any lower segment for a given size of bearing may be used with any upper segment, as they are all made accurately similar, being turned on the same mandrel and the internal surface of the lining being cast from the same core. With this system a record may be kept of the mileage of every car using these bearings, and the size of the axle being known when it is about time to renew the lining it is only necessary to take one of the upper and one of the lower segments of the correct size, and using cores of proper size to suit the shaft the set of boxes for the core may be cast. Without any unnecessary delay the worn-out bearing-boxes may then be removed from the car at night or at any convenient time when the car is not in use and the already-prepared bearings substituted therefor. It may here be mentioned that it has been found in actual practice that in this way a complete new set of bearings may be put in a car and the old ones removed in about twenty-five minutes, whereas in the past it was frequently necessary to keep the car in the repair-shop for half a day or more while the same work was being done.

Various sizes of cores may be used to suit the shafts of different cars, as some shafts may become worn more than others.

It will now be seen that I have devised a cheap simple easily-constructed bearing for motor-boxes, which not only will increase the life of the bearing, but will also reduce the

chance of accident from the shaft wearing down till the armature is in contact with the fields, and further greatly reduces the time and expense in renewing the antifriction-lining.

It will be understood that certain features of the device shown and described may be varied without departing from the spirit of my invention. For example, the thickness of the antifriction metal as shown in the drawings is greater at the bottom and less at the top; but it will be understood that if desirable this lining may be made of even thickness all round, so long as the center of the hole for the shaft is located above the center of the outside of the bearing-box. I may also dispense with the safety-plate secured in the bottom segment and the dust-proof disk in the end of the box, as such features, though valuable in themselves, are not essential in all cases.

It is to be understood that although I have described the process of making the bearing-box I do not wish to abandon the said process to the public, as it is my intention to file a later application for patent of the United States therefor.

What I claim as my invention is—

1. A bearing-box comprising an upper and a lower segment, the upper segment being less than a semicircle and the lower segment being more than a semicircle, an antifriction-lining in said box having a passage for the shaft, the axis of said passage being in the plane of section between the upper and lower segments, whereby that portion of the lining in the lower part of the box is thicker than the portion in the upper part as and for the purposes specified.

2. In a bearing-box, the combination with the shell and antifriction-lining, of a safety-plate located in the bottom of the box and projecting inwardly from the inner face of the shell, said plate being formed of a harder metal and one having a higher temperature of fusion than the antifriction-lining, the inner surface of said plate being covered by said lining and adapted to support the shaft when it has worn through the lining to the lower limit of safety or thereabout as and for the purpose specified.

3. In a device of the class described, the combination with a shell and antifriction-lining having a hole therethrough for the shaft, the center of said hole being located above the center line of the shell so as to support the shaft at the highest point of safety or thereabout, of a safety-plate located in the bottom of the box and projecting inwardly from the inner face of the shell, said plate being formed of a harder metal and one having a higher temperature of fusion than the antifriction-lining, the inner surface of said plate being covered by said lining and adapted to support the shaft when it is worn through the lining to the lower point of safety or thereabout as and for the purpose specified.

Signed at the city of Ottawa, in the Province of Ontario, this 29th day of December, 1902.

SILAS WILLIAM BRADLEY.

Witnesses:

MAY LYON,

FRANK C. ASKWITH.