

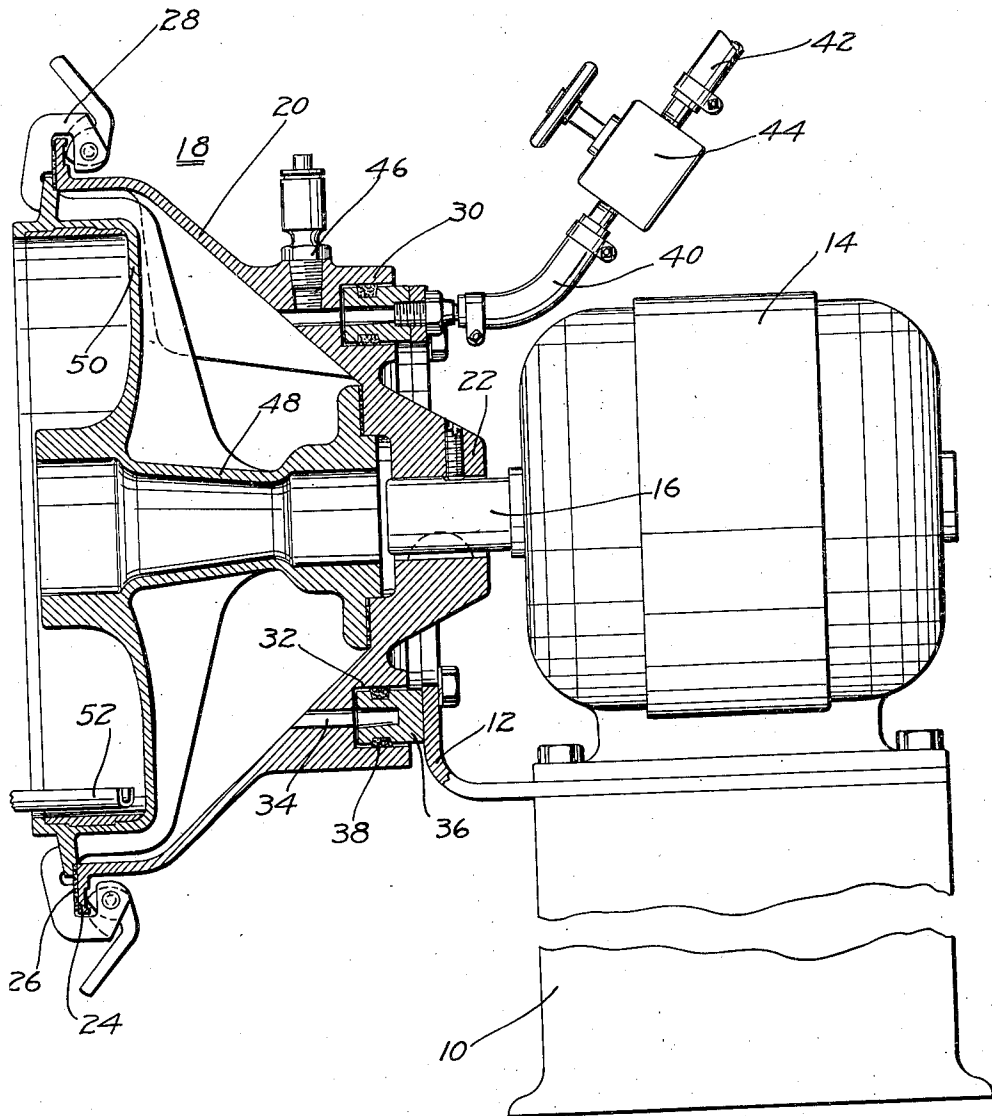
April 23, 1935.

F. C. FRANK

1,998,666

BRAKE

Filed May 31, 1932



INVENTOR.
FREDERICK C. FRANK
BY *A. H. Fowler*
ATTORNEY

UNITED STATES PATENT OFFICE

1,998,666

BRAKE

Frederick C. Frank, South Bend, Ind., assignor to
Bendix Aviation Corporation, South Bend, Ind.,
a corporation of Delaware

Application May 31, 1932, Serial No. 614,589

7 Claims. (Cl. 22—203)

This invention relates to brake drums, and more particularly to liners for brake drums.

Heretofore brake drums have been constructed from an aluminum alloy cast providing a housing member for a relatively thin stamped steel liner on which the friction elements of the brake rub. In order to use brake drum linings of a type which would score the low carbon steel necessary in the stamped liner, and to obtain the better braking surface, it is proposed to face the aluminum alloy casting on its braking surface with a comparatively thin layer of cast iron. Although cast iron liners have been heretofore inserted in aluminum brake drum housings, this operation has involved purely a mechanical operation; namely, that of inserting a machined cast iron lining into a machined brake drum housing.

These operations have not proved generally satisfactory, nor has it proved satisfactory to cast such combinations together with the so-called heat treated aluminum alloy, the temperature of which has been raised for heat treatment subsequent to casting, because after this heat treatment and quenching the temperature has to be again raised for what is known as "aging". The differential expansion of the cast iron and aluminum make the casting of a liner impossible in this type of alloy. The present invention aims to overcome these objections.

The invention broadly comprehends the utilization of the centrifugal casting process to apply a cast iron braking surface on the braking face or flange of an aluminum alloy casting previously heat treated. The essential factors of the invention consist in the application of a relatively small amount of cast iron centrifugally cast on the flange and in the application of water or other cooling medium to the aluminum alloy casting, so that its temperature is kept low enough to prevent re-annealing after the heat treatment.

The most important factor and the entire success of the invention is dependent upon the small total amount of the molten cast iron and the high rate of heat flow in the aluminum alloy casting.

An object of the invention is to provide a method for centrifugally casting a brake drum liner of cast iron on the braking flange of an aluminum alloy drum.

Another object of the invention is to provide a chuck and means associated therewith for cooling a work piece secured therein.

Other objects of the invention will appear

from the following description taken in connection with the drawing, which forms a part of this specification, and in which:

The drawing is a comprehensive view, largely in section and partly in diagram, illustrating the various parts which go to illustrate the present invention.

Referring to the drawing for more specific details of the invention, 10 represents a pedestal having suitably secured thereto a bracket 12. The pedestal has positioned thereon a motor 14 and the shaft 16 of the motor has suitably secured thereto a chuck indicated generally as 18.

The chuck includes a conical-shaped hollow member 20 having a hub 22 keyed or otherwise secured to the shaft 16. As shown, the conical member has a peripheral flange 24 on which is seated a gasket 26, and arranged on the flange in spaced relation are clamping devices 28.

The wall of the chuck has an enlarged annular portion 30 provided with an annular groove or channel 32 communicating with the interior of the chuck by a plurality of spaced openings 34. As shown, the annular channel 32 has positioned therein a ring or annular member 36 provided with suitable packing glands 38. The ring or annular member 36 is supported in a fixed position by the bracket 12. This annular member is connected through a suitable pipe 40 to a water supply pipe 42 with a suitable cut-off valve 44 interposed. Suitably positioned in the wall of the chuck is a safety valve 46.

As shown, a wheel hub 48 having the conventional brake drum 50 is positioned in the chuck and is retained against displacement by the clamps 28. The hub of the wheel is seated on the hub of the chuck, and a peripheral flange on the drum is seated on the peripheral flange of the chuck, so that the space between the drum and inner wall of the chuck is water tight.

With the hub and wheel secured in this position water is admitted through the supply line 40 to the chuck in a sufficient quantity to completely cover the enclosed side of the drum when the chuck is placed in rotation.

While the chuck is rotating with the drum secured in position and water within the space between the drum and the inner wall of the chuck, a small quantity of molten cast iron is fed through the trough 52 to the braking flange of the drum.

Because of the small quantity of molten cast iron deposited on the braking flange of this aluminum alloy drum and because of the cooling effect of the water within the chuck, a perfect

bond between the aluminum alloy drum and the cast iron liner is effected.

Although this invention has been described in connection with certain specific embodiments, the principles involved are susceptible of numerous other applications that will readily occur to persons skilled in the art. The invention is, therefore, to be limited only by the scope of the appended claims.

Having thus described the various features of the invention, what I claim as new and desire to secure by Letters Patent is:

1. The method of permanently applying a cast iron liner to a heat treated aluminum alloy drum, which includes applying a cooling fluid on the outside of the drum, rotating the drum, and centrifugally casting iron on the inside of the drum while subjected to the cooling fluid.

2. The method of permanently securing a cast iron liner on a heat treated drum flange without disturbing the heat treatment which comprises applying water to the back of the drum and rotating the drum, and centrifugally casting an iron liner on the inside of the drum during said rotation.

3. The method of permanently securing a cast iron liner on a heat treated aluminum alloy drum flange without disturbing the heat treatment which comprises applying water to the back of the drum and rotating the drum, and centrifugally casting an iron liner on the inside of the drum during said rotation.

4. The method of permanently securing a cast iron liner to a heat treated aluminum alloy drum

without disturbing the heat treatment thereof comprising securing the drum in an open ended chuck so as to seal the chuck, and expose the exterior of the drum to the space within the chuck, admitting water into the chuck and into contact with the exterior of the drum, rotating the chuck, and applying molten iron to the flange of the drum while the chuck is rotating.

5. A casting machine comprising a horizontal axis rotatable hollow chuck, means for detachably securing a work piece in the chuck to substantially seal the hollow chamber, and means for applying a cooling fluid to the hollow space when rotating the chuck.

6. A casting machine comprising a horizontal axis rotatable hollow chuck, a flange on the chuck for supporting a work piece, means for detachably securing the work piece in position to close one end of the chuck, and means on the other end of the chuck for admitting a cooling medium.

7. A casting machine comprising a horizontal axis rotatable hollow chuck open at one end and closed at its other end, means for detachably securing a work piece in the open end, an enlarged portion on the closed end having an annular channel communicating with the interior of the chuck through spaced openings, a ring positioned in the channel having a groove registering with the channel, means connecting the groove to a supply of cooling fluid, and means for pouring iron into the workpiece to be cast permanently therein.

FREDERICK C. FRANK.