E. H. SHERBONDY.

TURBO COMPRESSOR CASING.

APPLICATION FILED AUG. 1, 1918.

1,400,323. Patented Dec. 13, 1921.

FIG. 1.

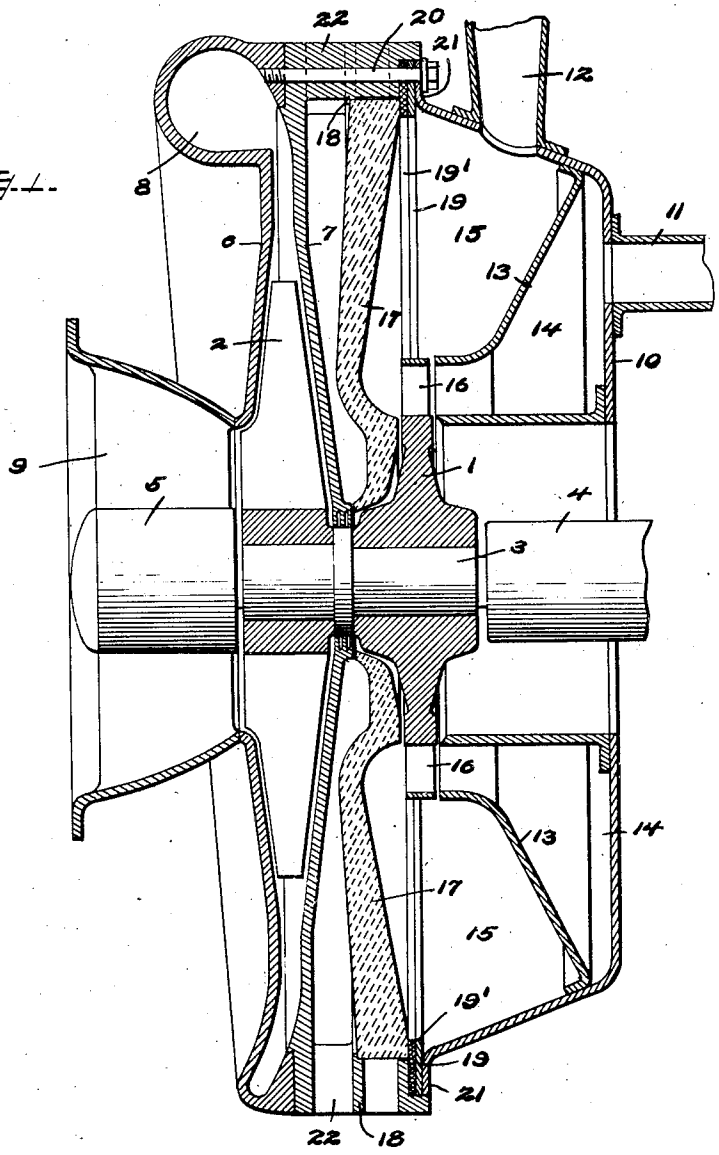
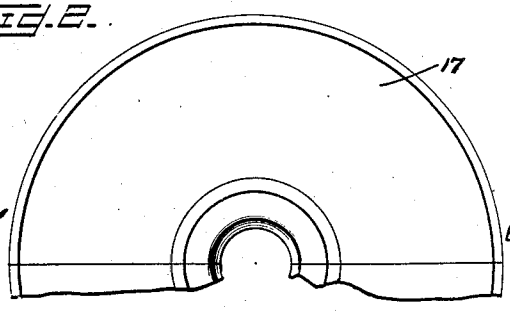


FIG. 2.



WITNESS

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TURBO-COMPRESSOR CASING.

1,400,323. Specification of Letters Patent. Patented Dec. 13, 1921.

Application filed August 1, 1918. Serial No. 247,848.

To all whom it may concern:

Be it known that I, EARL H. SHERBONDY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Turbo-Compressor Casings, of which the following is a specification.

This invention relates to a turbo-compressor unit and more particularly concerns the casing elements for said unit.

The unit consists of a turbine wheel and a compressor wheel mounted on the same shaft therewith. The turbine is adapted to be operated by the exhaust gases from an internal combustion engine, it in turn operating the compressor wheel of the usual centrifugal type to compress air for combustion in the engines, or for other purposes. The turbo-compressor casing is of that general type disclosed in my co-pending case Serial No. 224,892, filed Mar. 26, 1918.

The high temperature of the exhaust gases will obviously cause the turbine casing to become very hot. It has been found that with a casing made entirely of metal, parts of the casing, especially the back-plate of the turbine casing are distorted by the high temperature and also by the pressure of the exhaust gases against it, as they leave the turbine buckets. The back plate near the turbine buckets is subject to a greater concentration of gas, as it leaves the buckets, which causes this part to be more highly heated than the parts farther out and this unequal heating also causes distortion of the plate.

It is an object of this invention to provide a back plate for the turbine casing of material that will be substantially unaffected by the heat of the exhaust gases.

To this end this back plate is made of refractory material. As refractory material, there may be used:

Graphite, carborundum, alundum, fused silica, crucible clay. Any other desired refractory material, may of course be used.

Other objects and advantages will appear as the description proceeds.

In the drawings illustrating an embodiment of my invention, Figure 1 is a side view in section of a turbine casing, showing my invention and Fig. 2 is an end view of the back plate used, shown broken away and on a smaller scale.

Referring now to the drawings, the turbo-compressor unit, is shown as consisting of a turbine wheel 1 and a compressor wheel 2, both mounted on a common shaft 3, which in turn is mounted in bearings 4 and 5.

The wheel 2, is of an ordinary centrifugal type and has associated therewith a front casing element 6 and a rear casing element 7, the two being assembled to inclose the wheel 2 and to define a chamber 8, for the compressed air. The air enters the wheel 2, through the intake mouth 9.

The turbine casing comprises a main casing element 10, which is annular and shaped substantially like a shallow dish-pan. This casing is provided with one or more inlet ports 11 and one or more exhaust ports 12, for the inlet and exhaust respectively of the gases that operate the turbine.

Positioned within the casing element 10, there is an annular diaphragm 13, which defines inlet and exhaust chambers 14 and 15 respectively. The inner part of the diaphragm 13, terminates just adjacent the buckets 16 of the turbine, in order to guide the gas to said buckets.

The turbine casing is completed by the annular backing plate 17, located on the other side of the turbine buckets from the diaphragm 13. This plate 17 is positioned in the path of the gases leaving the buckets 16 and guide these gases into the exhaust chamber 15, from whence they escape to the atmosphere through the exhaust port 12. This backing plate 17, it has been found, when made of sheet metal is subject to distortion by the heat and to dislocation by the pressure of the exhaust gases against it, as they leave the turbine buckets.

On account of the small clearances used in such a structure, this distortion has caused binding of the parts and leakage of gas. This distortion is due to the unequal heating of the back plate, it being at a much higher temperature toward the inner part, adjacent the bucket 16, than at the outer part, toward the periphery.

In order to overcome these disadvantages, this back plate is made of a material which is substantially unaffected by heat, that is to say, it is made of refractory material, for example, graphite, carborundum, fused silica, crucible clay. The plate 17, is made sufficiently thick to prevent any undue transmission of heat to the adjacent compressor

casing 7. This plate 17 is annular and is held in position by being clamped against an annular rib 18, which rib is in turn supported by lugs 22 cast integral with the casing 7 and said rib. Plate 17 is held against this rib by an asbestos washer 19′ and a steel washer 19, which in turn are clamped by bolt 20, between an edge 21 of the turbine casing and the rib 18. For convenience in assembling, plate 17, may be made in sections.

While I have illustrated a possible embodiment of my invention, it should be understood that the invention may be carried out in other ways, as defined within the scope of the following claims.

I claim:

1. In combination with a gas engine turbine, a peripherally supported baffle in the path of the exhaust from said turbine, said baffle being free to flex along its body without transmitting the distortion substantially to the support of said baffle.

2. In combination with a gas engine turbine, a peripherally supported refractory baffle in the path of the exhaust from said turbine, said baffle being free to flex along its body without transmitting the distortion substantially to the support of said baffle.

3. In combination with the exhaust casing of a gas engine turbine, a deflecting baffle in the path of the exhaust gases of said turbine supported in said casing along the edge of said baffle, said baffle being free to flex along its body without transmitting the distortion substantially to the support for the edge of said baffle.

4. In combination with the exhaust casing of a gas engine turbine, a refractory deflecting baffle in the path of the exhaust gases of said turbine supported in said casing along the edge of said baffle, said baffle being free to flex along its body without transmitting the distortion substantially to the support for the edge of said baffle.

5. A turbine casing comprising an exhaust chamber for hot gases having a baffle as one wall thereof, a deflection chamber contiguous to and for said baffle wall, and a compressor means contiguous to said deflection chamber operated by said turbine.

In testimony whereof I affix my signature.

EARL H. SHERBONDY.