W. S. SUTTON.

PUMP.

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1,053,677.

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Fig. 1.

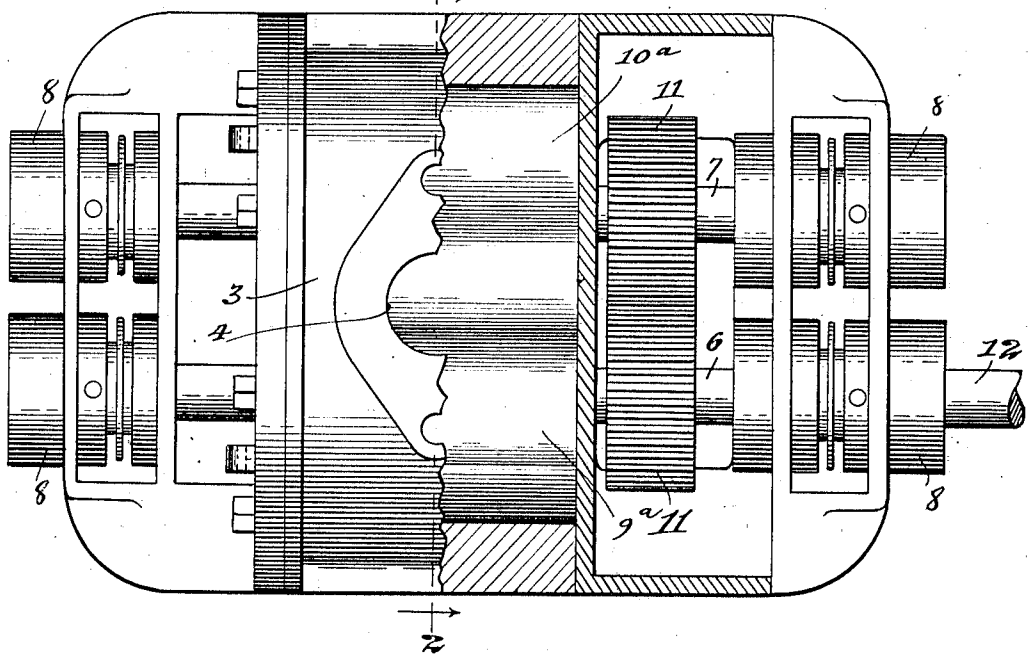
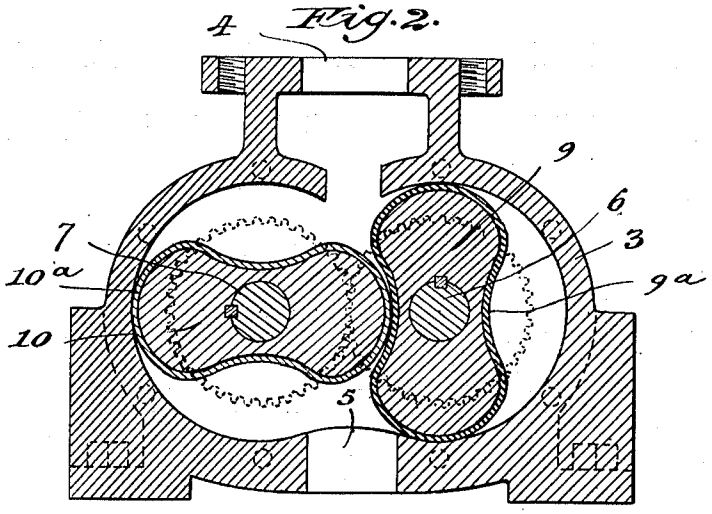


Fig. 2.



Witnesses,
F. S. Mann.
S. M. Ryan

Inventor,
William S. Sutton.
By Offield, Towle, Graves & Offield.
Attys

UNITED STATES PATENT OFFICE.

WILLIAM S. SUTTON, OF ROCKFORD, ILLINOIS, ASSIGNOR TO AMERICAN RADIATOR COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

PUMP.

1,053,677. Specification of Letters Patent. Patented Feb. 18, 1913.

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To all whom it may concern:

Be it known that I, WILLIAM S. SUTTON, a citizen of the United States, residing at Rockford, in the county of Winnebago, State of Illinois, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

My invention relates in general to pumps, but more particularly to air pumps used in vacuum cleaning apparatus where the air drawn into the apparatus passes through the air pump.

The invention is particularly directed to the impellers or blades of the pump.

In an air pump of well-known construction there are two impellers which revolve within a casing like a two-tooth gear to produce a positive and continuous suction. These impellers do not touch each other at any point but their adjustment has to be extremely fine. The dust-laden air drawn into the pipes of the vacuum apparatus passes through the air pump and if there are any foreign substances of any body drawn into the apparatus and not removed before reaching the air pump, considerable injury is done to the impellers, or other parts of the pump.

One of the objects of my invention is to surface the impellers used in air pumps with a soft metal, such as lead, to lessen vibration and to provide a surface that may be easily machined, but I have found that where the surfaces of both impellers are formed of metal of the same degree of hardness it results in the stripping or tearing of such metal from the impellers when some foreign substance drawn through the pipes is caught between them. This is due to the fact that the two metals are of the same degree of hardness and the foreign substance will first tear a piece of metal from one impeller which will injure the other impeller, resulting in the rolling up of a ball or strip of metal, a portion of which is collected from each impeller and thus not only destroying the efficiency of the machine, but frequently resulting in its breaking.

It is to overcome this disadvantage to impellers composed of material of the same hardness that my invention is further directed. It is also desirable to surface the impellers with material that will not rust, since water is frequently introduced into the pump and by using a soft metal, or a metal at least softer than the core of the impellers, the noise from the operation of the pump is considerably lessened.

In the accompanying drawing, Figure 1 is a top view of my improved pump with the casing broken away; Fig. 2 is a section on the line 2—2 of Fig. 1.

Referring now more particularly to the drawing, the pump consists of a casing 3 having an inlet port 4 and an outlet port 5. Mounted within the casing are shafts 6 and 7 having suitable bearings 8 and upon which are keyed the impellers 9 and 10. A gear 11 is mounted upon each shaft, and said gears are in mesh so that both shafts may be driven by a single drive-shaft 12.

I claim nothing new in the general pump construction since it is the common form of rotary pump of the cycloidal type in which the impellers 9 and 10 revolve like a two-tooth gear within the casing 3 producing a positive and continuous suction at the intake opening 4.

One feature of my invention resides in the construction of the impellers, the body portions of which are made of cast iron or any other suitable material, over which is molded or otherwise secured the surface material 9^a and 10^a, which are composed of metals of different degress of hardness.

Where the surfaces of the two impellers are composed of soft metal of the same degree of hardness, a foreign substance with any body whatsoever, after being partially embedded in one impeller, will injure the surface of the other impeller and if the machine is further operated the foreign substance picks up from each impeller a small amount of material upon each revolution, resulting in the ribboning or stripping of the surface material.

To overcome both the objections to impellers with hard surfaces, such as cast iron and those wherein the surfaces are of soft material, but of the same degree of hardness, I cover the body of the impellers with metals which are extremely low in elastic characteristics, and while I do not limit myself to any particular material, I preferably surface one impeller with common Babbitt metal and the other impeller with type metal, preferably of low grade, both of which substances have low elastic qualities and are of different degrees of hardness, and neither of these metals will rust. The result of such a construction

is this: that when a foreign substance with any body is caught between the impellers, the foreign substance will be either embedded in the surface of the impeller having the softer material thereon and such foreign substance will either remain in the surface of the impeller or be thrown therefrom, but in no event will material from one impeller be transferred and adhere to the other one and thus pass back and forth particles of metal so as to result in the stripping or ribboning of the metal surfaces from either or both impellers.

I do not wish it to be understood that I am limited to the particular metals herein designated, since it is obvious that other metals might be used having substantially the same characteristics without departing from the spirit of my invention, nor am I limited to the particular means for coating the impellers, such as by molding the surface metals thereon, and;

Therefore, without confining myself to the details herein specified, I claim:

1. A pump having impellers, the air impelling surfaces of which are composed of metal of low elastic characteristics and of different degrees of hardness.

2. A pump having impellers, the air impelling surfaces of which are composed of metal low in elastic characteristics and unequally yieldable to the same pressure.

WILLIAM S. SUTTON.

Witnesses:

ROBERT LATHROP,

LOUISE LAWRENCE.