

Sept. 8, 1959

Y. KIBA

2,902,941

PLASTIC PUMP IMPELLER

Filed Aug. 2, 1957

Fig. 1.

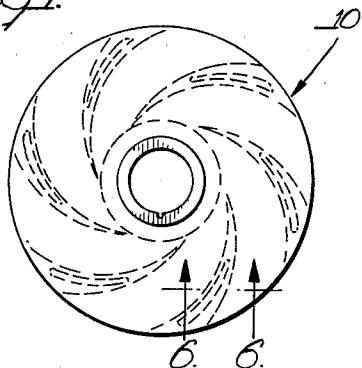


Fig. 2.

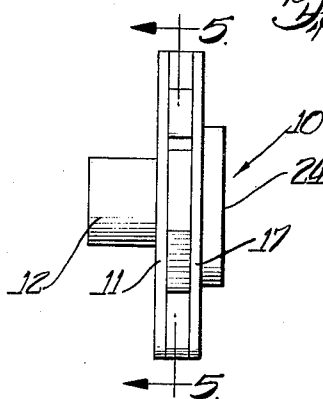


Fig. 3.

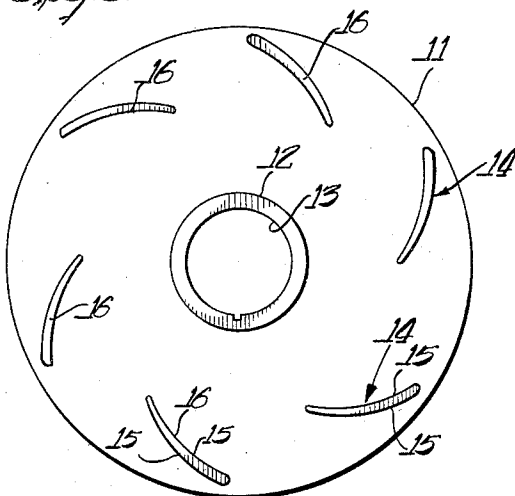


Fig. 4.

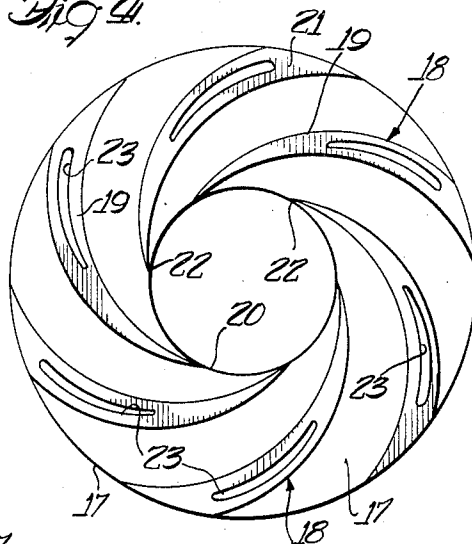


Fig. 5.

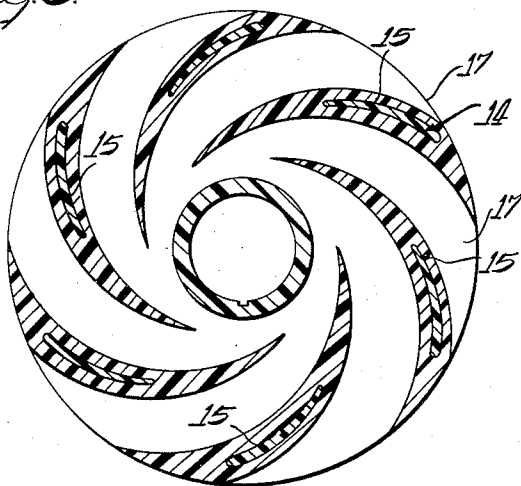
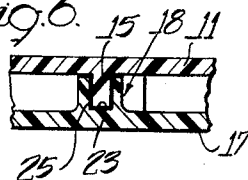


Fig. 6.



Inventor
Yorio Kiba
Helmuth Q. Vogel
Attorney

1

2,902,941

PLASTIC PUMP IMPELLER

Yoneo Kiba, Chicago, Ill., assignor to Continental
Plastics Corporation, a corporation of Illinois

Application August 2, 1957, Serial No. 676,029

5 Claims. (Cl. 103—114)

This invention relates to pumps and more particularly it relates to a specific type of impeller. More particularly the invention relates to a plastic vane type impeller for pumps.

In many pump applications it has been found that plastic impellers have a high degree of durability and can be produced much more economically than the usual metal type of pump impeller. Vane type of plastic impellers have been manufactured previously and in order to produce such impellers it has been necessary to mold the same in two pieces by the formation of two separate disks, one of which includes the vanes, the said two disks then being suitably secured together in assembly to produce the impeller type pump. In general, however, such difficulty has been experienced in suitably securing the two disks in assembly and suitable bonding agents which have been utilized have been unsatisfactory since by virtue of the vane type construction the bonding surfaces to which the bonding cement could be applied were quite limited. It is a prime object of this invention therefore to provide an improved plastic impeller having a novel construction wherein the two disks of the impeller may be permanently secured together.

A still further object of the invention is to provide an improved vane type of plastic impeller for pumps, the said impeller comprising a pair of plastic disks, one of said disks having a plurality of spirally shaped vanes including grooves in the vanes and the other disk including a plurality of projections which engage the grooves of the first mentioned disk for suitably securing the two plastic disks in assembly.

A still further object of the invention is to provide an improved plastic impeller comprising a pair of disks, one of said disks including a plurality of spirally shaped plastic vanes having spirally extending grooves in said vanes, the other disk including a plurality of projections which complement and engage the grooves, the said two disks being held in permanent assembly by means of a plastic bonding agent disposed above the projections within the grooves to securely fasten the parts in assembly.

These and other objects will become readily more apparent from a reading of the description when examined in connection with the accompanying sheet of drawing.

In the drawing:

Figure 1 is a side elevational view of a plastic pump impeller;

Figure 2 is an end elevational view of the plastic impeller shown in Figure 1;

Figure 3 is an enlarged view of a first disk of a plastic pump impeller, the said disk including a plurality of projections.

Figure 4 is an enlarged elevational view of another plastic disk forming a portion of a pump impeller, the said disk having a plurality of spirally shaped vanes;

Figure 5 is an enlarged cross sectional view through a plastic pump impeller taken particularly along the line 5—5 of Figure 2; and

Figure 6 is an enlarged sectional detail view of a portion

2

of a pump impeller taken substantially along the line 6—6 of Figure 1.

The pump impeller to which the present invention relates is generally designated by the reference character

10. Impeller 10 is made of a plastic material which can suitably be manufactured by a plastic molding technique. The impeller 10 comprises a first disk 11 having a hub 12 providing an opening or bore 13. The impeller disk 11 comprises a plurality of integral projections 14 which are spirally or helically shaped. Each projection 14 includes outer walls 15 and an outwardly disposed flat surface 16.

The impeller 10 also comprises a second disk 17 having molded thereon a plurality of projecting vanes 18. The vanes 18 each comprise a body 19 of spiral or helical formation and the second disk 17 also includes a centrally disposed opening 20. Each body 19 of each vane 18 comprises a substantially wide portion 21 immediately adjacent the outer peripheral edge of the disk 17. The body 19 of each vane 18 tapers to a point 22 adjacent the opening 20. Each body 19 also includes an elongated spirally shaped groove or recess 23. The disk 17 as shown in Figure 2 also includes a hub 24.

Each disk 11 and 17 comprises a plastic material and may be formed in a suitable plastic forming technique such as by a molding process. The projections 16 and the vanes 18 are all integral with the disks. In assembly the projections 14 are completely coated by a suitable bonding cement of a type which is normally utilized in connection with the assembly of plastics. Particular care is taken to coat the outer sides or walls 15 of each projection 14 and also the flat face 16. The two disks 11 and 17 are then placed into assembly by placing each of the projections 14 into complementary mating relation with the grooves 23. The grooves 23 also, as best shown in Figure 6, are also flat on their bottoms and as indicated by the numeral 25 the bonding cement is completely placed around the projection and the said cement also covers all of the inner surfaces of the groove and particularly the lower flat bottom portion of the said groove 23. Thus upon drying of the bonding cement the two disks are tightly held together in assembly since the bonding cement disposed within each groove covers considerable area so that permanent assembly of the two disks is assured. By virtue of the tongue and groove relation of the projections 14 and grooves 23 the disks cannot become axially displaced from each other. By virtue of the novel bonding of the two disks the same cannot be separated and thus the vane-type impeller will remain as a completely assembled unit which will perform its intended function without the possibility of the two disks becoming separated.

Thus it is apparent that the objects of the invention have been fully achieved and it must be understood that modifications and changes may be made without departing from the spirit of the invention as disclosed or the scope thereof as defined in the appended claims.

What is claimed is:

1. A plastic impeller comprising a first disk having a first centrally disposed opening, a hub portion on said first disk concentric with said first opening, said first disk including a first surface having a plurality of helical projections integral with and extending outwardly of said surface, said projections each having curved outer sides and a substantially flat outer face, a second disk connected to said first disk, said second disk having a second centrally disposed opening in registry with said first disk, said second disk having a second surface including a plurality of outwardly projecting helically shaped vanes, each vane comprising a body having a flat outer face, each body being substantially wide in cross section at a point at the outer peripheral edge of said second disk, each said body

3

including sides progressively tapering inwardly to provide a relatively narrow body portion adjacent the second opening of said disk, a helically shaped groove disposed in the outer face of each body, each said groove having inner walls extending axially and a flat bottom portion positioned at the bottom thereof, said projections of said first disk being positioned in complementary mating engagement with said grooves, and a solidifiable fluid plastic bonding element disposed in each said groove in bonding relation between the flat bottom portion thereof and the flat outer face of each said projection and between the sides of said projections and in the inner walls of said grooves.

2. A plastic impeller comprising a first disk having a first centrally disposed opening, said first disk including a first surface having a plurality of integral helical projections extending outwardly of said surface, said projections each having outer sides and a substantially flat outer face, a second disk connected to said first disk, said second disk having a second surface including a plurality of integral outwardly projecting helically shaped vanes, each vane comprising a body having a flat outer face, each body being substantially wide in cross section at a point at the outer peripheral edge of said second disk, each said body including sides progressively tapering inwardly to provide a relatively narrow body portion adjacent the second opening of said disk, a helically shaped groove disposed in the outer face of each body, each said groove having inner walls and a flat bottom portion positioned at the bottom thereof, said projections of said first disk being positioned in complementary mating engagement with said grooves, and a solidifiable fluid plastic bonding element disposed in each said groove in bonding relation between the flat bottom portion thereof and the flat outer face of each said projections and between the sides of said projections and the inner walls of said grooves.

3. A plastic impeller comprising a first disk, said first disk including a first surface having a plurality of integral curved projections extending outwardly of said surface, said projections each having outer sides and a substantially flat outer face, a second disk connected to said first disk, said second disk having a second surface including a plurality of integral outwardly projecting curved vanes, each vane comprising a body having a flat outer face, a curved groove disposed in the outer face of each body, each said groove having inner walls and a flat bottom portion positioned at the bottom thereof, said projections of said first disk being in complementary mating engagement with said grooves, and a solidifiable fluid plastic bonding element disposed in each said groove in bonding relation between the flat bottom portion and the flat outer face of each said projections and between

4

the sides of said projections and the inner walls of said grooves.

4. A plastic impeller comprising a first disk having a plurality of integral spirally extending vanes projecting outwardly of said first disk, each vane having a generally spirally extending narrow groove with inner side walls and terminating in a substantially flat bottom, a second disk connected to said first disk, said second disk comprising a plurality of integral spirally extending projections extending outwardly of said disks, said projections each including sides and a flat outer surface, said projections being positioned for engaging said grooves in complementary mating relation, and means connecting each projection in each groove comprising a solidifiable fluid plastic bonding material disposed between the inner walls of said grooves and the sides of said projections and between the flat bottoms of said grooves and the flat outer surface of said projections.

5. A plastic impeller comprising a first disk having a plurality of vanes integral with and projecting outwardly of said first disk, each vane including a narrow groove having inner side walls and terminating in a substantially flat bottom, a second disk connected to said first disk, said second disk comprising a plurality of projections integral with and extending outwardly of said second disk, said projections each having sides and a flat outer surface, said projections being positioned for engaging said grooves in complementary mating relation, and means connecting each projection in each groove comprising a solidifiable fluid plastic bonding material disposed between the inner walls of said grooves and the sides of said projections and between the flat bottoms of said grooves and the flat outer surfaces of said projections.

References Cited in the file of this patent

UNITED STATES PATENTS

1,967,182	Allen	July 17, 1934
2,120,277	Grierson	June 14, 1938
2,347,034	Doran	Apr. 18, 1944
2,402,204	Phelan et al.	June 18, 1946
2,433,583	Adams	Dec. 30, 1947
2,478,306	Orr	Aug. 9, 1949
2,486,619	Troxler	Nov. 1, 1949
2,625,884	Welsh	Jan. 20, 1953
2,732,423	Morrison	Jan. 24, 1956
2,764,099	Wernert	Sept. 25, 1956
2,782,722	Chubbuck	Feb. 26, 1957

FOREIGN PATENTS

365,817	Great Britain	Jan. 28, 1932
720,956	Great Britain	Dec. 29, 1954
733,578	Great Britain	July 13, 1955