July 18, 1939. O. FRANCK 2,166,758

PUMP

Filed Dec. 16, 1936

Fig. 6.

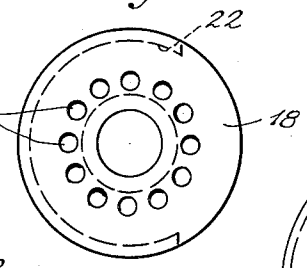


Fig. 4.

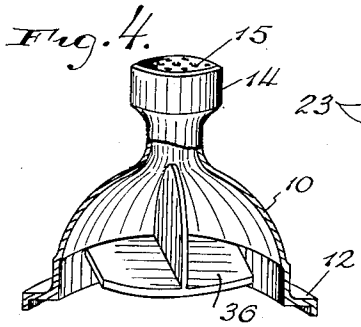


Fig. 2.

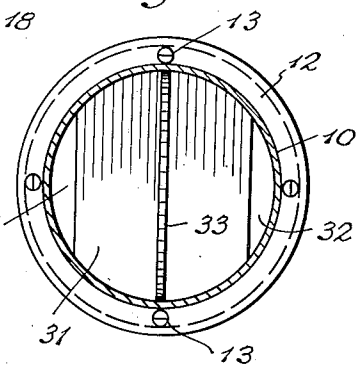


Fig. 7.

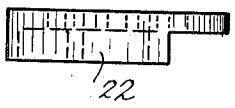


Fig. 5.

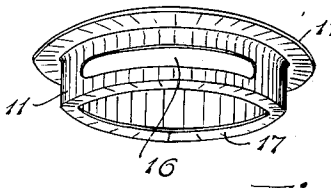


Fig. 3.

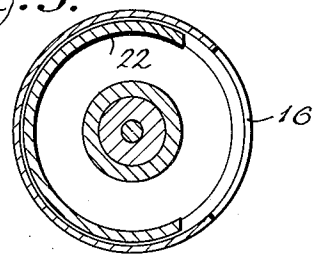
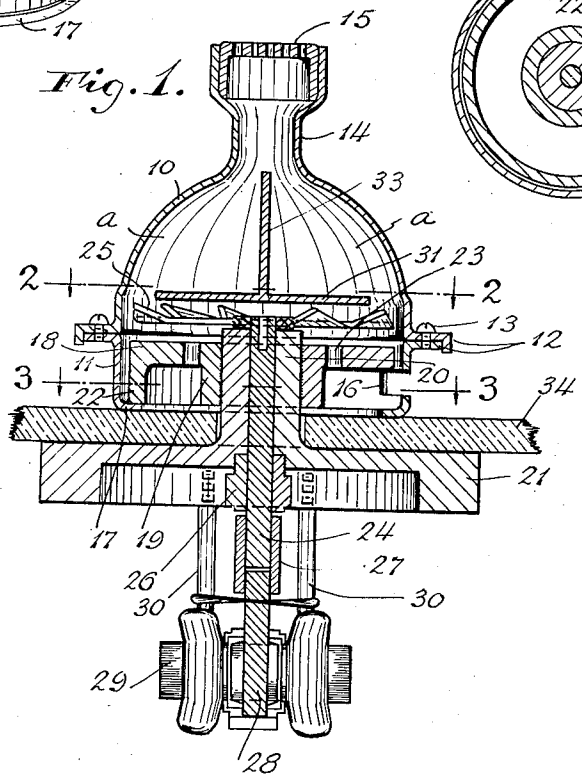


Fig. 1.



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PUMP

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1 Claim. (Cl. 103—97)

My invention relates to pumps and more particularly to pumps designed for pumping liquids and has for its object to provide a pump of small dimensions constructed and operating in a novel manner to develop a relatively high pumping power. The invention contemplates further a pump of the indicated type which is particularly adapted for use in connection with fountains and especially with miniature fountains and the like. Other more specific objects will appear from the description hereinafter and the features of novelty will be pointed out in the claim.

In the accompanying drawing, which illustrates an example of the invention without defining its limits, Fig. 1 is a sectional elevation of the novel pump embodied in a miniature fountain; Fig. 2 is a horizontal section taken approximately on the line 2—2 of Fig. 1; Fig. 3 is a similar view on the line 3—3 of Fig. 1; Fig. 4 is a perspective view, partly in section, of a part of the pump casing; Fig. 5 is a perspective view of a second part of said pump casing; Fig. 6 is a detail plan view of an interior element, and Fig. 7 is a detail side view thereof.

For convenience of description the novel pump has been illustrated in a form adapted particularly for fountains, and more especially miniature fountains such as are combined with aquariums; it is therefore to be distinctly understood that the selected exemplification of the invention in no sense defines the limits thereof either as to details of construction or as to its scope of use.

In the form shown in Fig. 1, the casing of the novel pump consists of a main section 10 and an auxiliary section 11, said sections being detachably connected with each other in any conventional manner as by means of co-operating flanges 12 and screws 13. The main section 10 of the casing is provided with an outlet chamber and an outlet 14 leading therefrom; the exit end of said outlet 14 may, as illustrated, accommodate a perforated cap 15 either premanently or removably fastened in place in any convenient way. The auxiliary section 11, as shown in Fig. 5, is provided with a slot 16 in its annular wall which cooperates with an internal element of the pump to function as a valve as will appear more fully hereinafter; in the specific form disclosed in the selected example, the bottom of the section 11 is provided with an annular flange 17 and is otherwise open.

The pump as shown further includes an internal element 18 having an internally screw threaded hub 19 adapted for threaded engagement with the bearing projection 20 of a nut or clamping member 21. The internal element 18, in addition, includes a depending flange 22 extending partly around the periphery of the element 18 which is preferably of circular form as shown in Figs. 3 and 6; with this arrangement, the space between the ends of the flange 22 constitutes an inlet to the chamber defined by said flange 22, said inlet in co-operation with the slot 16 of the casing section 11 providing a valve for the purpose to be more fully set forth hereinafter. The element 18, in addition, is provided with a plurality of perforations 23 in concentric relation to the hub 19 as shown in Fig. 6; the perforations or apertures 23 extend in the direction of the axis of the element 18 and in the assembled pump establish communication between the aforesaid chamber beneath the element 18 as defined by the flanges 22 and the space within the pump casing above said element 18. The projection 20 constitutes a bearing for a shaft 24 to the upper end of which is secured an impeller 25, the arrangement being such that the impeller 25 rotates in a plane parallel with and above the element 18 as shown in Fig. 1. To provide against unintentional leakage, the shaft 24 may extend through a suitable stuffing box 26 and in any case is coupled by means of a connection sleeve 27 or its equivalent to the driving shaft 28 of a suitable electric or other motor 29; in the illustrated example of the invention, the motor 29 is suspended from and supported upon the nut 21 by means of supporting rods 30 as illustrated in Fig. 1.

The interior of the main section 10 of the pump casing is provided with a partition member 31 extending transversely across the casing section 10 in a plane parallel with the plane in which the impeller 25 rotates, said partition member 31 being shaped and dimensioned to provide opposite side openings 32 in the manner illustrated in Figs. 1, 2 and 4. A second partition member 33 projects from the partition member 31 in perpendicular relation thereto and is dimensioned and shaped to fit the interior of the casing section 10 and to extend into proximity and preferably up to the outlet 14 in substantial axial registry with the axis of the latter, as shown in Figs. 1 and 4.

In the preferred construction the partition member 31 is located at the inlet end of the outlet chamber of the pump and substantially forming a bottom therefor, said member 31 being provided with the opposite side openings 32 which communicate with said outlet chamber. The second partition member 33, as illustrated in Fig. 1, divides the outlet chamber into two separate

compartments *a* each of which communicates with the outlet **14** and is in communication with one of the openings **32**; furthermore the entry end of the outlet **14** is divided by said partition member **33**, into two separate passages whereby the compartments *a* of the outlet chamber are independently connected with said outlet **14**.

In the arrangement selected to exemplify the invention, the pump is located within a tank or other container **34** which may be of any conventional type, and is connected with the bottom of said tank **34** by means of the internal element **18** and the nut or clamping member **21**; that is to say, as shown in Fig. 1, the bearing projection **20** projects through an opening in the bottom **34** of the tank into the interior of the auxiliary casing member **11**; the internal element **18** is screwed upon the projection **20** until the lower edge of the flange **22** is brought into engagement with the flange **17** of the section **11** to thereby clamp the pump upon the inside of the tank **34** and the motor and its associated elements upon the outside thereof. The adjustment of the internal element **18** on the threaded projection **20** is such that the clamping pressure exerted on the flange **17** will be sufficient to secure the pump and its motor securely in operative position; at the same time the aforesaid clamping pressure is insufficient to prevent the rotation of the casing sections **10** and **11** relatively to the internal element **18** for adjusting the flow of the water or other liquid to the pump as will be more fully pointed out hereinafter. In practice, water or other liquid will be contained in the tank **34** in such an amount that the level of the water will be slightly above the partition member **31** for instance at the point indicated by the section indicating line **2**—**2** in Fig. 1. It will be understood that the motor **29**, if it is electrically operated, will be connected with a suitable source of electrical energy and controlled as to starting and stopping by means of a switch of any conventional type.

In practice assuming the motor **29** is operating, the shaft **24** will be rotated and accordingly will correspondinly rotate the impeller **25**. As the impeller is thus operated, water will be forced through the opposite side openings **32** into the compartments *a* upon opposite sides of the partition member **33** and above the partition member **31**. As the action of the impeller **25** continues, the volume of the water or other liquid will be progressively built up in the two compartments *a* at the same time the partition member **33** acts to build up and develop pressure in the volume of water or other liquid so that the latter is forced outwardly through the apertures **15** in the form of a spray or the like. In the illustrated example of the pump, the water or other liquid after it has been forced through the perforated head **15** may be returned to the tank or other container **34** for repeated use by the pump, or said tank or container **34** may be connected in any convenient manner with a source of water or other liquid supply whereby the water or other liquid in the tank or other container **34** is replenished.

The flow of water and consequently the height of the spray may be controlled by rotatably adjusting the pump casing sections **10** and **11** so as to adjust the position of the slot **16** relatively to the space between the opposite ends of the flange **22** of the element **18**. As the rotative adjustment of the pump casing in the manner described continues, more or less of the slot **16** will project over the flange **22** and thereby reduce the size of the inlet through which the water or other liquid enters into the interior of the pump casing. In other words, the space between the opposite ends of the flange **22** is the equivalent of a slot so that the element **18** and the casing **10**, **11** are provided wtih co-operating slots adjustable relatively to each other at will to control the flow of water or other liquid into the pump. It will be understood that the aforesaid rotative adjustment of the pump casing **10**, **11** may be readily accomplished by simply exerting a force sufficient to overcome the clamping force of the internal element **18** upon the flange **17**; when the desired adjustment has been effected, this clamping force will serve to maintain the casing **10**, **11** in its set position.

The provision of the partition members **31** and **33** located and arranged interiorly of the pump casing as illustrated for instance in Fig. 1, makes it possible to build up volume and pressure within the pump casing with the application of only a minimum amount of pumping power. As a result, the pump itself may be of small dimensions and compact form and efficiently operated for its intended purpose by a motor of relatively small size. While the novel pump is ideal in association with miniature fountains, the pump is equally well adapted for fountains regardless of the size and for many other purposes in which a pump of relatively compact form and high power is required.

Various changes in the specific forms shown and described may be made within the scope of the claim without departing from the spirit of the invention.

I claim:

A pump comprising a circular casing having an outlet chamber and an upright outlet leading therefrom, and having an inlet slot in its peripheral wall, a bearing projection extending into said casing in axial registry with said outlet, a clamping member carried by said bearing projection exteriorly of said casing, a stationary apertured element carried by said projection within said casing and having an interrupted flange forming an opening adapted to register with said inlet slot, a driving shaft journalled in said bearing projection, an impeller carried by said shaft and rotatable thereby in a plane parallel with said element, a horizontal partition member in parallel proximity to said impeller at the inlet end of said outlet chamber provided with opposite site openings leading thereto, an upright partition member projecting from said horizontal partition member in approximate registry with the axis of said outlet whereby said outlet chamber is divided into two separate compartments, and a motor mounted on said clamping member and operatively connected with said driving shaft for operating the same and said impeller, said casing being rotatably adjustable at will relatively to said stationary element whereby said inlet slot is shifted relatively to the opening of said element to control the flow of liquid into the pump, and being clamped between said clamping member and stationary element so as to be held in adjusted position by friction.

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