

(No Model.)

W. SWABEL.
CENTRIFUGAL PUMP.

No. 538,050.

Patented Apr. 23, 1895.

Fig. 1.

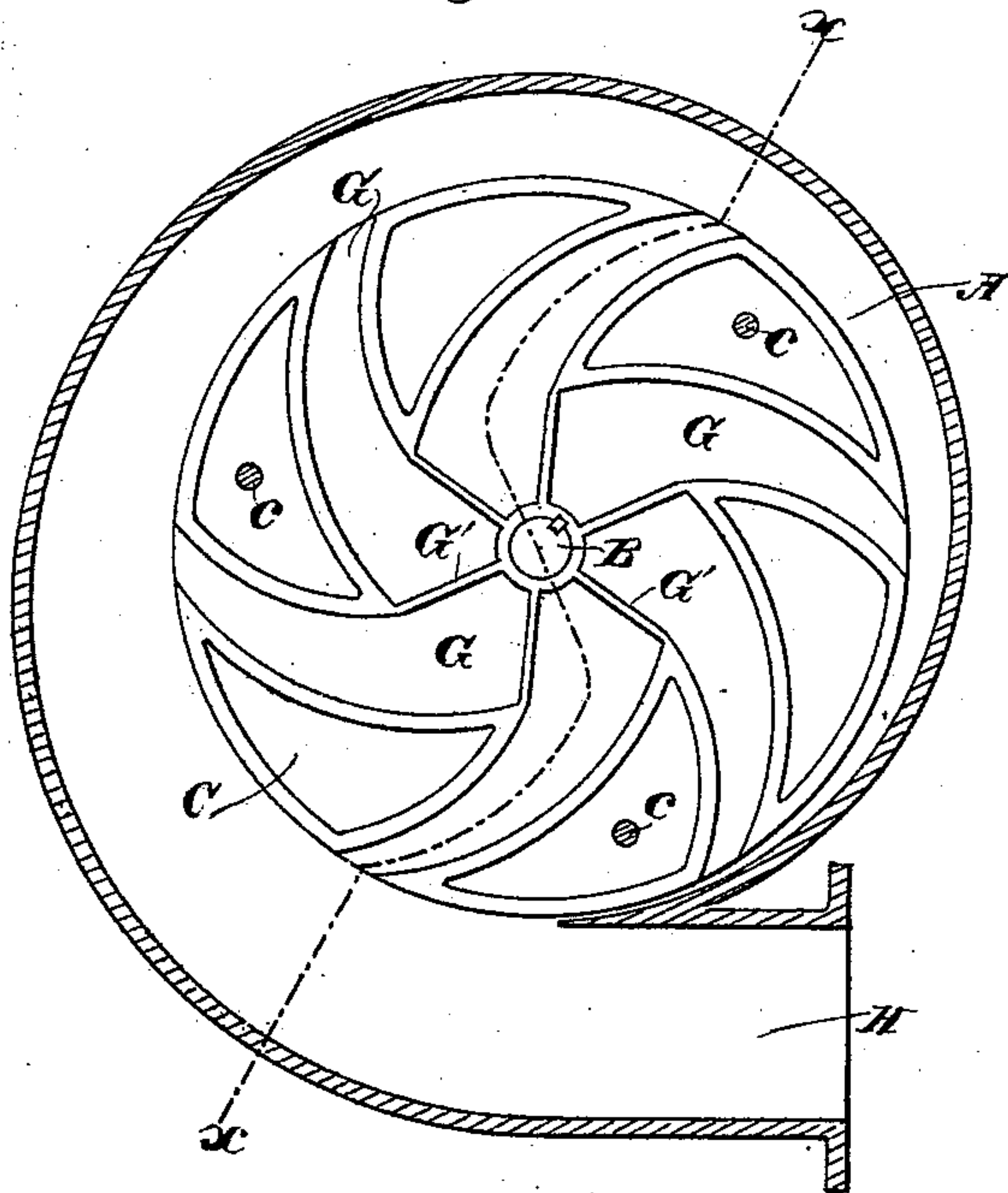


Fig. 2.

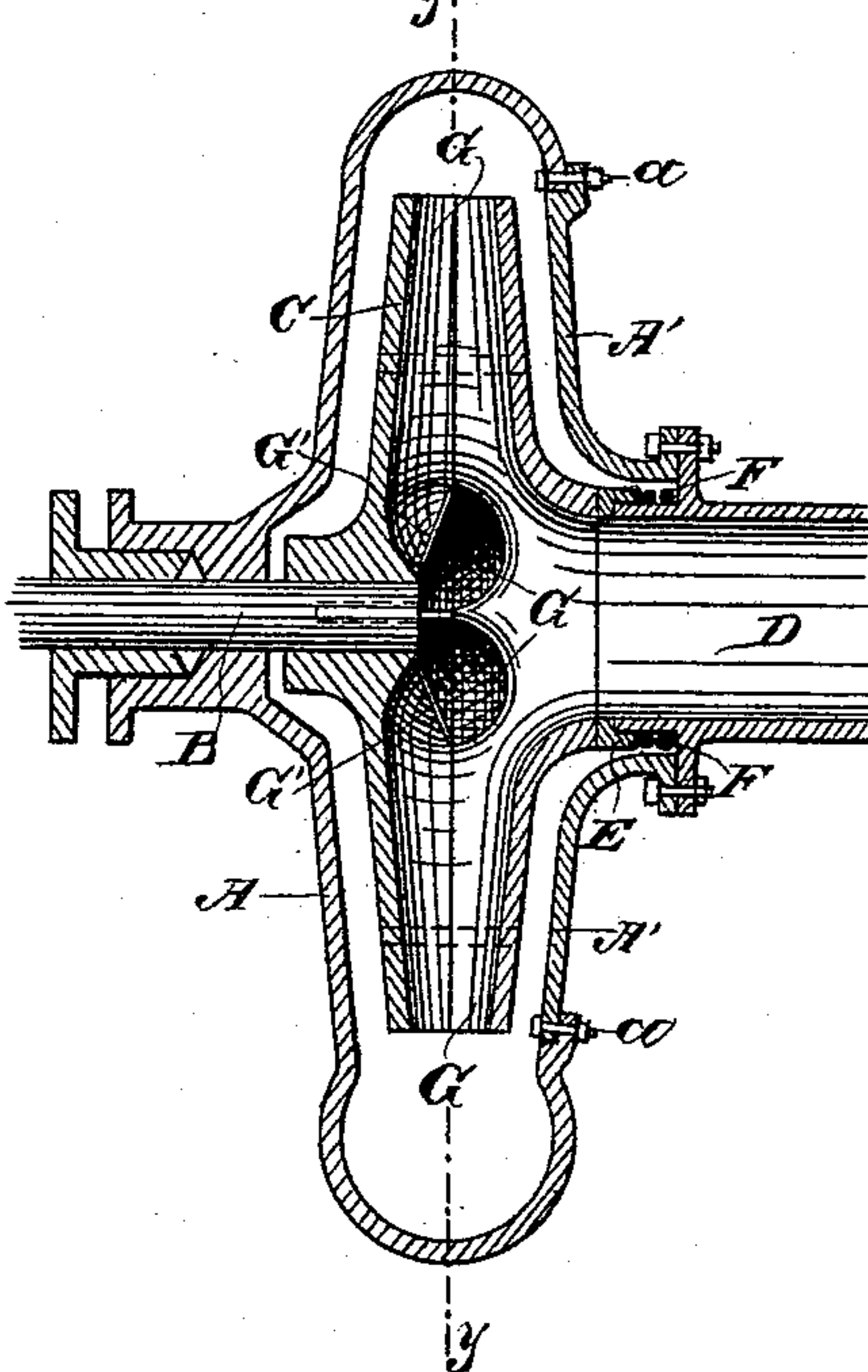
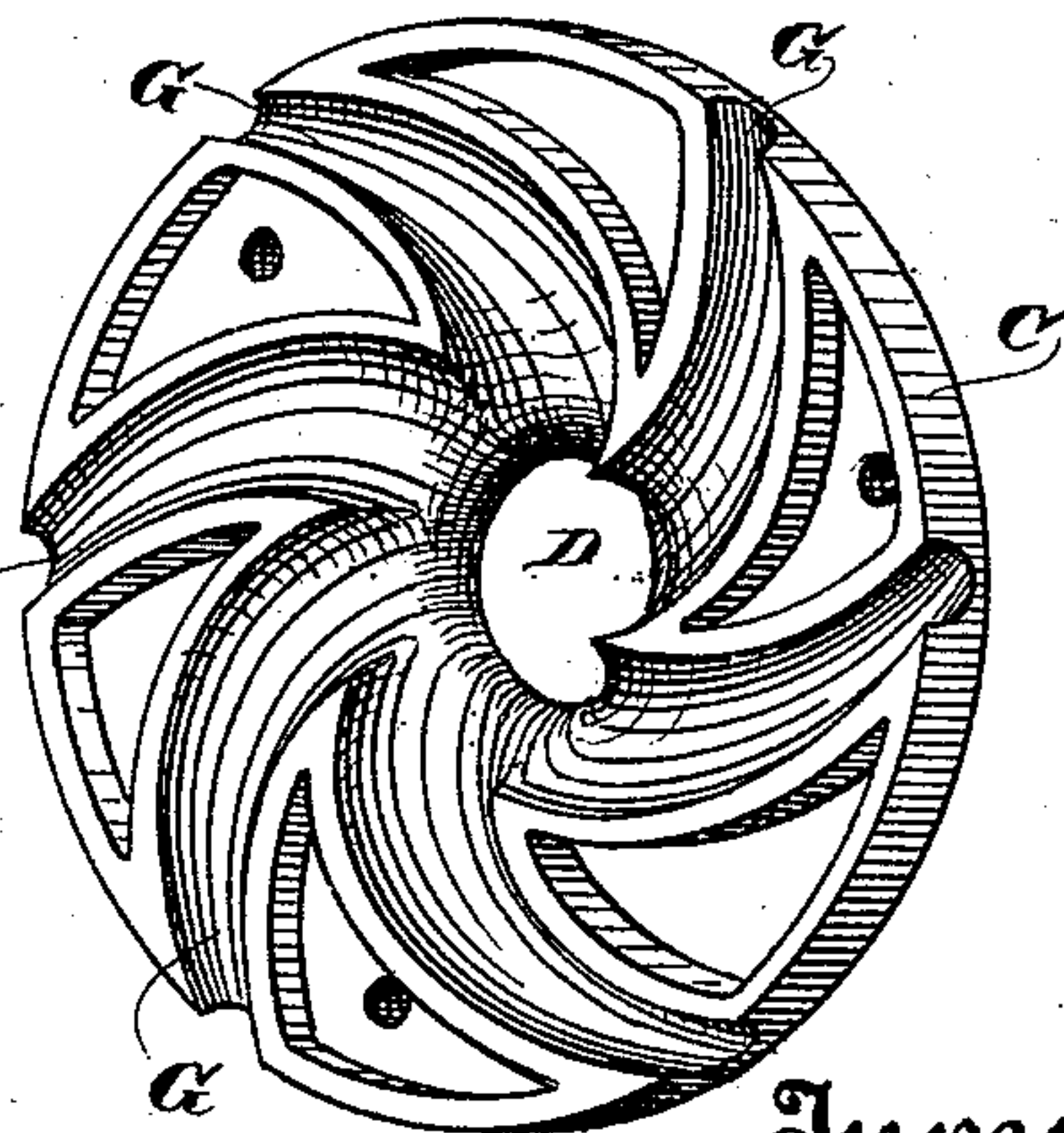
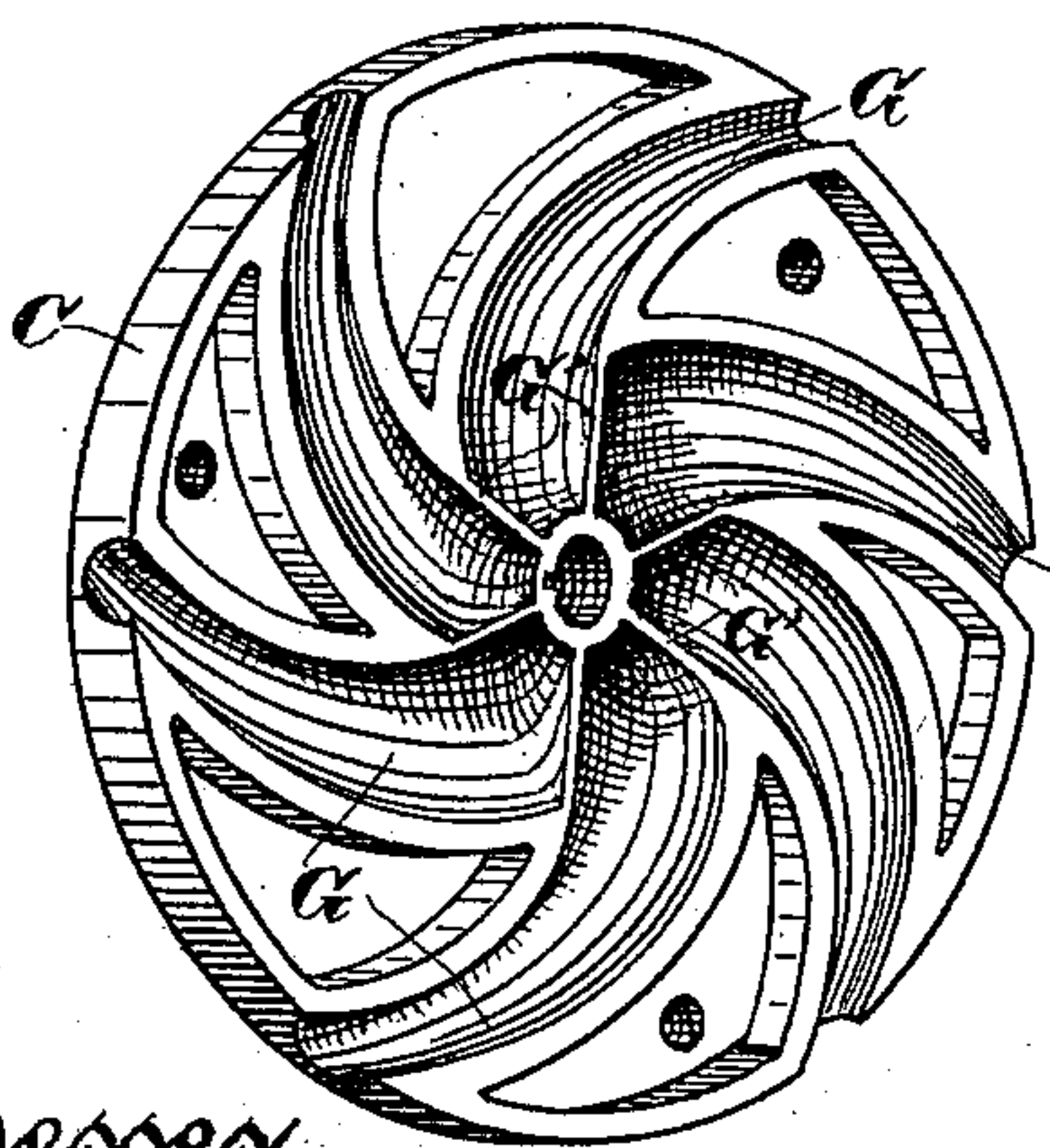


Fig. 3. Fig. 4.



Witnesses,
J. H. House
J. F. Clackey

Inventor
William Swabel
By Dewey & Co.
attorneys

UNITED STATES PATENT OFFICE.

WILLIAM SWABEL, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO ISAAC L. BURTON, OF SAME PLACE.

CENTRIFUGAL PUMP.

SPECIFICATION forming part of Letters Patent No. 538,050, dated April 23, 1895.

Application filed October 6, 1893. Serial No. 487,378. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SWABEL, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Centrifugal Pumps; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an improved centrifugal apparatus for pumping, and it consists of the constructions and combinations of devices which I shall hereinafter fully describe and claim.

The object of my invention is to provide an improvement in centrifugal pumping apparatus, and the means for supplying water thereto and discharging it therefrom.

In the accompanying drawings: Figure 1 is a sectional elevation on the line $y-y$ of Fig. 2. Fig. 2 is a sectional elevation on line $x-x$ of Fig. 1. Figs. 3 and 4 are perspective views of the two halves of the runner.

A is the main portion of the outer stationary case, having an opening made in the center of the side, for the entrance of the shaft B, to the inner end of which the disk or runner C is secured so as to be rotated by power applied to the shaft in any suitable manner, not here shown.

A' is the remaining portion of the case having a flange and bolts, as shown at a , by which its periphery is bolted to the portion A after the runner C has been introduced into its position and the supply pipe or passage D is afterward bolted to this part of the casing.

The portion A of the casing is supported in a stationary manner upon any suitable floor or timbers, not here shown.

The outer periphery of the case is in the form of a spiral passage which is approximately circular in cross section, and this spiral passage increases in diameter from its point of commencement adjacent to the discharge opening H, until it merges into said opening where the discharge takes place. The object of this gradually enlarging diameter of the peripheral passage, is to provide a sufficient space to receive the liquid which is continuously discharged into it by the pas-

sages of the runner, each of which adds to the amount already within this peripheral passage, from the point where it commences to deliver at the narrowest part of the passage until it reaches the point where it passes the junction with the discharge passage H, and the peripheral passage thus being kept constantly full, will produce a strong current which, in conjunction with the tapering passages of the runner, provides a powerful suction and discharge.

The runner C is composed of two parts which are cast in the form of thin shells having spiral or curved passages G extending from the center to the periphery as shown, and also tapering so that their outer or discharge ends are of smaller diameter than their receiving ends. These passages are preferably circular in cross section and between them, the disks in which they are formed are cored out to make them as light as possible. When fitted together the disks are secured by bolts c so that the passages, half of which are formed in each disk, unite to form a complete passage as described. The portion of the runner which is secured to the shaft B has radial partitions G' extending from the center to the angles where the passages G meet so as to complete the division between these passages, and from the shape of the inner ends of the passages formed by these partitions, the water which enters through the inlet pipe D is directed in curved lines into the passages G.

That portion of the runner C which is bolted to the part carried by the shaft B has an opening in line with the inlet pipe D.

E is a movable sleeve or ring, one end of which abuts against this opening in the runner so as to form a joint therewith, and the other end extends outwardly toward the inlet pipe D as shown. Between this end of the joint sleeve and the end of the pipe is a spiral spring F which serves to force the inner end of the sleeve into contact with the opposing edge of the opening in the runner so as to maintain a tight joint between the two and prevent leakage at this point.

By reason of the gradually decreasing diameter of the channels G, the current of water which is thrown toward the periphery, when

the runner or disk is rapidly revolved, will gradually increase in speed as the openings contract and thus it serves to produce a powerful suction through the inlet pipe D, and as the water continues to be delivered from the outer end of each of these channels G into the gradually enlarging peripheral passage of the case, the latter will be kept constantly full from one end to the other, and the flow of water therein, and also through the discharge opening H, will increase in rapidity, on account of the increase of the amount to be conveyed, and this continued increase in the rapidity of flow adds to the suction power by which the water is drawn into the pump, and also the force by which it is discharged therefrom.

In the present case I have shown the shaft B extending through one side of the case A and having the runner C fixed to it and depending upon the supports of the shaft at one side only of the case, but if the pump is of large diameter the shaft may be extended into the supply pipe D and supported at that point.

The quantity of water passing through the pump, or the height to which a given quantity may be delivered, depends upon the tapering of the passages G and the consequent rapidity with which the water is discharged through them and through the discharge passage H of the case.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A centrifugal pump consisting of a disk or runner formed of two parts bolted together having curved passages extending from the center to the periphery and decreasing in diameter outwardly, fixed radial partitions extending from the center of the runner to the angles where the spiral passages meet to complete the divisions between said passages, an exterior case having a spiral discharge passage formed between it and the periphery of

the runner, said runner operating in close contact with the inner wall of the case at the largest portion of said spiral discharge, whereby water received into the enlarged portions of the curved passages discharges at the narrowest portion of the spiral passage until the outer end of the curved passages reaches the point where it passes the junction with the largest portion of the discharge of the case, whereby a powerful suction and discharge is produced; a driving shaft to the inner end of which the runner is secured, and an inlet passage in the case through which water is delivered to the curved passages.

2. An improved centrifugal pump consisting of a case having an inlet opening at the center of one side to which an inlet pipe is bolted, a shaft passing through the opposite side of the case, a two-part runner on said shaft, each part of which has a coincident spiral channel which tapers from the inner end outwardly, fixed radial partitions extending from the center of the runner to the angles where the spiral passages meet to complete the division between said passages, said case having a spiral discharge passage formed between its inner wall and the periphery of the runner, and said runner having its periphery operating close to the inner wall of the case at the point where the smallest end of the spiral discharge makes a junction with the largest end of said passage, whereby water received into the spiral channels of the runner discharges into the smallest end of the spiral discharge until the narrowest part of the spiral channel of the runner reaches the point where the smallest part of the spiral discharge merges into the largest part of the discharge.

In witness whereof I have hereunto set my hand.

WILLIAM SWABEL.

Witnesses:

S. H. NOURSE,
J. A. BAYLESS.