

Sept. 2, 1924.

1,507,413

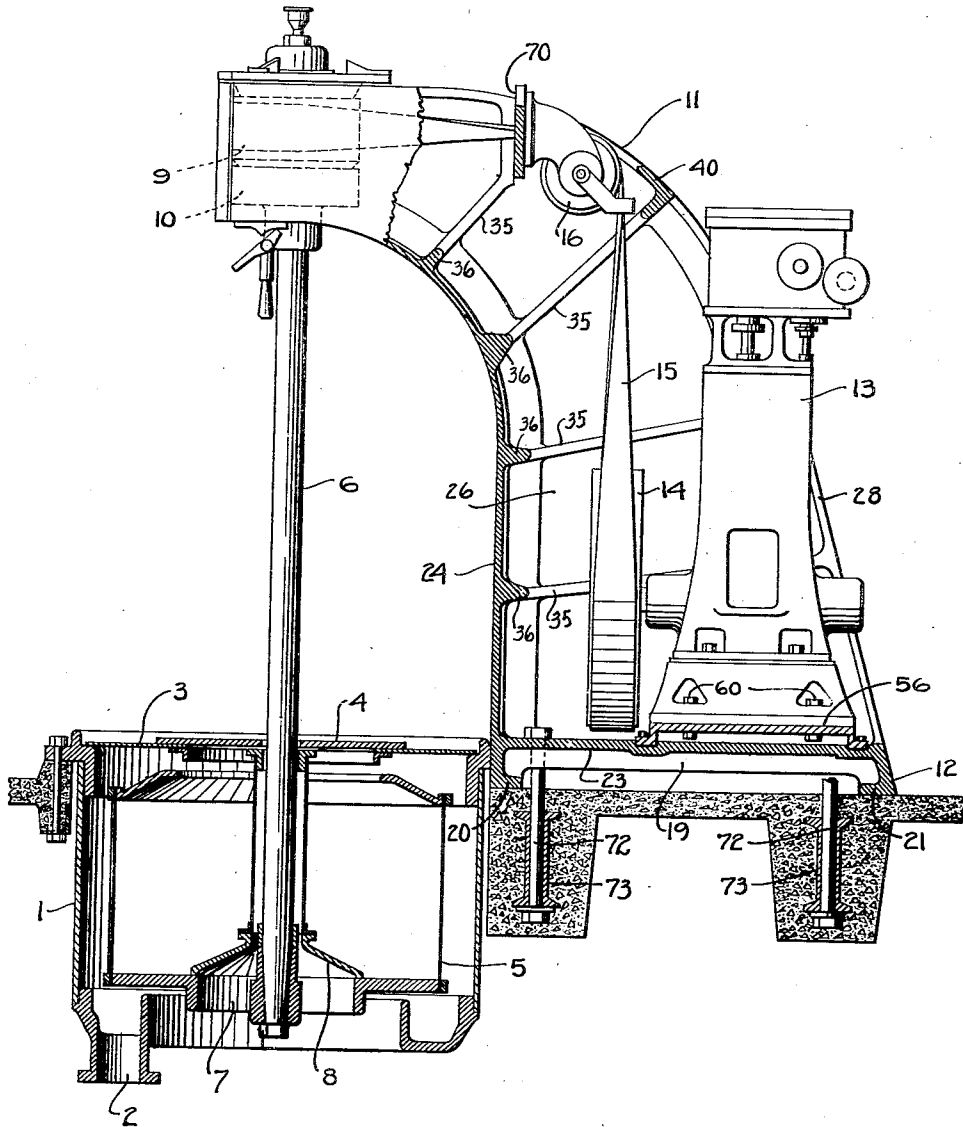
T. A. BRYSON

CENTRIFUGAL MACHINE

Filed Dec. 10, 1920

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FIG. 1



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FIG 2

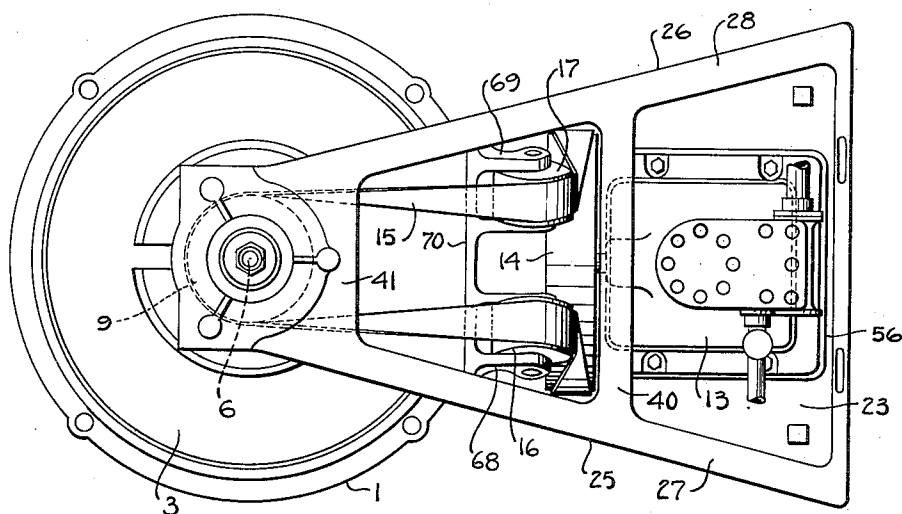
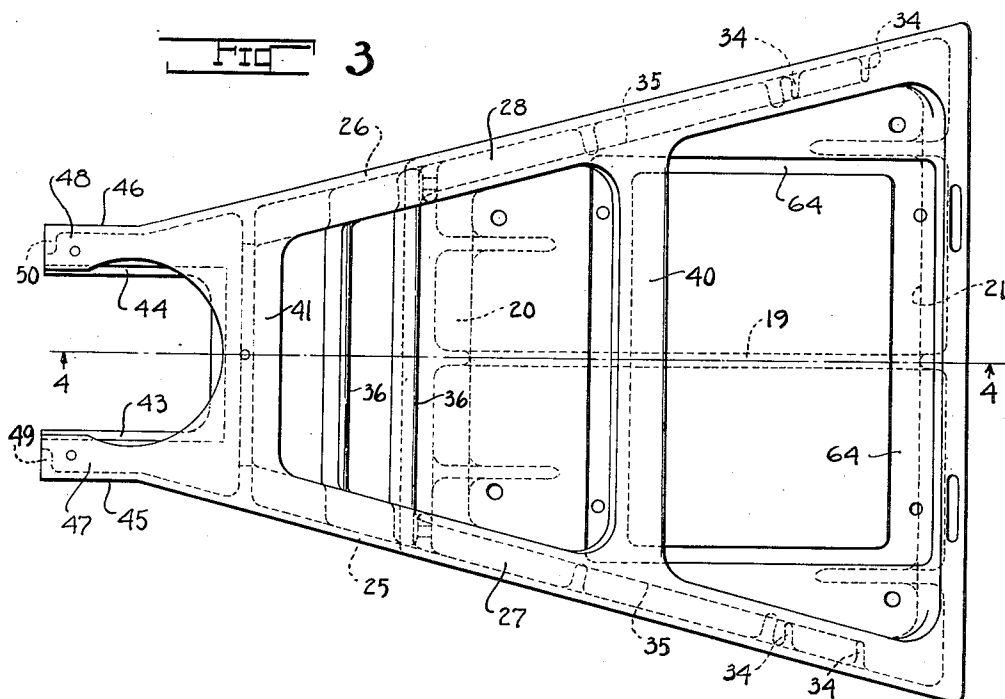


FIG 3



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FIG 4

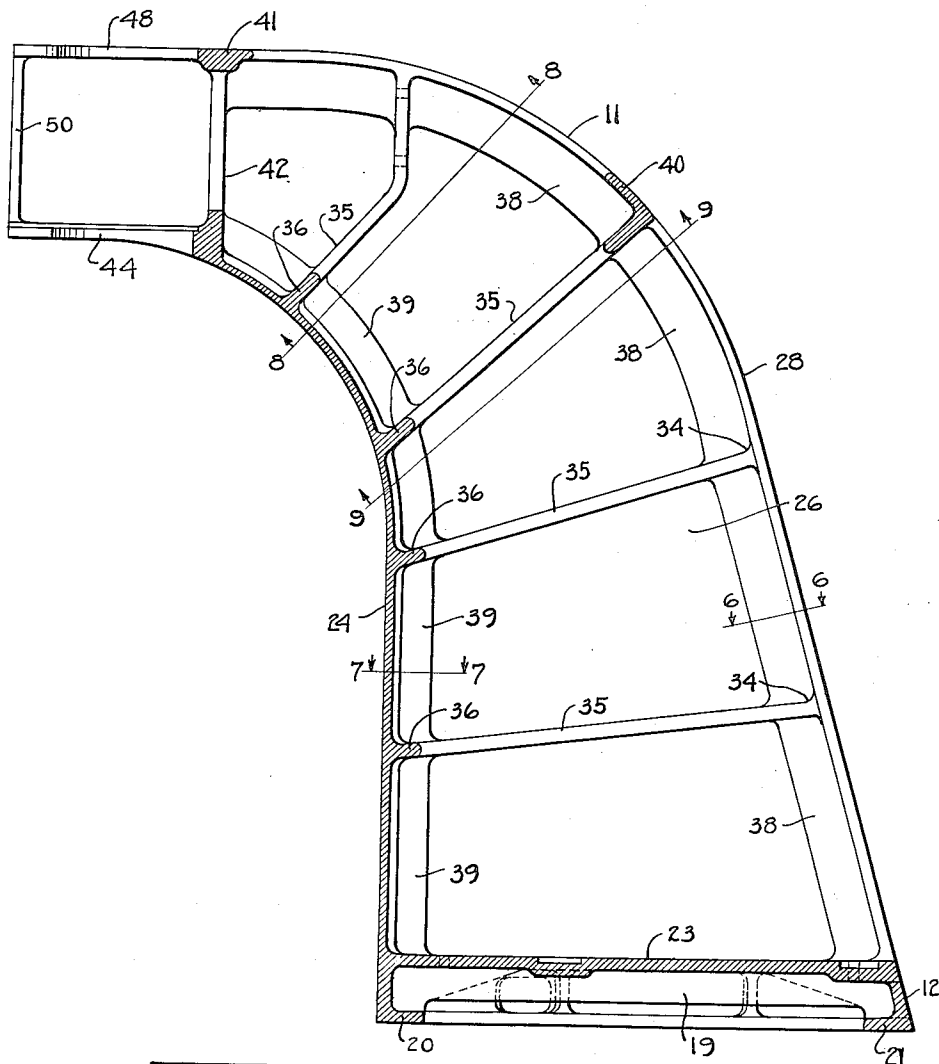
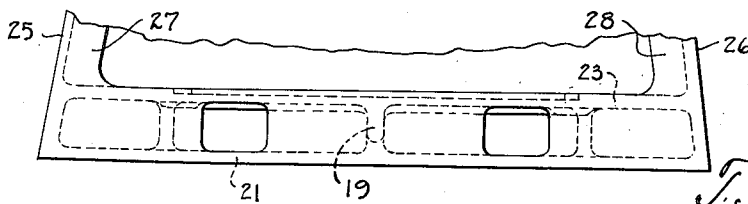


FIG 5



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FIG 8

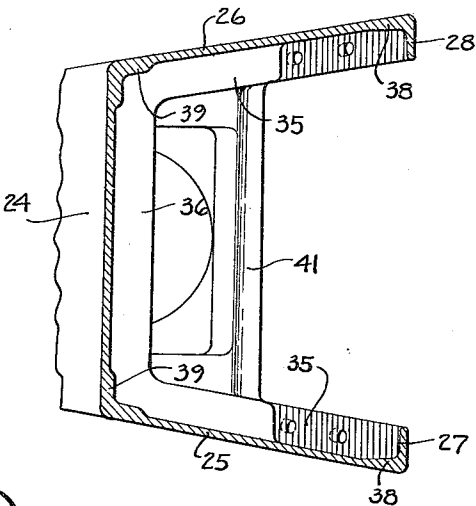


FIG 6

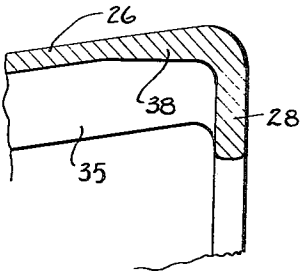


FIG 9

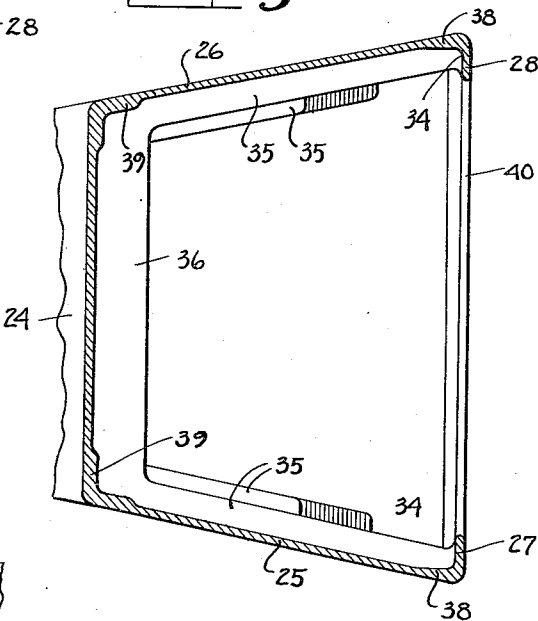
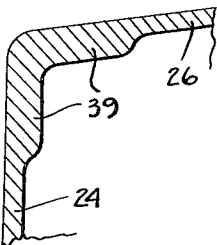


FIG 7



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FIG 10

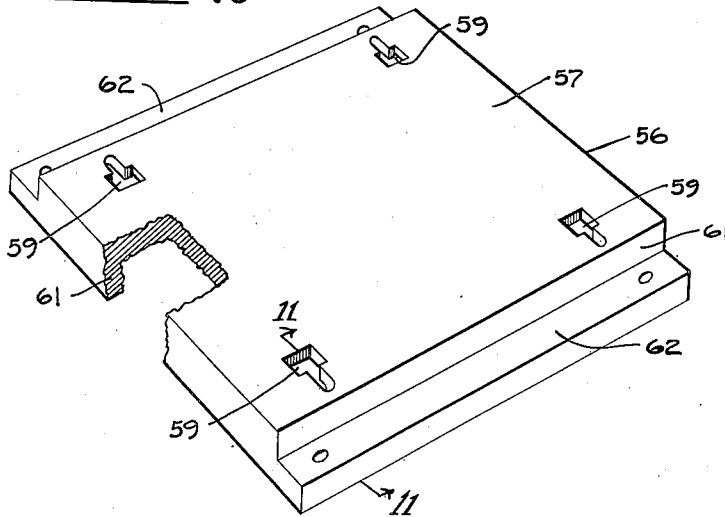
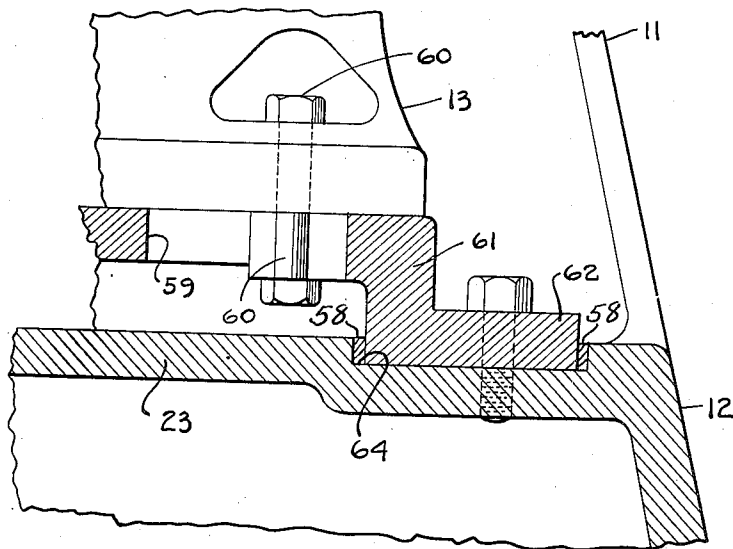


FIG 11



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UNITED STATES PATENT OFFICE.

TANDY A. BRYSON, OF TROY, NEW YORK, ASSIGNOR TO TOLHURST MACHINE WORKS,
A CORPORATION OF NEW YORK.

CENTRIFUGAL MACHINE.

Application filed December 10, 1920. Serial No. 429,737.

To all whom it may concern:

Be it known that I, TANDY A. BRYSON, a citizen of the United States, residing at Troy, in the county of Rensselaer and State of New York, have made certain new and useful Improvements in Centrifugal Machines, of which the following is a specification.

The invention relates to centrifugal machines, and more particularly to a novel overhead support of the curved pillar type for the centrifugal basket and shaft.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:—

Fig. 1 is an elevation of a centrifugal machine embodying the invention;

Fig. 2 is a top plan corresponding to Fig. 1;

Fig. 3 is an enlarged plan of the pillar or support by itself and showing more clearly the structure thereof;

Fig. 4 is a central vertical section, taken on line 4—4 of Fig. 3;

Fig. 5 is a fragmentary elevation of the bottom part of the pillar or support, looking at Figs. 3 and 4 from the right;

Fig. 6 is a fragmentary section, greatly enlarged, taken on line 6—6 of Fig. 4;

Fig. 7 is a fragmentary section, greatly enlarged, taken on line 7—7 of Fig. 4;

Fig. 8 is a transverse section, taken substantially on line 8—8 of Figure 4;

Fig. 9 is a transverse section, taken substantially on line 9—9 of Figure 4;

Fig. 10 is a perspective of the engine base; and

Fig. 11 is a greatly enlarged fragmentary

section, substantially on line 11—11 of Fig. 10, and of the cooperating parts of the frame base.

The invention relates primarily to improvements in an overhead support for a centrifugal basket and its vertically arranged shaft, the support consisting of a curved or bent pillar having its base at one side of the basket, the pillar curving upwardly toward and over the basket, with its upper end constituting a support for the basket shaft.

The improvement of the present invention consists primarily in providing a unitary or unit-cast pillar, possessing a jointless, unbroken, close-grained or cast skin exterior. Such a cast and unmachined or otherwise unfinished surface (which surface may conveniently be termed a cast skin surface), is highly resistant and impervious to acid and other destructive fumes and splashing, such as are common and prevalent in work employing centrifugal machines. Joints, screw-thread and other fastenings, and machined and otherwise finished surfaces are exceedingly vulnerable to such destructive agencies. The unitary structure is also highly resistant and substantially proof against machine strains and vibrations or cumulative vibrations, or other vibrational disturbances, which loosen, impair and destroy jointed and bolted-together structures.

More specifically or in detail, and with the present preferred embodiment particularly in mind, a curved or bent hollow pillar for a basket shaft support is provided, with relatively thin walls and preferably of angular transverse cross-section, in which the base, sides, face and cross braces or tie rods are all cast integral together, the entire pillar being a unitary or unit-cast structure, with a substantially jointless, close-grained, cast skin exterior, resistant and proof against attacks of acid fumes and splashing and against loosening and disintegration from machine strains and vibrations.

Other features and objects of the invention will be set forth in connection with the detailed description of the drawings, both the preceding and following description being illustrative and exemplary, and not restrictive of the invention.

Referring now in detail to the embodiment of the invention shown by way of example in the accompanying drawings, a centrifugal machine is shown with a casing 1, provided with an outlet 2 in its bottom, and having a top plate 3, which has a closure 4 about the basket shaft: The basket 5 is carried upon a rotatable shaft 6, the shaft having an overhead suspension and drive of suitable type or form. The basket 5 is provided with a central bottom discharge orifice 7, which is opened and closed by means of a valve 8. Shaft 6 is provided at its upper end with a driving pulley 9 and a brake band 10, which may be of any usual or suitable design.

The suspension or support for the basket and shaft comprises a journal mounting for the shaft and an enclosing casing or housing supported in the upper end of a bent pillar 11, the pillar having its base 12 fixed to the floor alongside the centrifugal. The shaft suspension permits of gyratory movement of the rotating shaft and basket to compensate for unbalanced loads in the basket, and may in its details be of any suitable construction.

The curved pillar 11 is hollow and open from the back, an engine 13 being mounted within the pillar, upon the base thereof, and at the rear. The engine is provided with a fly wheel 14, utilized as a driving pulley for a belt 15, which runs over guiding pulleys 16 and 17 and over the shaft pulley 9.

The centrifugal is shown positioned with respect to its support to discharge its load into the story or space beneath the floor on which the supporting pillar is fixed. By using a shorter shaft 6, the centrifugal can be positioned at a higher level, so as to discharge its load on the same floor with its mounting or support.

The construction and arrangement so far as described is old and well-known, the present invention being directed to novel features in the structure and characteristics of the curved pillar support and to the mounting of the engine upon the base of the pillar.

By the present invention a curved pillar suspension for a centrifugal machine is provided consisting of a unit casting, preferably of general quadrilateral shape in cross section, and comprising an upwardly and outwardly curved face or front toward the centrifugal machine, two sides, a base and tie bars or reinforcing pieces, all cast integral together.

This construction presents on its exterior and also on its interior a practically continuous unbroken and unmachined surface of cast iron, or other metal, which surface possesses the characteristic close grained and relatively impenetrable scale or skin, which may be conveniently termed a cast skin.

Referring more in detail to the drawings, the base of the pillar 11 is provided with feet 20 and 21, extending parallel with the front and back of the pillar, and provided also with a floor 23, which serves as a support for the engine. A reinforcing rib or ribs 19 extend beneath the floor 23 from foot 20 to foot 21, and integral with both the base and the feet. As stated, the pillar curves upwardly from its base and over the centrifugal, to provide a suspension for the basket shaft at the outer end of the pillar. The transverse section of the pillar is approximately quadrilateral, hollow, and with the back thereof largely open, except as hereinafter described.

The face or front 24 of the pillar, which fronts upon the centrifugal, is preferably an unbroken surface from the bottom edge of the base to the top end of the pillar, the face being curved upwardly and outwardly. The sides 25 and 26 are preferably positioned in substantially or approximately rectangular relation to the front or face 24, and are curved in their own planes in the same direction as the face, and are cast integral with the front or face 24. Upon the back of the pillar, while most of the space is open, there are two edges or flanges 27 and 28, cast integral with, and in angular position with respect to, the sides 25 and 26. They also extend continuously from the base upwardly to the top of the pillar, and there integrally unite with, or cast with, the parts of the pillar which support the basket shaft and its drive.

Within the pillar, cast integral with the base, the front, the sides and the back flanges already described, are a plurality of reinforcing tie rods or reinforcing ridges, comprising a part 34 starting out of and integral with the backs of the flanges 27 and 28, and having a part 35 extending across, projecting from, and integral with the side 26. These reinforcing ridges likewise have a part 36 extending across, projecting from, and integral with, the front 24 of the pillar. The construction is the same upon the opposite side 25 and with respect to the other back flange 27, and the same reference numerals are applied thereto. A plurality of these reinforcing and tying members are provided, spaced apart longitudinally within the pillar 11. The pillar 11 interiorly is provided with reinforced or thickened corners, as shown at 38 for the corner running along between the side plates and the back flanges and as shown at 39 for the corners between the side plates and the front or face of the pillar.

A cross tie or exterior reinforcing strip 40 is provided extending across between the back flanges 27 and 28 and preferably cast integral therewith. The strip 40 is

placed as nearly as practicable in vertical line with the center of mass or gravity of the pillar 11, so that suspending and moving means may be attached thereto, and the pillar thereby moved about and set while standing in substantially its vertical or normal position.

At its upper and exterior end the pillar is provided with a relatively heavy reinforcement comprising an integral cross tie plate 41, into which the upper ends of the flanges 27 and 28 merge, and comprising an inner reinforcing rib 42 projecting inwardly from all four sides of the pillar, and being cast integral therewith.

The support for the shaft housing and drive is designed to enclose the same to the greatest possible extent consistent with practical assembling. For this purpose, the bottom horizontally extending portion of the pillar comprises supporting flanges 43 and 44, integral with and constituting extensions of the front of the pillar, and sides 45 and 46, and top flanges 47 and 48 and front flanges 49 and 50, all cast integral with each other and with the pillar.

The engine 13 is mounted upon a removable base 56 (Figs. 1, 2, 10 and 11), having a supporting top or platform 57, upon which the engine frame rests, and provided with holes 59 for the bolts 60, which fasten the engine thereto. A rim 61 extends downwardly around the engine supporting part 57 and terminates in a base 62 on two sides, but on the other two sides it extends downwardly preferably equally with the bottom of the base 62.

The floor 23 of the pillar base is channelled out as shown at 64, to receive the finished engine base 56. Babbitt metal or other suitable filler 58 may be used for a seat for the engine base, and this allows the finished engine base to be replaced as may be necessary, and permits the floor or base 23 of the pillar to present an unbroken cast skin surface, except where covered by the engine base and the Babbitt metal filler.

The pulleys 16 and 17 are supported, respectively, on brackets 68 and 69, mounted upon or integral with the plate 70, which plate is bolted to the ends of one of the reinforcing strips within the pillar.

The base 12 is fastened to the floor in a suitable manner, as by bolts 72 passing through the floor 23 and attached to suitable anchorages 73 in the floor.

Not only does the machine present an unbroken close-grained cast skin to the corroding acid fumes and splash, and is thus free from the cracks and crevices which collect acid and acid vapors and form starting places for corrosion, but it also has practically no planed joints, or machined surfaces such as are present in a built up pillar, and which are very quickly attacked by acid

fumes and splashings. Screw-threaded tie rods and nuts and the holes therefor through the other parts of the pillar are also avoided, as these furnish numerous, ready and deeply extending places of attack for the destructive agencies mentioned.

A loaded centrifugal in rapid motion is subject to vibration, and with an unbalanced load this is greatly increased by the gyratory motion of the basket. The unit cast pillar not only is acid resistant but is also more rigid and resistant to vibratory disturbances than the multi-part pillars heretofore in use.

In a machine of this kind there are usually several critical speed ranges, that is, several points in the increasing or decreasing rotative speed of the machine where the vibration tends to become excessive, that is, the period of vibration of the basket and shaft and of the frame synchronize.

The load supported at the top of the pillar or frame, that is, the weight of the basket and spindle, is normally directed straight downwardly but under certain operating conditions, such as an unbalanced load, the line of action may be rapidly diverted through a varying angle from the normal line of action, for example, it may become gyratory. This produces twisting or torsional strains on the frame. The unit-cast frame provides an elastic resistance to the torsional and vibrational stresses with the result that the deformation bears a definite relation to the disturbing forces.

With a unit-case frame, in which the deformation is a definite function of the stress by which it is produced, the speeds at which the vibrations tend to become severe are more or less definitely fixed and it is possible to so proportion such frame or support so that the critical ranges may be made to occur at definite values, which values may be selected and restricted to such points in the speed range of the machine that cumulative vibrations may be avoided.

With a built-up frame the presence of joints may permit more or less sliding, or other indeterminate loose motion, between its constituent members. This condition or indefinite loose motion, may vary in amount or in relation to the rotating speed of the centrifugal, depending upon the condition of the joints and the variable coefficient of sliding friction, thus destroying the definite relation of strain or deformation to stress and therefore removing the condition necessary for definite or stable values of the critical speeds and preventing their restriction to points where they will not give rise to serious if not destructive vibration.

If the critical speeds depend upon, or are determined by, the variable friction of slidable joints, it is possible that during the acceleration of the machine a critical range

may be so unstable as to "follow" the machine as the speed is changed, thus preventing smooth operation at any speed.

Other advantages of the invention than these will be obvious to those skilled in the art, or may be learned by practice with the invention. It will be understood that changes may be made from the details of the present preferred embodiment, within the scope of the accompanying claims, without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:—

1. A pillar for a centrifugal machine comprising a hollow integral casting with relatively thin walls and uniting and reinforcing cross members all cast integral together, the pillar having its base at one side of the basket and curving upwardly over the basket, the upper end of the pillar serving as a support for the basket shaft.

2. A pillar for a centrifugal machine comprising a unit-casting having relatively thin angularly disposed walls, the pillar having its base at one side of the machine basket and curving upwardly over the basket, the upper end of the pillar serving as a support for the basket shaft, the walls of the pillar facing the basket presenting a jointless close-grained cast skin surface highly resistant to acid fumes and splashings.

3. A pillar for a centrifugal machine comprising a unit-casting having relatively thin angularly disposed walls uniting and reinforcing members therebetween, the pillar having its base at one side of the basket and curved upwardly over the basket, the upper end of the pillar serving as a support for the basket shaft.

4. An overhead support for a centrifugal basket comprising a one-piece casting having relatively thin walls, said casting curving upwardly and outwardly to form an overhanging bearing for the basket shaft, the front wall facing said support for the basket shaft

being unbroken, and a series of spaced reinforcing ribs cast integral with the inner surface of said casting and extending substantially transversely to the line of curvature of said casting.

5. An upstanding overhanging tower for a centrifugal basket comprising a single hollow skeleton casting of quadrilateral cross section curved upwardly and outwardly to provide an overhanging bearing for the basket shaft, the corner supports of said casting having vertically arranged reinforcing flanges connected together at intervals spaced vertically of the casting by integrally cast ribs arranged in planes substantially transverse to the line of curvature of the casting, the front side of said casting being unbroken to present a jointless, unbroken cast skin exterior, highly resistant to acid.

6. An overhead support for a centrifugal basket comprising a one-piece casting of quadrilateral cross section curving upwardly and outwardly to one side to form an overhanging support for the basket shaft, the inner walls of said casting being suitably braced by integrally cast ribs arranged at spaced intervals vertically of the casting and in planes substantially transverse to the line of curvature of the casting.

7. An overhead support for a centrifugal basket comprising a one-piece hollow casting quadrilateral in cross section, said casting curving upwardly and outwardly to one side to provide a support for the basket shaft, the inner walls of said hollow casting being formed with integrally cast reinforcing ribs whereby said unitary structure is highly resistant to machine strains and vibrations.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

TANDY A. BRYSON

Witnesses:

M. M. CURRAN,
M. K. BUSKIN.