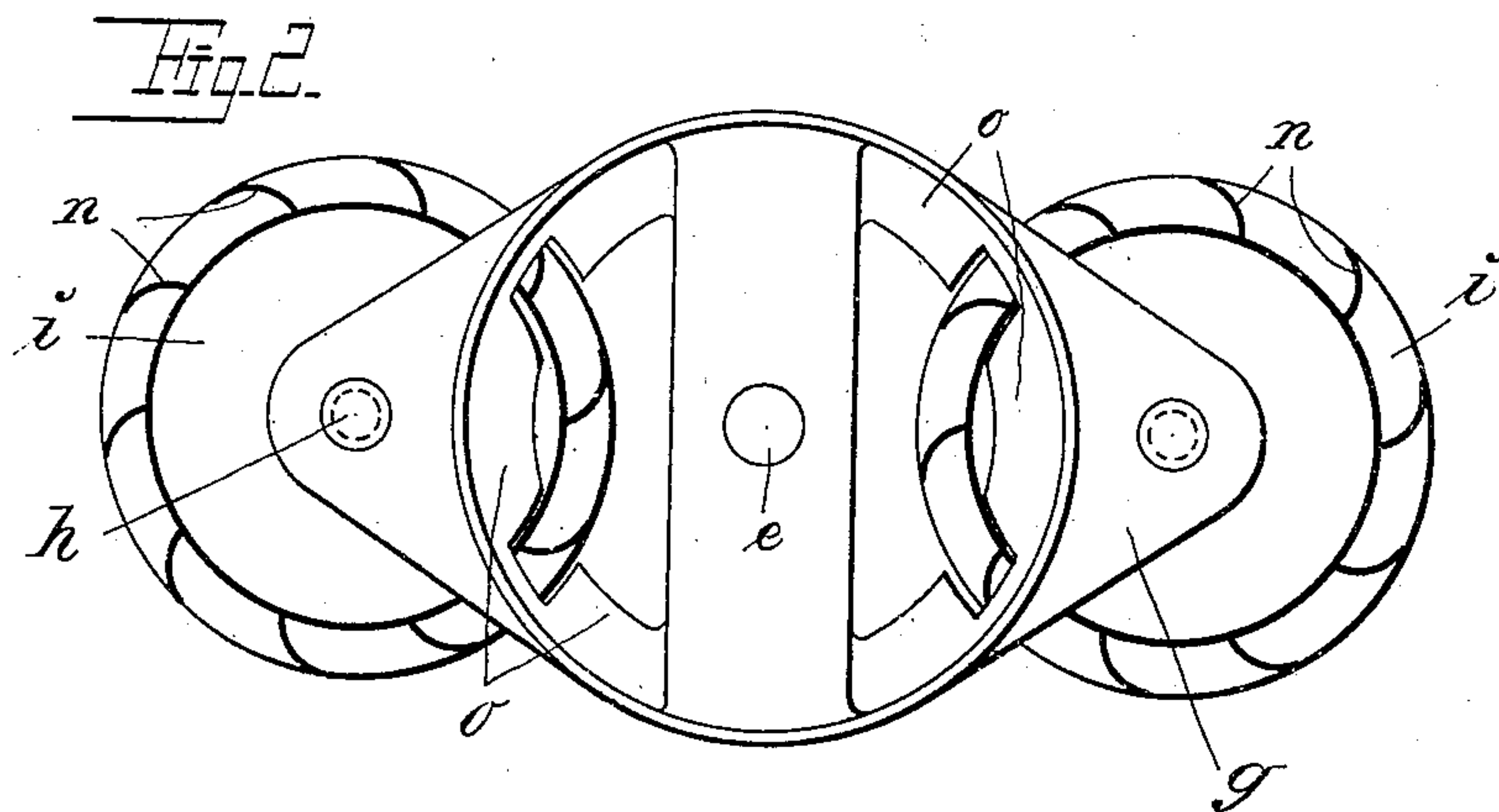
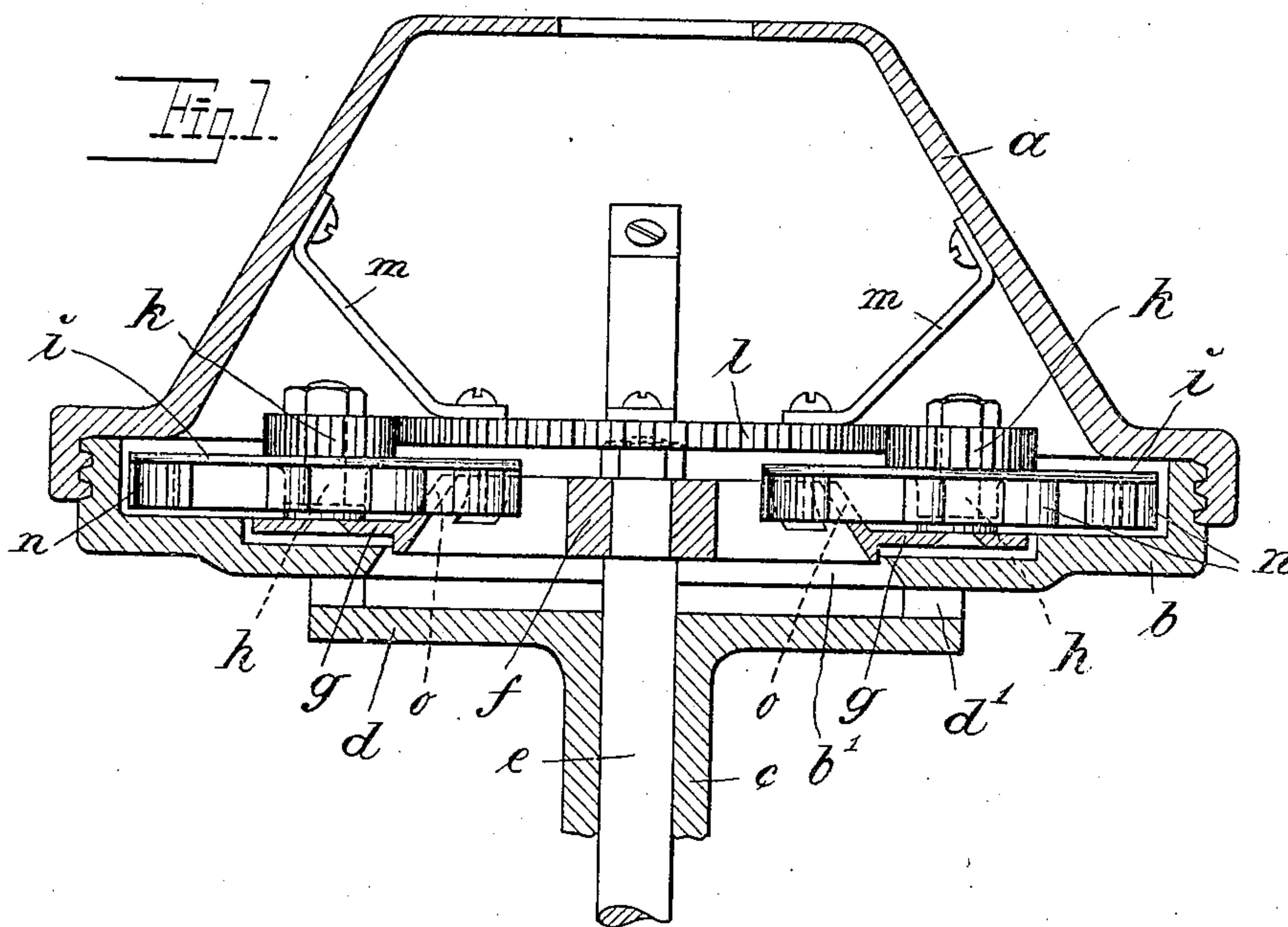


No. 832,047.

PATENTED OCT. 2, 1906.

A. J. ERICSSON.
CENTRIFUGAL MACHINE.
APPLICATION FILED MAY 19, 1905.

2 SHEETS—SHEET 1.



Witnesses.

M. M. Hamilton
Thomley B. Wood

Inventor

Anders Johan Ericsson

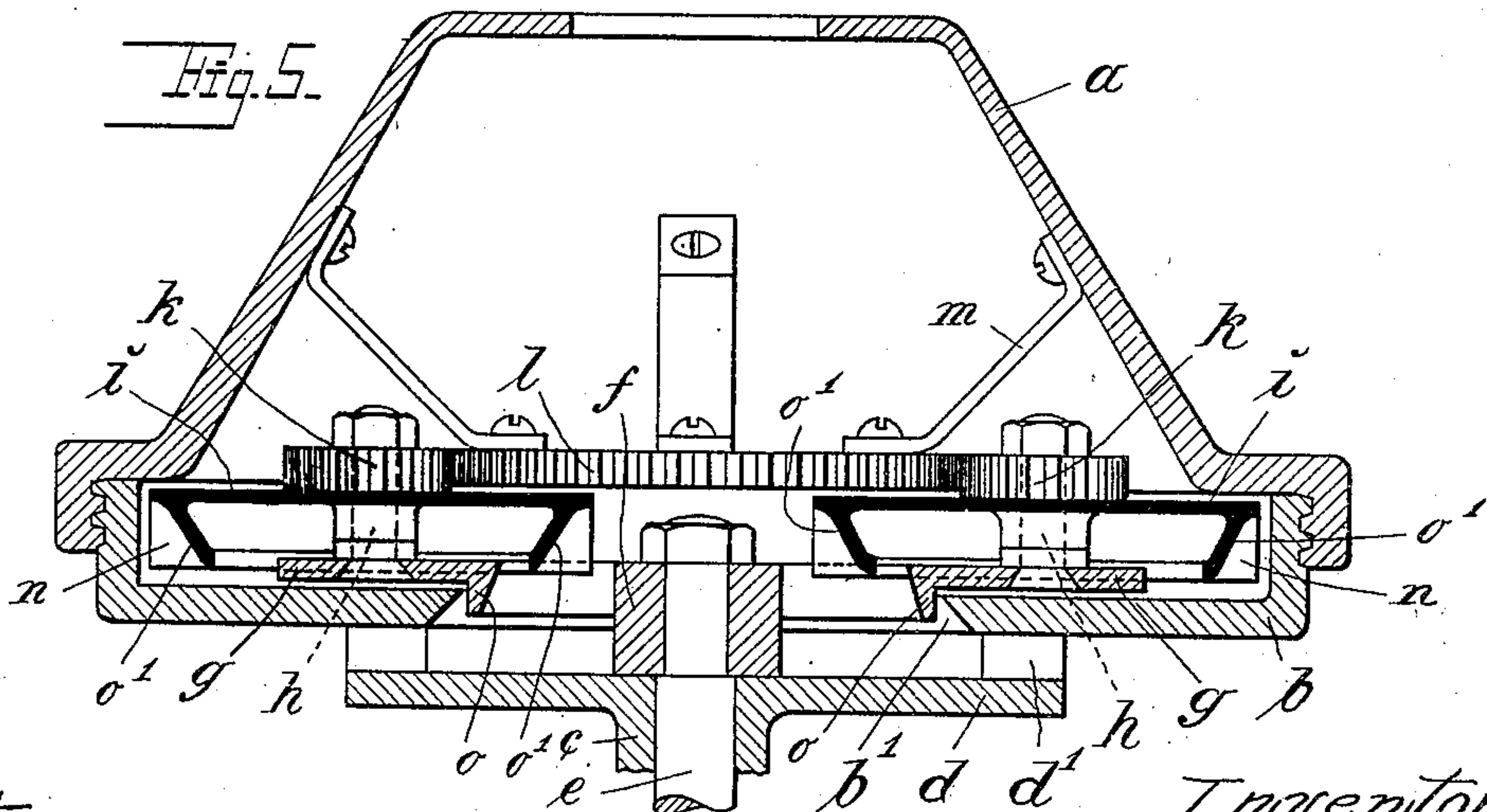
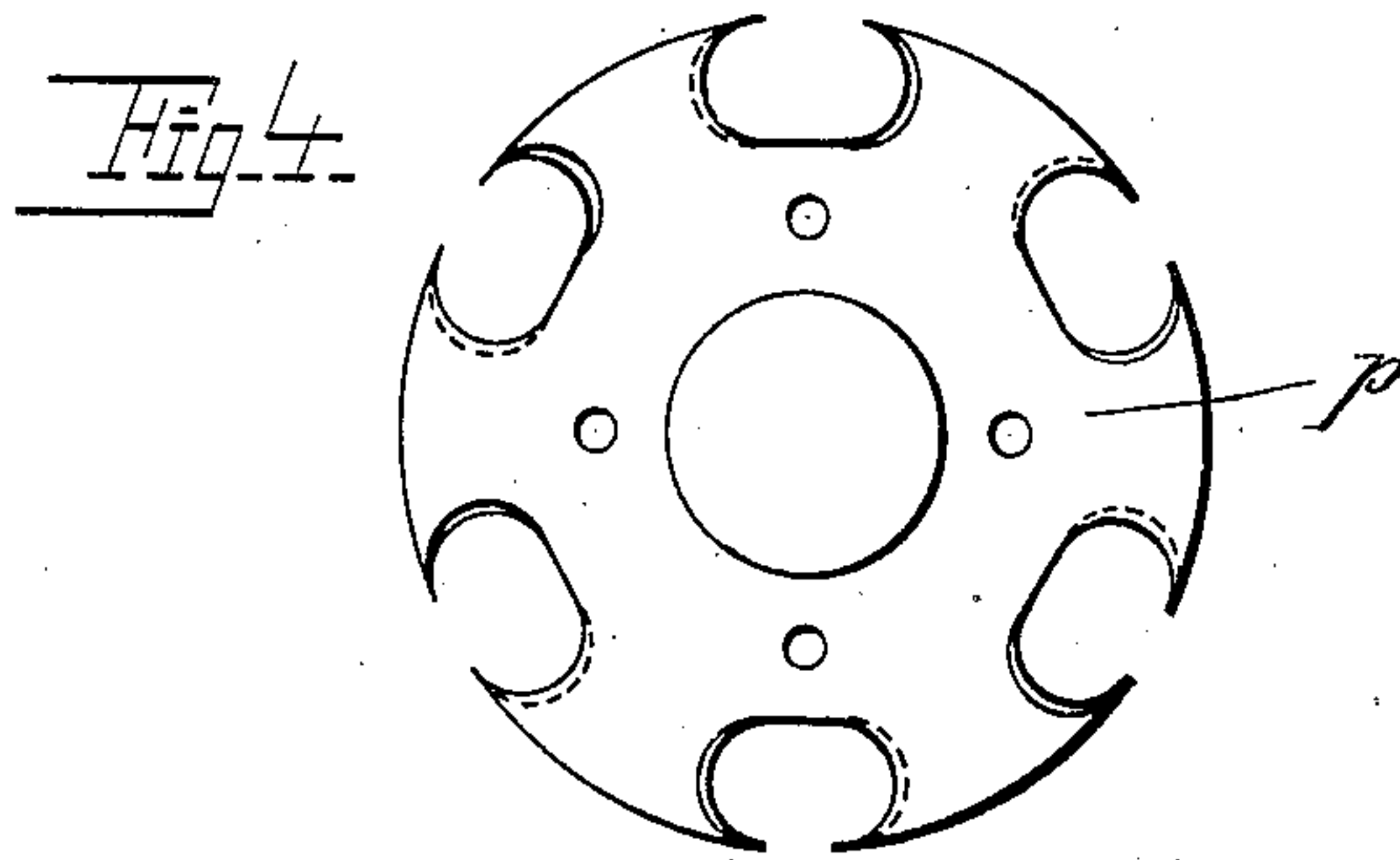
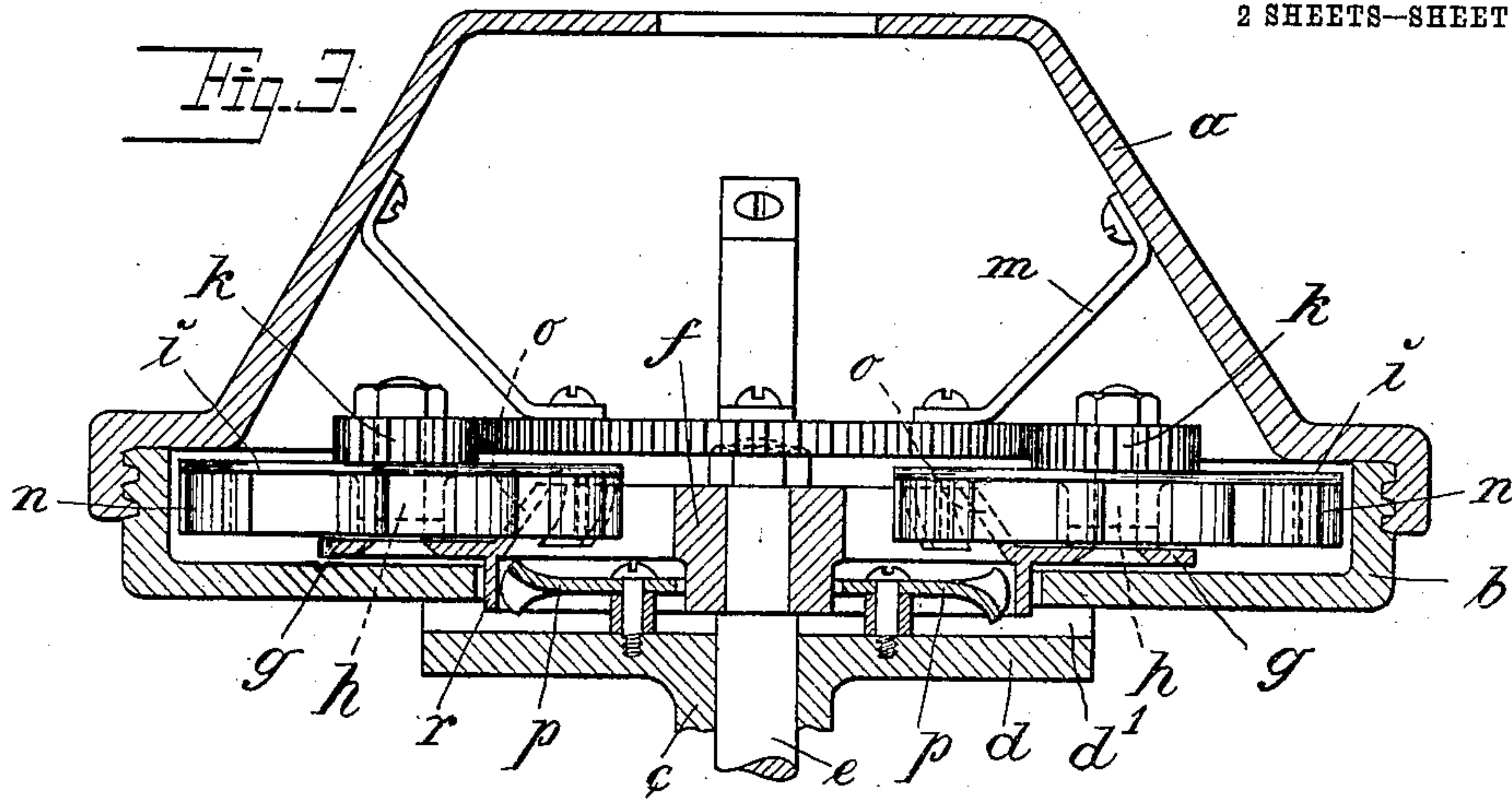
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UNITED STATES PATENT OFFICE.

ANDERS JOHAN ERICSSON, OF STOCKHOLM, SWEDEN, ASSIGNOR TO
AKTIEBOLAGET SEPARATOR, OF STOCKHOLM, SWEDEN.

CENTRIFUGAL MACHINE.

No. 832,047.

Specification of Letters Patent.

Patented Oct. 2, 1906.

Application filed May 19, 1905. Serial No. 261,139.

To all whom it may concern:

Be it known that I, ANDERS JOHAN ERICSSON, a subject of the King of Sweden, residing at Stockholm, Sweden, have invented certain new and useful Improvements in Centrifugal Machines for Separating Solid Matters from Liquids; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in centrifugal separators such as used for separating liquids from solid matters, and more especially to separators of such art as described in my United States Patent No. 773,489, and it more particularly relates to arrangements for facilitating the continuous carrying away of the solid matters out of the separator. As is more fully described in the said United States Patent No. 773,489, the solids that stratify along the inner wall of the bowl are brought outside the bowl by means of scraper-wheels, carrying the solid matters transversely through the layer of liquid to a point within the same nearer the center of the bowl, whence the solid matters are continuously carried away in such a manner that they immediately before the scrapers of the scraper-wheels occupy their position nearest the center of the bowl, owing to the action of the centrifugal force and their own gravity, are loosened from the scrapers and then thrown downward through a central opening into a partition placed under the scraper-wheels or in the very bottom of the bowl. It is, however, evident that if the rotary speed of the bowl is relatively high the gravity will be of no importance, but the solids are thrown out in the direction of the centrifugal force, whereby the contents of the scrapers will again be thrown out toward the periphery of the bowl.

My invention relates to a device for preventing this inconvenience, so that even when the rotary speed of the bowl is relatively high the solid matters may not be thrown out of the scrapers toward the periphery of the drum, but are caught by this device and brought outside the bowl.

The device is illustrated on the accompanying drawings, wherein—

Figure 1 is a vertical section of a centrifugal bowl with a portion of my improvement applied thereto. Fig. 2 shows a part of the centrifugal bowl of Fig. 1 in invested plan view. Fig. 3 is a partial section of a centrifugal bowl with a portion of my improvement applied thereto; Fig. 4, a detail in plan view of Fig. 3. Fig. 5 is a partial section of a centrifugal bowl with my improvement applied thereto.

Like letters of reference indicate like parts in the different figures.

Taking first Figs. 1 and 2, the bowl consists of an upper part or cover *a* and an under part or bottom *b*, screwed together in the usual manner. The bottom *b* is provided with a central circular opening *b'*, inclining outward. The driving-shaft *c* of the bowl is at the top enlarged to a flange *d*, riveted to the bottom of the bowl or integral with it. Between the flange *d* and the bottom *b* of the bowl channels *d'* *d'* are located. The driving-shaft *c* is hollow and within the same the massive shaft *e* projects, on the top of which a nave *f*, integral with the cross-pieces *g*, is mounted. This cross-piece *g* is provided with short shafts *h* *h*, which are secured to the cross-piece by means of nuts or the like. On these shafts the scraper-wheels *i* *i* and the cog-wheels *k* *k* move. The scraper-wheels and the cog-wheels are secured to each other. The cog-wheels *k* *k* are in gearing with a cog-ring on a central disk *l*, which is secured to the bowl by means of stays *m*. By this arrangement the shafts *h* *h* and the cog-wheels *k* *k* and the scraper-wheels *i* *i* will receive a motion relative to the bowl when the shaft *c* has a speed higher or lower than that of the shaft *e*. At the same time the scraper-wheels *i* *i* will rotate on their shafts *h* *h* as the cog-wheels *k* *k* are in gearing with the cog-ring on the disk *l*. The scraper-wheels *i* *i* are provided with scrapers *n* of scoop or shovel shape. The cross-piece *g* is, as is shown in Figs. 1 and 2, provided with obliquely upward directed shield-shaped parts *o*, thus situated that the scrapers on rotating pass between them and the center of the bowl. The inclined edge of the opening in the bottom of the bowl forms a continuation of the obliquely-directed shields *o*. By this

arrangement the solid matters being brought by means of the scrapers to a position nearest to the center of the bowl from where they are thrown out horizontally in the direction of the centrifugal force will on their movement outward meet the shields *o* of the cross-piece *g* and are caught by them. Consequently they will be directed obliquely downward and slide on the parts *o* and the inclined edge of the opening in the bottom to the channels *d'* between the flange *d* and the bottom *b* of the bowl, through which channels they are brought outside the bowl.

The constructional form shown in Figs. 3 and 4 differs from that shown in Figs. 1 and 2, inasmuch as the obliquely-directed shield-shaped parts *o* have a cylindrical extension *r* reaching slightly below the edge of the opening in the bottom of the bowl. The solid matters being caught by the parts *o* slide thereon downward and reach the cylindrical parts *r*, from which they are removed by means of a scraper-wheel *p*, the edges of which are turned or inclined, so that when moving they will bring the solid matters downward. On leaving the lower edge of the extension *r* the solid matters flow outside the bowl through the channels *d'*. The scraper-wheel *p* is secured to the flange *d* by means of nuts or in any other suitable manner, so that it rotates relatively to the cross-piece *g*.

A third constructional form is shown in Fig. 5. In this modification the scrapers *n* are each provided with a shield *o'*, that inclines to the center axis of the shaft *h*. When the scrapers occupy the position nearest to the center of the bowl, the solid matters slide downward on the shields *o'* and are thrown out toward the shield-shaped parts *o* over the edges of the shields *o'*. Then they are brought outside the bowl in the same manner as indicated by reference to Figs. 1 and 2. It is evident that the parts *o* need not in this case reach more than immediately above the lower edges of the shields *o'*. In Fig. 5 the shields *o'* form together a conical ring on the scraper-wheels; but it is clear that they need not be integral with each other. It is evident that the wall of the bowl can be perforated or not.

What I claim is—

1. In a centrifugal machine the combination with the rotary bowl having scraper-wheels for conveying the solid matters stratified on the walls to a point nearer the center line of the bowl, said scraper-wheels being driven by a separate shaft with a speed different from that of the bowl, of an inclined shield for each scraper-wheel intersecting a plane through the center line of the bowl and the center line of the scraper-wheel and located between the rotating scrapers and the center of the scraper-wheel and extending downward over the central opening in the bottom of the bowl.

2. In a centrifugal machine the combination with the rotary bowl having scraper-wheels for conveying the solid matters stratified on the walls to a point nearer the center line of the bowl, said scraper-wheels being driven by a separate shaft with a speed different from that of the bowl, of an inclined shield for each scraper-wheel intersecting a plane through the center line of the bowl and the center line of the scraper-wheel and located between the rotating scrapers and the center of the scraper-wheel and extending downward over the central opening in the bottom of the bowl, said shields forming part of the central disk upon which the shafts of the scraper-wheels are mounted.

3. In a centrifugal machine the combination with the rotary bowl having scraper-wheels for conveying the solid matters stratified on the walls to a point nearer the center line of the bowl, said scraper-wheels being driven by a separate shaft with a speed different from that of the bowl, of an inclined shield for each scraper-wheel intersecting a plane through the center line of the bowl and the center line of the scraper-wheel and located between the rotating scrapers and the center of the scraper-wheel and extending downward over the central opening in the bottom of the bowl, said shields provided with cylindrical extensions projecting over the lower edge of the central opening and means for scraping off the solid matters stratifying on said cylindrical extension and conveying them to the outlet.

4. In a centrifugal machine the combination with the rotary bowl having scraper-wheels for conveying the solid matters stratified on the walls to a point nearer the center line of the bowl, said scraper-wheels being driven by a separate shaft with a speed different from that of the bowl, of an inclined shield for each scraper-wheel intersecting a plane through the center line of the bowl and the center line of the scraper-wheel and located between the rotating scrapers and the center of the scraper-wheel and extending downward over the central opening in the bottom of the bowl, said shields provided with cylindrical extensions projecting over the lower edge of the central opening and inclined scrapers fixed at the bowl and located in the central opening in the bottom of the bowl.

5. In a centrifugal machine the combination with the rotary bowl of scraper-wheels for conveying the solid matters stratified on the walls to a point nearer the center line of the bowl, said scraper-wheels being driven by a separate shaft with a speed different from that of the bowl, the scrapers of said scraper-wheels being inclined downward so as to permit the solids to slide along the inclined plane when the scrapers occupy their position nearest the center line of the bowl,

and of an inclined shield for each scraper-wheel, intersecting a plane through the center line of the bowl and the center line of the scraper-wheel and located below the scraper-wheel, between the scrapers and the center of the scraper-wheel and extending downward over the edge of the central opening in the bottom of the bowl.

6. In a centrifugal machine, in combination, a rotary bowl provided with an opening and scrapers adapted to convey the solid material on the wall of the bowl toward the center of the bowl, and a shield inclined at an angle to the axis of the bowl.

7. In a centrifugal machine, in combination, a rotary bowl provided with an opening and scrapers adapted to convey the solid material on the wall of the bowl toward the center of the bowl, and a shield inclined at an angle to the axes of the bowl and scraper.

8. In a centrifugal machine, in combination, a rotary bowl provided with an opening and scrapers adapted to convey the solid material on the wall of the bowl toward the center of the bowl, a shield inclined at an angle to the axis of the bowl, said shield extending downward into said opening in the bowl.

9. In a centrifugal machine, in combination, a rotary bowl provided with an opening and scrapers adapted to convey the solid material on the wall of the bowl toward the center of the bowl, a shield inclined at an angle to the axes of the bowl and scraper, said shield extending downward into said opening in the bowl.

10. In a centrifugal machine, in combination, a rotary bowl provided with an opening and scrapers adapted to convey the solid material on the wall of the bowl toward the center of the bowl, a shield inclined at an angle to the axis of the bowl, said shield having a vertical extension extending into said opening.

11. In a centrifugal machine, in combination, a rotary bowl provided with an opening and scrapers adapted to convey the solid ma-

terial on the wall of the bowl toward the center of the bowl, a shield inclined at an angle to the axes of the bowl and scraper, said shield having a vertical extension extending into said opening.

12. In a centrifugal machine, in combination, a rotary bowl provided with an opening and scrapers adapted to convey the solid material on the wall of the bowl toward the center of the bowl, a shield inclined at an angle to the axis of the bowl, said shield having a vertical extension extending into said opening, and means to remove the solids adhering to said extension and carry them to the outlet.

13. In a centrifugal machine, in combination, a rotary bowl provided with an opening and scrapers adapted to convey the solid material on the wall of the bowl toward the center of the bowl, a shield inclined at an angle to the axes of the bowl and scraper, said shield having a vertical extension extending into said opening, and means to remove the solids adhering to said extension and carry them to the outlet.

14. In a centrifugal machine, in combination, a rotary bowl, provided with an opening, and scrapers adapted to convey the solid material on the wall of the bowl toward the center, and a shield for each scraper, said shield being at an angle to the axis of the bowl.

15. In a centrifugal machine, in combination, a rotating bowl provided with an opening and scraper-wheels adapted to convey the solid material on the wall of the bowl toward the center, a shield for each scraper-wheel, said wheels having a plurality of scrapers and a shield for each scraper.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

ANDERS JOHAN ERICSSON.

Witnesses:

K. E. ULIBERG,
HARRY ALBIHN.