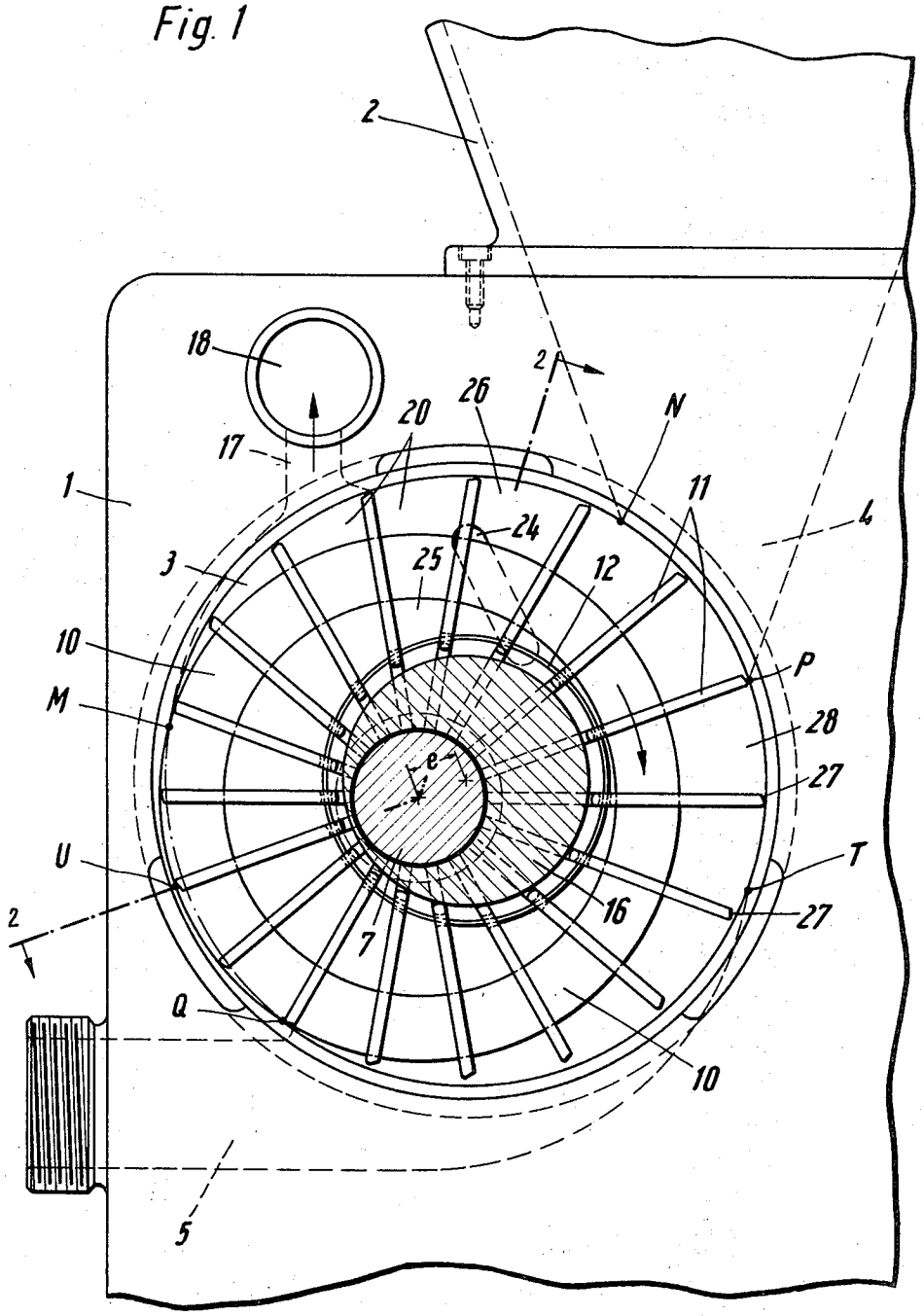
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FEEDING DEVICE FOR PULPY MASSES OF THE TYPE OF A BUCKET PUMP, PARTICULARLY FOR SAUSAGE FILLING MACHINES

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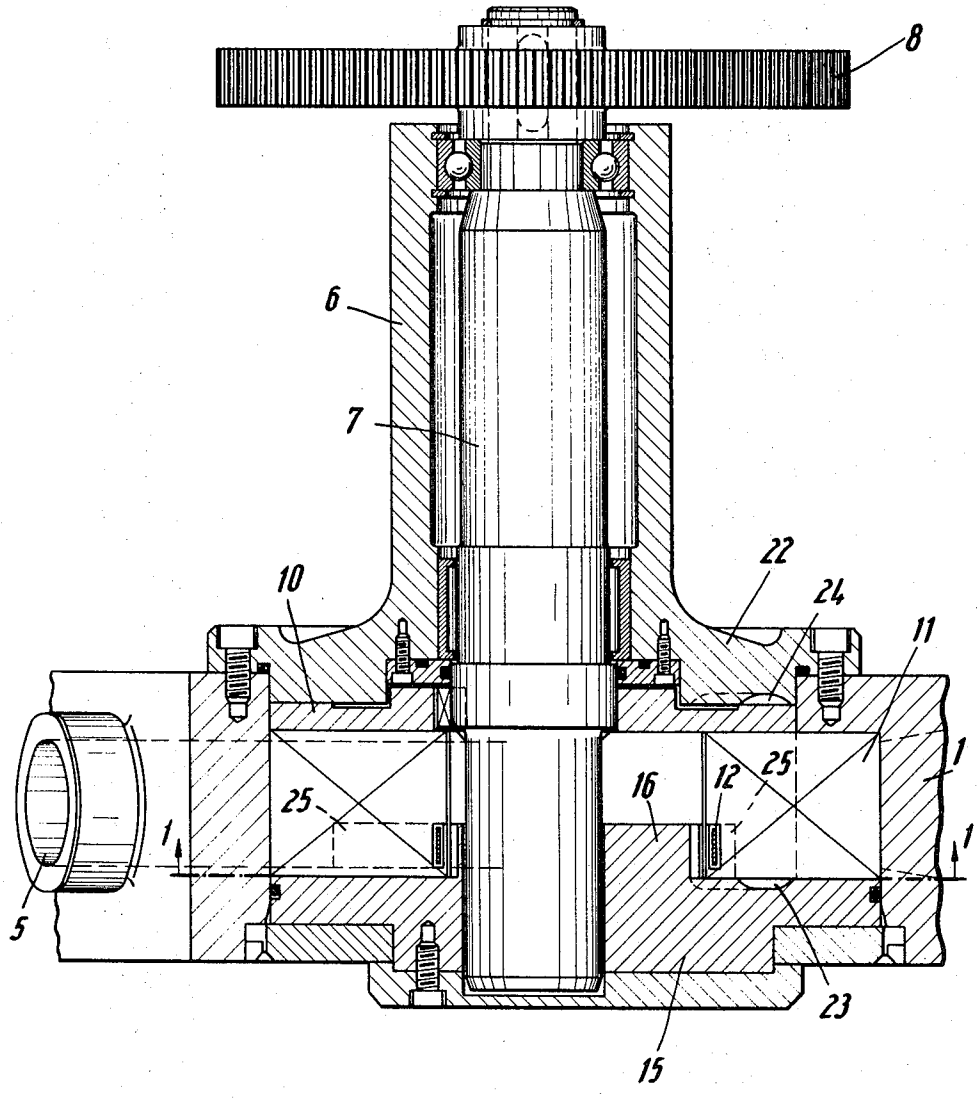
Fig. 1



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Fig. 2



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Fig. 3

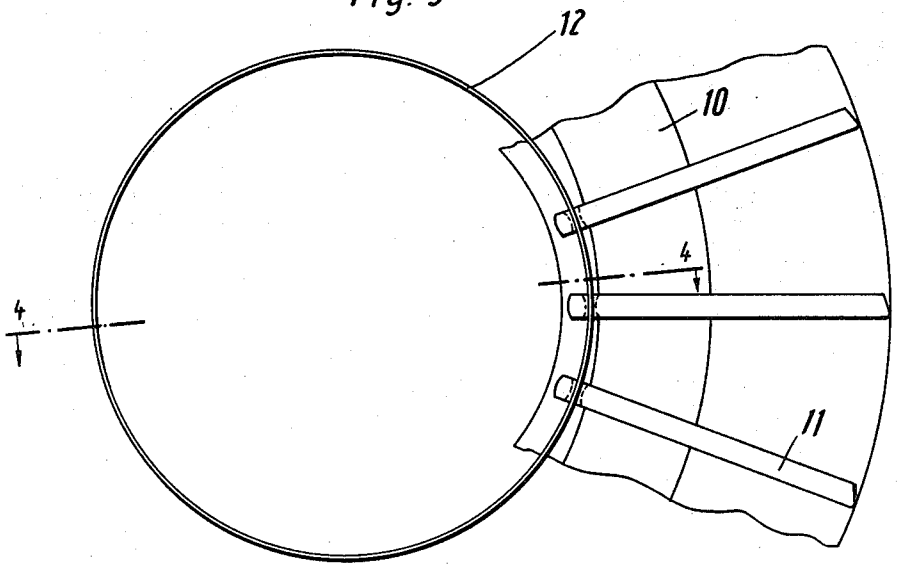


Fig. 4

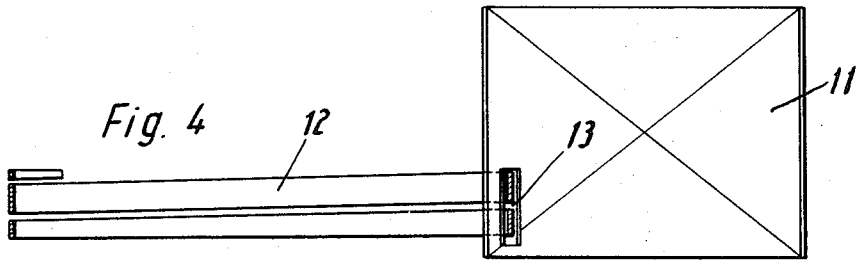
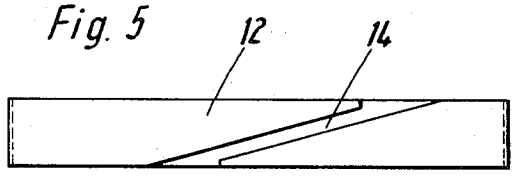


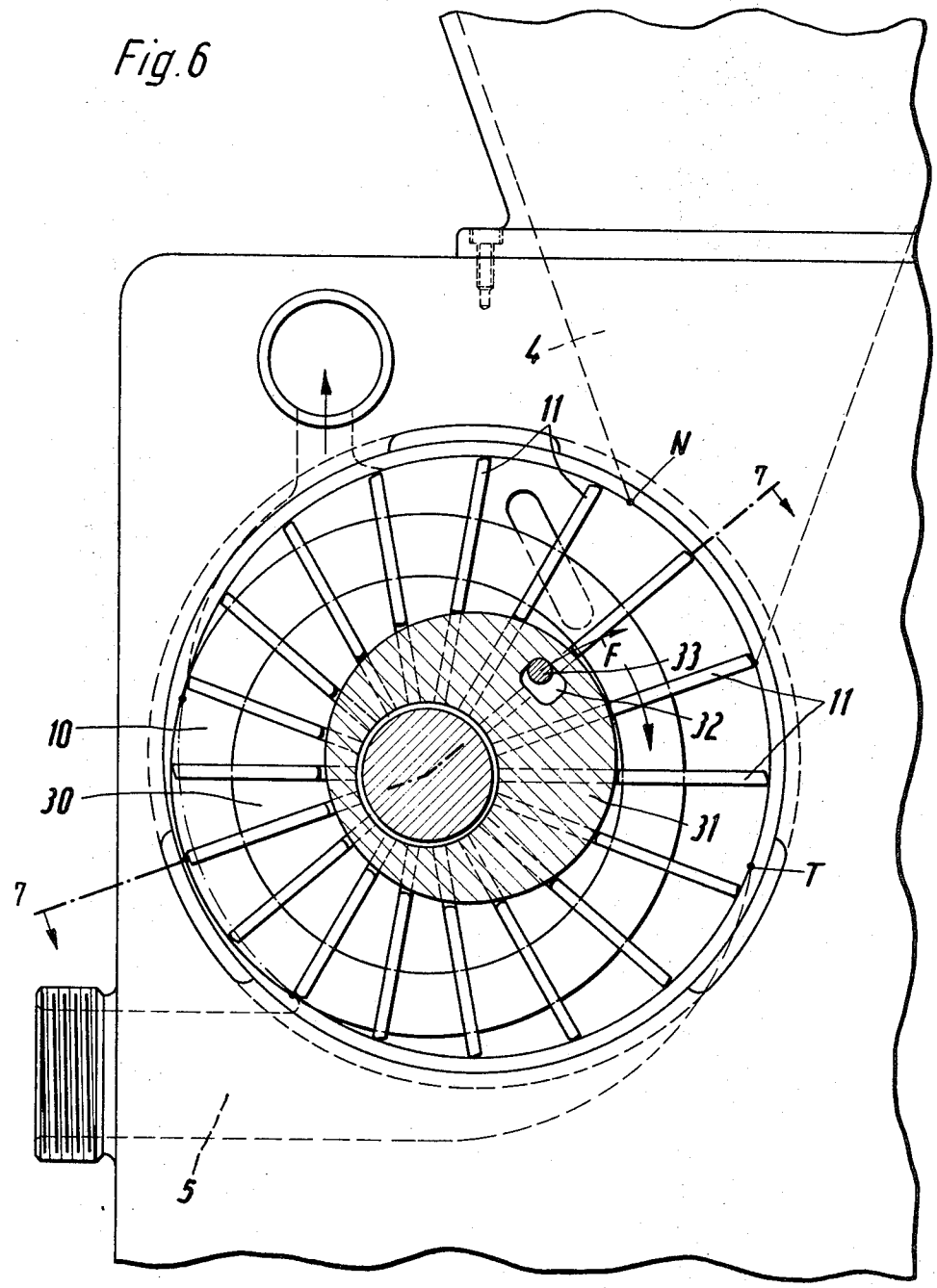
Fig. 5



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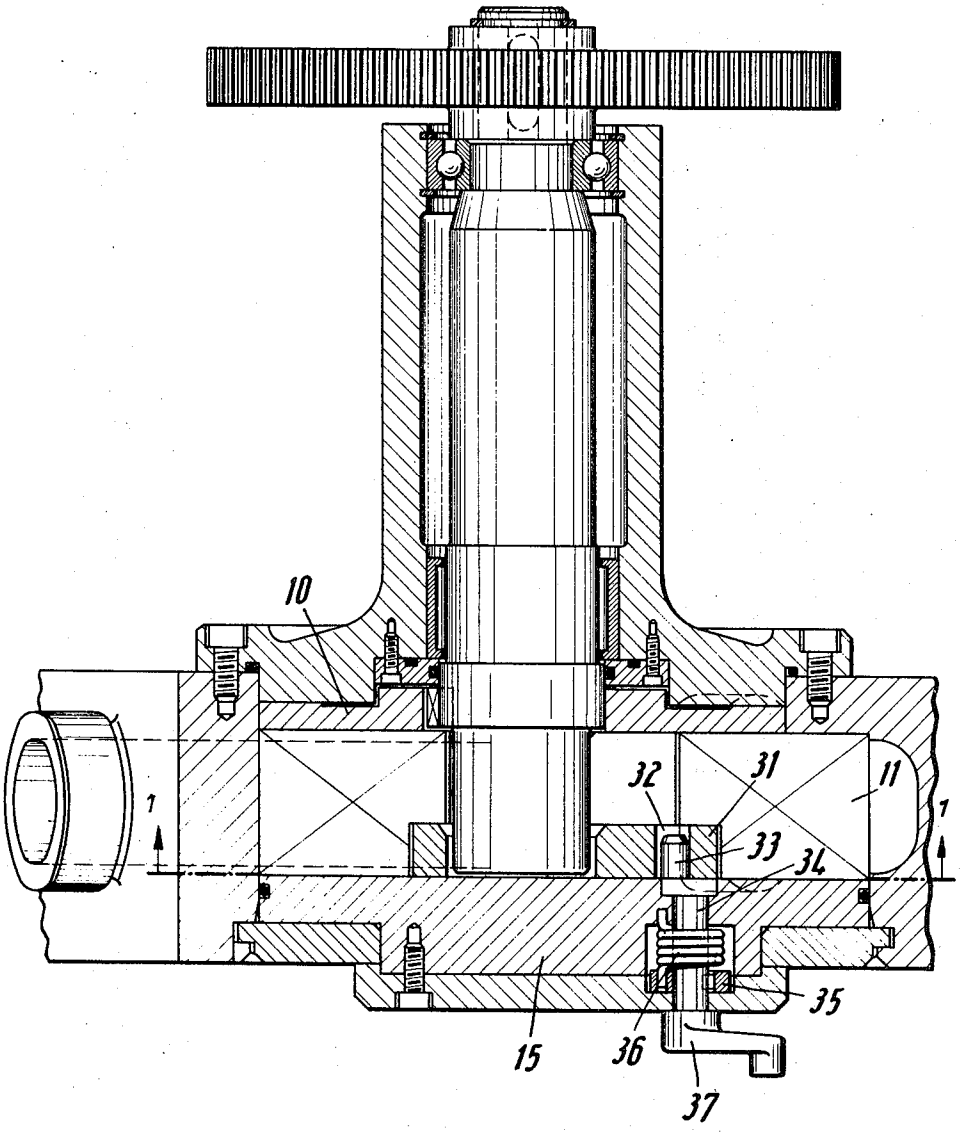
Fig. 6



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Fig. 7



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Fig. 8

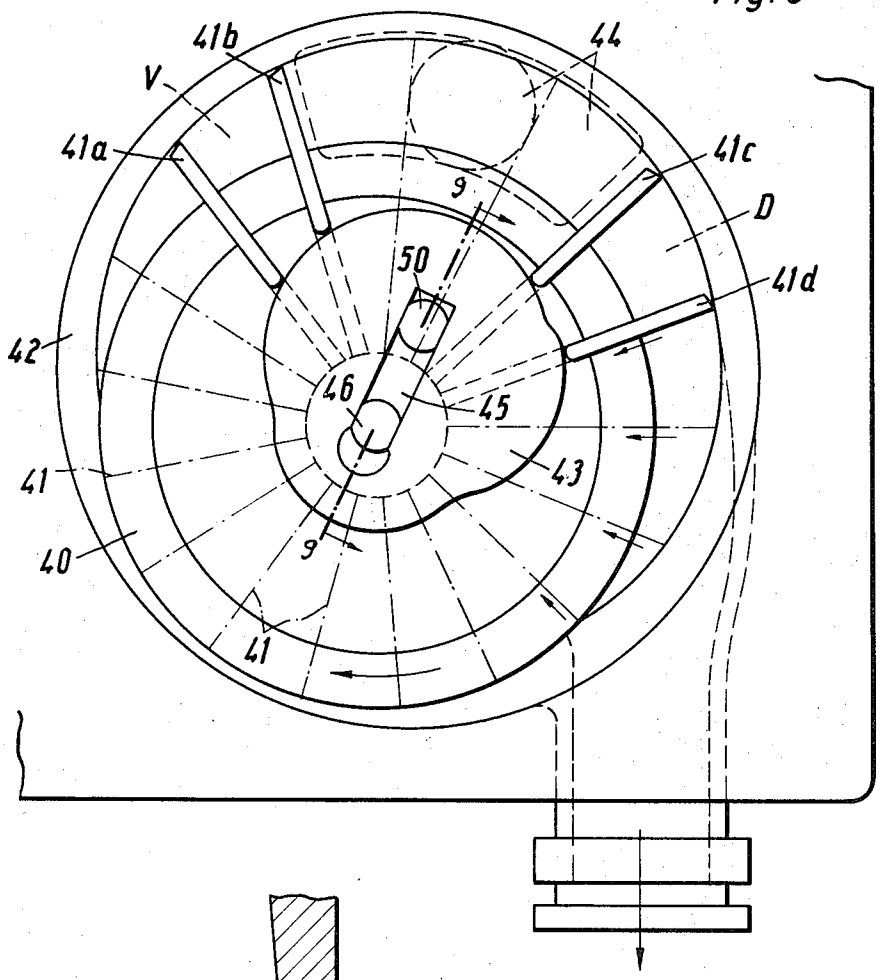
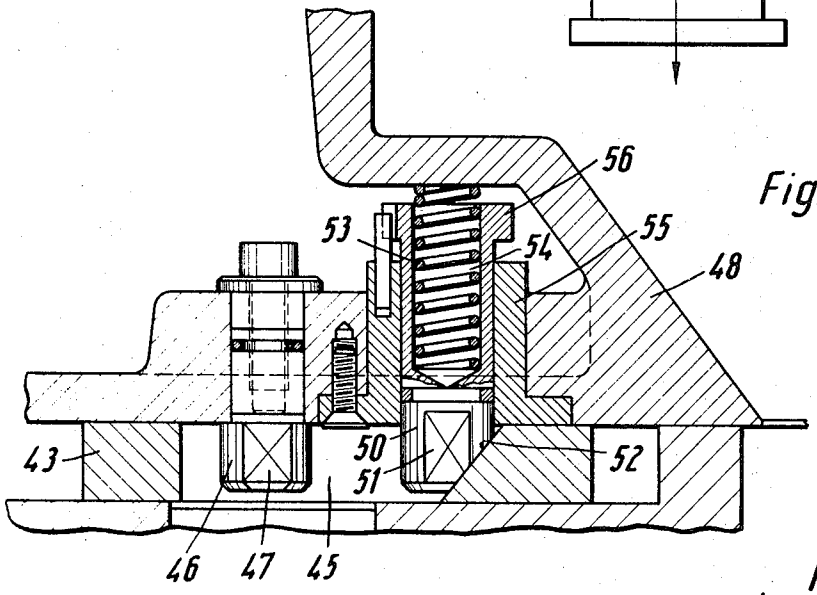


Fig. 9



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United States Patent Office 3,543,330 Patented Dec. 1, 1970

3,543,330

FEEDING DEVICE FOR PULPY MASSES OF THE TYPE OF A BUCKET PUMP, PARTICULARLY FOR SAUSAGE FILLING MACHINES

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Int. Cl. A22c *11/08*
U.S. Cl. 17—37 14 Claims

ABSTRACT OF THE DISCLOSURE

A feeding device for pulpy masses of the type of a bucket pump, which comprises a pump housing having a cover and a rotor disposed eccentrically in the pump housing and having radial slots. Feeding wings are guided in the rotor and cooperate with the walls of the housing. The pump housing includes an inlet channel and a vacuum chamber disposed in front of the inlet channel in order to suck off air. A common resilient element is centrally inserted in the pump housing, and the feeding wings support themselves in radial direction on the resilient element.

The present invention relates to a feeding device for pulpy masses, of the type of a bucket pump, particularly for sausage filling machines, with feeding wings of the bucket pump being guided in radial slots of a rotor disposed eccentrically in the pump housing and which cooperate with the housing wall, whereby in front of the inlet channel a vacuum chamber is provided to suck off the air. In such feeding devices, it has been found that due to the unavoidable wear of the guides for the feeding wings, a non-tolerable play is created between the wing ends and the pump housing, which influences strongly the feeding effect. Particularly of disadvantage is thereby the sucking in mass particles into the air suction device caused by the large play, which air suction device is provided within the range of the rotating feeding wings.

It is one object of the present invention to provide a feeding device for pulpy masses of the type of a bucket pump, wherein the draw-backs are avoided in the feeding device of the described type such, that in the housing chamber of the pump, a joint resilient element is centrally inserted, on which the feeding wings support themselves in radial direction. By this arrangement, a non-objectionable sealing of the feeding wings relative to the housing wall is obtained and the unavoidable wear of the wings and of the housing wall is compensated for, whereby the mentioned disadvantageous occurrences are removed and the production simplified.

In accordance with the present invention, an annular—or ring—spring is used as a resilient element, which annular spring is set in the housing chamber of the pump concentrically to the latter and rotating with the rotor.

In accordance with another embodiment of the present invention, a further lowering of the friction between the feeding wings and the inner wall is obtainable. Furthermore, the disassembly and assembly of the particular pump parts is simplified during cleaning. For this purpose, in accordance with the present invention, a control disc is inserted in the rotor chamber eccentrically to the rotor and freely moving in radial direction, however, non-rotatably, the periphery of which control disc determines the radial position of the feeding wings and on which continuously the pretension of a spring supporting itself on the housing is effected, which spring presses the

feeding wings in a predetermined range to the housing inner wall. By this arragement, the function directly exerted on the ring spring is displaced into the control disc, whereby the elastic pressing effect originates from a spring which is usable in conventional structure and is no more connected with the individual feeding wings. With the removal of the ring spring also a simplification is obtained during the production of the feeding wings, since the production of the slit-like perforations in the wings for the receiving of the springs which requires a certain precision is now obsolete.

In accordance with a further development of the present invention, an arrangement is provided in which in the pump cover a guide bolt is inserted coaxial with the rotor shaft, which guide bolt projects in a guide groove of the control disc, whereby the guide groove extends in the direction to the engaging points of the sealing feed wings arranged between the insert channel and the vacuum chamber and the pressure chamber, respectively.

By these means, the radial forces from the guide bolt being effective in the pressure chamber onto the pump wings and thereby onto the control disc are assumed, so that they cannot influence any more the position of the control disc. Due to this fact the feeding wing pressure cannot be transferred any more to the wings and the suction chamber, so that the total friction in the pump is reduced and the life and the output, respectively, are increased. Simultaneously, the complementary guide of the guide bolt brings about that the displacement force exerted or exercised by the spring pressure to the control disc takes place safely only in the direction required for the function of the pump, namely against the pump spring to be engaged.

The present invention uses the arrangement of the guide groove in the control disc for a further improvement, which results in the fact that in the pump cover a spring bolt is provided which projects into the guide groove and is loaded axially by the spring pressure, which spring bolt supports itself on the control disc over an inclined face. By this arrangement, in accordance with the present invention, also the spring bolt equipped with flattened portions which engage the walls of the guide groove. In an advantageous manner, in accordance with the present invention, the spring bolt is arranged with the pressure spring in an insert member, which is removable in the cover secured thereto such that the spring bolt support itself by means of the spring in case the cover is in its closed position.

By this arrangement, the spring bolt joins the assumption of the pressure from the pressure chamber and simultaneously joins the guide of the control disc.

With these and other objects in view, which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

FIG. 1 is a section of the feeding device along the lines **1**—**1** of FIG. 2;

FIG. 2 is a section along the lines **2**—**2** of FIG. 1;

FIG. 3 is a part elevation of the rotor at an enlarged scale;

FIG. 4 is a section along the lines **4**—**4** of FIG. 3;

FIG. 5 is a section of another embodiment of the ring spring;

FIG. 6 is a section **6**—**6** of FIG 7 of another embodiment of the feeding device;

FIG. 7 is a section along the lines **7**—**7** of FIG. 6;

FIG. 8 is a plan view of a further variation of the feeding device, the cover being removed; and

FIG. 9 is a section along the lines of **9**—**9** of FIG 8.

Referring now to the drawing, and in particular to FIGS. 1–4, the feeding device comprises a pump housing **1** which is equipped with a feeding hopper **2** and the

pump housing **1** defines a pump chamber **3** which is connected by the inlet channel **4** with the hopper **2** and by means of the pressure channel **5** with the filling device of the sausage filling machine (not shown). A branch **6** is flanged to the pump housing **1** in which the pump shaft **7** is eccentrically mounted to the pump chamber **3**. On the shaft **7**, on the one hand, a driving gear **8** and, on the other hand, the pump rotor **10** is secured, in the radial slots of which the feeding wings **11** are displaceably inserted. All feeding wings are aligned on a ring spring **12** disposed concentrically to the pump chamber **3**, which ring spring **12** is joined by the wings in the rotary movement. Each feeding wing is equipped with a holding opening **13** corresponding with the profile of the ring spring, which holding opening **13** is dimensioned such, that the wings are still tangentially displaceable free from clamping on the spring. Since the spring, as shown in the embodiment disclosed in FIG. 4, comprises a plurality of windings, or, as shown in FIG. 5, has a long extended opening slit **14**, the individual feeding wings **11** can be inserted in a simple manner in the ring spring and can be removed therefrom, respectively, and remain, for instance, during mounting or cleaning, together on the ring spring without loss.

At its under end side the pump chamber is covered up by a cover **15**. This cover **15** has a cylindrically shaped projection **16** extending into the pump chamber and arranged concentrically therein, on the peripheral face of which the inner edges of the feeding wings support themselves, as long as they pass the pressure section of the pump chamber (T to Q).

Simultaneously, the spring path of the ring spring is limited by the projection **16** to a tolerable measure, which is, however, kept at such size, that the feeding wings are pressed resiliently towards the inner wall of the pump housing and the wear of the wings and of the housing wall is compensated for. The diameter of the ring spring **12** is chosen such that, for instance, in case of an empty feeding device, all wings are pushed with a certain pretension onto the pump housing and that by possible wear of the wings, still a sufficient pressure onto the pump housing remains. In the section Q to P the complementary connection of the feeding wings with the ring spring brings about, that the wings corresponding to the eccentricity *e* are displaced radially relative to the rotor.

For the amplification of the suction effect of the pump and for the removal of the air which is fed with the incoming mass, one part of the suction section extending from point U to point P is connected by means of the channels **17** and **18** to a source having pressure below atmospheric pressure, whereby about between point M and point N the vacuum chamber **20** is formed which is disposed at least for a distance of two feeding wings in front of the terminal (point N) of the incoming channel **4**. In order to include into the effect of the vacuum chamber **20** also the inner chambers of the pump, channels **23** and **24**, respectively, are worked into the plane side of the lower cover **15** and of the inner cover **22**, respectively, whereby the channel **23** connects the vacuum chamber **20** with a cylindrical recess in the rotor **10** and, thereby, connects also with the pressure chamber. By these channels **23** and **24**, respectively, air bubbles which, under circumstances, are still present in the pressure chamber, are sucked off by slots on the guide slits of the feeding wings **11** and on the plane side of the rotor **10**. The mass particles sucked up thereby into the recess **25** are fed due to the rotation of the feeding wings extending into this recess to the channel **23** and return under the suction effect of the vacuum into the area between the vacuum chamber **20** and the inlet channel **4** and finally into the range of the inlet channel **4**.

In order to assure an effective sealing between the outer edges and the feeding wings **11** and the cylindrical guide face of the pump chamber in the section directly in front of the vacuum chamber starting at M, the

eccentricity *e* of the rotor **10** is somewhat larger than the difference between the radii of these parts. Thereby, an overlapping of these radii results, starting at point Q and extending up to point M, which secures the desired sealing.

Each feeding wing **11** is equipped at its outer edge with an inclination **27**. This inclination **27** serves the reception of a pressure force, which is created in the feeding cell **28** due to the precompression occurring therein and which tends to displace the feeding wings against the effect of the ring **12** inwardly. The mentioned precompression in the cell **28** occurs due to the fact, that the start T of the pressure chamver and of the exit channel **5**, respectively, is disposed at about two cell distances behind the end P of the inlet channel **4**. The precompression has the purpose to reduce the difference between the pressures in the pressure chamber and in the feeding cell entering into this chamber and to equalize or compensate, respectively, and to avoid thereby a pulse feeding, which due to the compressible feeding goods would be created. Since a maximum precompression pressure is set, which corresponds with the high values of the feeding pressure, the forces effective perpendicularly to the feeding wings on both sides coming to equilibrium as soon as the pressures prevailing on both sides are equal. By this arrangement, the friction forces between the guide slot and the wings are equal zero and the compression pressure in the cell **28** presses now over the inclination **27** the wing against the force of the ring spring inwardly, whereby the wing lifts itself from the pump wall and a connection between the cell chamber **28** and the pressure chamber is brought about. Due to this arrangement, also in favor of an equalized operation of the pump, too strong a precompression is made impossible. The projection **16** prevents thereby that the wings standing under the effect of the high filling pressure can transform over the ring spring too great a radial force component to the wing passing the suction range.

With the described feeding device during the production of sausages, the individual sausages can be filled continuously, as well as continuously portioned. During the portioning, the rotor of the feeding device is driven intermittently over a limited rotary angle settable in correspondence with the portion volume.

Referring now again to the drawings, and in particular to FIGS. 6 and 7, in the inner chamber **30** of the rotor **10** closed by the cover **15**, the control disc **31** is inserted eccentrically to the rotor **10** and radially freely movable, however, non-rotatably. The screw is equipped with a recess **32** in which an eccentric pin **33** engages. The latter is part of a rotary shaft **34**, which is mounted in the cover **15** and on which by means of a ring **35** the pretension of a rotary spring **36** anchored in the cover **15** is effected. On the shaft **34** is secured outside of the cover a hand lever **37**, which renders possible during assembly of the cover **15** the tensioning of the spring and the insertion of the pin **33** into the recess **32**.

The helical spring **36** is inserted such, that its pretension tends to turn the shaft **34** clockwise, so that the eccentric pin **33** exerts a force extending in the direction of the arrow F onto the control disc **31**. By corresponding formation of the control disc periphery during rotation of the rotor **10**, only the two feeding wings **11** disposed in front of the point N and behind the point T come to engagement with the screw or the disc **31** and are simultaneously tightly pressed towards the wall of the pump chamber, whereby they support themselves against the spring force F on the disc **31**.

The mentioned tight engagement of the feeding wings in the ranges prior to the terminal of the inlet channel **4** (point N) and in front of the start of the pressure channel **5** (point T), as well as the remaining functions of the shown feeding device are clearly brought out.

Referring now to FIGS. 8 and 9 of the drawings, an embodiment is disclosed, in which the feeding wings **41**,

jointly moved with the rotor **40** and disposed within the pump chamber, support themselves, on the one hand, at the inner periphery of the housing **42** and, on the other hand, on the peripheral edge of a control disc **43**. The design of the support faces is such thereby that only four pump wings **41***a*, **41***b*, **41***c* and **41***d* are pressed tightly against the housing wall. The wings **41***a* and **41***b* seal thereby between the entrance channel **44** and the vacuum chamber V, while the wings **41***c* and **41***d* assume the sealing between the inlet channel **44** and the pressure chamber D. The other wings, indicated in point-dotted lines, move with slight play between their guiding faces, so that the actual friction points are limited to the wings **41***a*–**41***d*.

The securing of this advantage presumes, however, that the radial pressure indicated by arrows and exerted in the pressure chamber D onto the end sides of the feeding wings is not transformed, as until now, by the movable control disc **43** to the feeding wings **41** running on the suction side and produces there additional friction and wear. In order to avoid this, the control disc **43** is equipped with a groove **45**, which runs in the direction to the sealing engaging points of the feeding wings **41***a*–**41***d* and in which the guide bolt **46** with its flattening faces projects. The bolt **46** is fixed to the cover **48**, which cover **48** closes the pump from above. By this arrangement, the guide bolt **46** is in position to catch the above-mentioned pressure forces of the feeding wings and to render them non-damaging.

Simultaneously, the guide bolt **46** in cooperation with the groove **45** provides a forced guide of a control disc movable in the horizontal plane in the direction towards the sealing feeding wings **41***a*–**41***d*.

A continuous resilient pressure force is exerted onto the control disc **43** by a spring bolt **50** which projects with lateral flattenings **51** likewise into the guide groove **45** and supports itself there on the one hand over an inclined face **52** on the control disc **43**. On the other hand, the bolt **50** is continuously charged by a pretensioned spring **53** which supports itself on the pump cover **48**. The spring sits in a hollow chamber **54** of the spring bolt **50**, the latter being guided in an insert member **55**, which is secured in the cover **48**. In case the cover is open, the spring **53** can displace the bolt **50** only up to the abutment of the flange **56**. Upon mounting the cover **48**, the pretension of the spring takes place automatically by support of the bolt **50** on the face **52**.

Since the spring bolt **50** sits likewise in the pump cover **48**, it is engaged with the guide of the control disc **43**, as well as with the support of the pressure forces of the feeding wings effective upon the control disc **43**, so that a safe guide of the control disc **43** in a manner favorable for the pump function is assured.

While I have disclosed several embodiments of the present invention, it is to be understood that these embodiments are given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

I claim:

1. A feeding device for pulpy masses of the type of a bucket pump, comprising

a pump housing including a wall and having a cover,

a rotor disposed eccentrically in said pump housing, and having radial slots,

feeding wings guided in said rotor and cooperating with said wall of said housing,

said pump housing including an inlet channel,

a vacuum chamber disposed in front of said inlet channel in order to suck off air,

a common resilient element centrally inserted in said pump housing, and

said feeding wings supporting themselves in radial direction on said resilient element.

2. The feeding device, as set forth in claim **1**, wherein

said common resilient element comprises a ring spring, and

said ring spring is inserted concentrically in said pump housing and rotating with said rotor.

3. The feeding device, as set forth in claim **2**, wherein

said feeding wings are aligned complementary and exchangeably on said ring spring, whereby said ring spring has a long opening and a plurality of adjacent disposed windings.

4. The feeding device, as set forth in claim **1**, wherein

said cover has a cylindrical projection extending into and being concentric to said pump housing,

said projection being surrounded by said resilient element, and

the inner edges of said feeding wings supporting themselves within the range of the diminishing cell chambers.

5. The feeding device, as set forth in claim **1**, wherein

the rotary axis of said rotor is spaced apart from the center of said pump housing for an eccentricity larger than the difference between the radii of said parts.

6. The feeding device, as set forth in claim **1**, which includes

an exit- and pressure-channel, respectively, for the goods to be fed,

said inlet-channel having an end, and

said channel starts in a range of said pump chamber, which is disposed for about two spaces of said feeding wings after the end of said inlet-channel, so that a precompression of the goods to be fed takes place prior to reaching said pressure channel.

7. The feeding device, as set forth in claim **1**, wherein

the end edges of said feeding wings sliding along the wall of said pump housing are equipped with an inclination pointing against the direction of rotation, so that by the compression pressure a component of the force effective in radial direction on said feeding wing can be formed.

8. The feeding device, as set forth in claim **1**, wherein

said vacuum chamber of said housing is connected by means of channels with a concentric recess provided in said rotor and tapping slots of said feeding wings.

9. The feeding device, as set forth in claim **1**, which includes

a control disc inserted in the rotor chamber eccentrically to said rotor and freely movable in radial direction, however non-rotatably,

the periphery of said central disc determining the radial position of said feeding wings,

a pretensioned spring supporting itself on said housing and the pretension being continuously effective against said control disc, and

said pretensioned spring pressing said feeding wings to the inner wall of said pump housing within a predetermined range.

10. The feeding device, as set forth in claim **9**, wherein

said supporting spring comprises a helical spring provided with pretension in said housing cover, which helical spring is effective upon a rotary shaft with an eccentric pin, entering a recess of said control disc.

11. The feeding device, as set forth in claim **9**, which includes

a guide bolt inserted coaxially with the rotor shaft into the cover of said pump housing,

said guide bolt projecting with flat faces into a guide groove of said control disc, and

said guide groove extends in the direction towards said engagement points of the sealing feeding wings disposed between said inlet channel and said vacuum chamber and said pressure chamber, respectively.

12. The feeding device, as set forth in claim **11**, which includes

an axial spring bolt, biased by spring pressure and projecting into said guide groove provided in said cover of said pump housing, and

said spring belt supports itself on said control disc on an oblique face.

13. The feeding device, as set forth in claim **12**, wherein said spring bolt has flattened faces which engage the walls of said guide groove.

14. The feeding device, as set forth in claim **12**, wherein said spring bolt is disposed with said pressure spring in an insert member, being removably secured to said cover of said pump housing such, that said spring

bolt supports itself by means of said spring on said cover in the closing position of the latter.

References Cited

UNITED STATES PATENTS

475,367	5/1892	Wassermann	17—37
2,302,651	11/1942	Holly.	
2,837,762	6/1958	Azzini et al.	17—37
2,963,735	12/1960	Gaudlitz	17—37

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