UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

Parties:
Imo Industries, Inc.
1710 Airport Road
P.O. Box 5020
Monroe, NC 28111-5020
USA
Plaintiff

Allweiler AG
Allweilerstrasse 1,
D-78315 Radolfzell
Germany
Plaintiff

Seim S.R.L.
Via A. Volta
17-20090 Cusago (MI)
Italy
Defendant

Innovative Continental Equipment, LLC
225 Route 46, Suite 1A
Totowa, New Jersey 07512
USA
Defendant

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UNITED STATES DISTRICT COURT
DISTRICT OF NEW JERSEY

IMO INDUSTRIES, INC. and ALLWEILER AG, Plaintiffs, v. SEIM S.R.L., and INNOVATIVE CONTINENTAL EQUIPMENT, LLC, Defendants.	Civil Action No. _____ **COMPLAINT AND DEMAND FOR JURY TRIAL** ***Document Filed Electronically***

Plaintiffs IMO Industries, Inc., and Allweiler AG, by and through their undersigned attorneys, complaining of Defendants, allege as follows:

JURISDICTION AND VENUE

1. This is an action for patent infringement arising under the patent laws of the United States. This Court has subject matter jurisdiction over this civil action pursuant to 28 U.S.C. §§1331 and 1338. This Court has supplemental jurisdiction over all of the other claims asserted herein in accordance with 28 U.S.C. §1338(b) and 28 U.S.C. §1367(a), these claims being necessarily determinable together with the federal claims.

2. This Court has personal jurisdiction over Defendant Seim s.r.l. pursuant to 28 U.S.C. §1391(d). Defendant Seim s.r.l., (hereinafter "Seim") is a foreign corporation transacting business in the United States. Further, this Court has jurisdiction over Defendant Seim pursuant to N.J. Court Rules, R. 4:4-4 (2007), in that the Defendant conducts substantial business activity in the State of New Jersey and this District and, in the course of such business activity, Defendant Seim has engaged in the conduct described herein.

3. This Court has personal jurisdiction over Defendant Innovative Continental Equipment, LLC, (hereinafter "ICE") pursuant to 28 U.S.C. §§ 1391(b) and 1400(b). Defendant ICE is located within this district, having a principle place of business located at 225 Route 46, Suite 1A, Totowa, New Jersey 07512. Defendant ICE conducts substantial business in this district and maintains a website on the Internet at www.ic-equipment.com, which is accessible in this district. Further, this Court has jurisdiction over Defendant ICE pursuant to N.J. Court Rules, R. 4:4-4 (2007), in that Defendant conducts substantial business activity in the State of New Jersey and this District and, in the course of such business activity, Defendant ICE has engaged in the conduct described herein.

4. Venue is proper in the District of New Jersey pursuant to 28 U.S.C. §§ 1391(b), (c), (d) and 1400(b).

PARTIES

5. Plaintiff IMO Industries, Inc. (hereinafter "IMO") is a corporation duly registered and existing under the laws of the State of Delaware. IMO's primary place of business is located at 1710 Airport Rd., Monroe, North Carolina, USA. IMO is an assignee/licensee of the right, title and interest in, and has standing to sue for infringement of United States Patent No. 5,123,821.

6. IMO is an industry leader in supplying high quality products to the hydraulic elevator industry. One of IMO's products is a submersible elevator screw pump that incorporates the technology protected by the '821 patent. This pump is comprised primarily of three rotors (spindles) in an axial flow design. This innovative design provides for positive displacement through the pump housing and reduces the pulsation effect found in many elevators.

7. Plaintiff Allweiler AG is a German corporation registered and existing under the laws of Germany and having a place of business at Allweilerstrasse 1, D-78315 Radolfzell, Germany. This suit pertains to Allweiler's ingenious pumps, designed and invented and owned by Allweiler. These pumps are designed to reduce the pulsation effect in elevators. The market for these pumps has grown significantly, due in large part to the success of Plaintiff Allweiler's design.

8. Defendant Seim is an Italian company with a primary location of Via A. Volta, 17-20090 Cusago (MI), Italy. Defendant Seim transacts business within the United States, specifically within this District.

9. Defendant Seim manufactures pumps that are covered by the claims of Plaintiffs' '821 patent. The pumps manufactured by Defendant Seim use the technology as claimed in Plaintiffs' '821 patent to reduce the pulsation effect in elevators.

10. Defendant ICE is a limited liability company duly registered and existing under the laws of the State of New Jersey. ICE has a principal place of business located at 225 Route 46, Suite 1A, Totowa, New Jersey 07512. Defendant ICE is the United States representative of Seim s.r.l., and accepts purchase orders for Seim pumps. ICE is a distributor of the infringing

elevator pumps manufactured by Defendant Seim throughout the United States, and specifically within this District.

COUNT I

PATENT INFRINGEMENT, INDUCEMENT TO INFRINGE, AND CONTRIBUTORY INFRINGEMENT OF THE '821 PATENT AGAINST SEIM S.R.L.

11. Plaintiffs Allweiler and IMO hereby repeat and reallege the allegations of paragraphs 1 through 8 as if fully set forth herein.

12. This is an action for damages, exemplary damages, interest, costs, attorney's fees, and injunctive relief arising from Defendant Seim's willful infringement of Plaintiffs' '821 patent under 35 U.S.C. §§271, 281, 284, and 285. Plaintiffs' '821 patent teaches and claims a submersible elevator pump that reduces the pulsation effect found in elevators.

13. Plaintiff Allweiler AG is the lawful owner of all rights to United States Patent No. 5,123,821 (hereinafter the "'821 patent") entitled "Screw Spindle Pump With A Reduced Pulsation Effect," which was duly and lawfully issued by the United States Patent and Trademark Office on June 23, 1992. A copy of the '821 patent is attached hereto and incorporated herein by reference as Exhibit 1.

14. IMO is the exclusive licensee of Allweiler AG to United States Patent No. 5,123,821. A copy of the exclusive license agreement is attached hereto and incorporated by reference as Exhibit 2. IMO has exclusive rights to distribute Allweiler's elevator pumps in the United States. IMO also has a legal standing to bring all actions and recover all damages for infringement of the '821 patent.

15. Defendant Seim has made, used, offered for sale, and/or sold in interstate commerce throughout the United States pumps that infringe one or more claims of the '821 patent and will continue to do so unless enjoined by this Court. Defendant Seim continues to manufacture and distribute infringing pumps throughout the United States that are within the scope of Plaintiffs' '821 patent, without license or authority from Plaintiffs.

16. Defendant Seim had actual knowledge of Plaintiff IMO's '821 patent. Defendant Seim has been notified in writing of its violation of Plaintiffs' rights under the '821 patent, and Defendant Seim has, with full knowledge of that patent, willfully and wantonly proceeded, and continued to infringe, in disregard of Plaintiffs' rights thereunder. Defendant Seim's misappropriation of the pump design through infringement of the '821 patent has been deliberate and willful, and Defendant Seim will continue its infringing conduct unless enjoined by this Court.

17. Defendant Seim has actively induced infringement of the '821 patent by encouraging its customers and prospective customers, including individuals and business within this judicial district, to purchase, use, offer to sell, and/or sell pumps that infringe the '821 patent.

18. Defendant Seim markets to customers in the United States by attending trade shows where it actively markets its infringing pumps. Upon information and belief, Defendant Seim attends trade shows along with representatives of its United States distributor, Defendant ICE. Defendants Seim and ICE unfairly compete with Plaintiffs by advertising for sale pumps that infringe Plaintiffs' '821 patent as their own devices.

19. Defendant Seim's infringement has been willful, intentional and deliberate, with knowledge of and in conscious disregard of the '821 patent and Plaintiffs' rights.

20. Defendant Seim's misappropriation and infringement of Plaintiffs' designs through the infringement of the '821 patent has caused and will continue to cause damage and irreparable harm to Plaintiffs unless Defendant Seim's infringing activities are enjoined by this Court. Defendant Seim's misappropriation and infringement have allowed Defendant Seim to obtain substantial profits and market share in the United States submersible pump market causing substantial and irreparable economic harm to Plaintiffs.

21. Plaintiff Allweiler has no adequate remedy at law.

22. Plaintiff IMO has no adequate remedy at law.

23. Plaintiffs seek to enjoin Defendant Seim from all activities that constitute infringement of Plaintiffs' '821 patent.

COUNT II

PATENT INFRINGEMENT, INDUCEMENT TO INFRINGE, AND CONTRIBUTORY INFRINGEMENT OF THE '821 PATENT AGAINST INNOVATIVE CONTINENTAL EQUIPMENT LLC

24. Plaintiffs Allweiler and IMO hereby repeat and reallege the allegations of paragraphs 1 through 23 as if fully set forth herein.

25. This is an action for damages, exemplary damages, interest, costs, attorney's fees, and injunctive relief arising from Defendant ICE's willful infringement of Plaintiffs' '821 patent under 35 U.S.C. §§271, 281, 284, and 285. Plaintiffs' '821 patent teaches and claims a submersible elevator pump that reduces the pulsation effect found in elevators.

26. Defendant ICE has made, used, offered for sale, and/or sold in interstate commerce throughout the United States pumps that infringe one or more claims of the '821 patent and will continue to do so unless enjoined by this Court. Defendant ICE continues to distribute infringing pumps throughout the United States that are within the scope of Plaintiffs' '821 patent without license or authority from Plaintiffs.

27. Defendant ICE had actual knowledge of Plaintiff IMO's '821 patent. Defendant ICE has been notified in writing of its violation of Plaintiffs' rights under the '821 patent, and Defendant ICE has, with full knowledge of that patent, willfully and wantonly proceeded, and continued to infringe, in disregard of Plaintiffs' rights thereunder. Defendant ICE's misappropriation of the pump design through infringement of the '821 patent has been deliberate and willful, and Defendant ICE will continue its infringing conduct unless enjoined by this Court.

28. Defendant ICE has actively induced infringement of the '821 patent by encouraging its customers and prospective customers, including individuals and business within this judicial district, to purchase, use, offer to sell, and/or sell pumps that infringe the '821 patent.

29. Defendant ICE markets to customers in the United States by attending trade shows where it actively markets its infringing pumps. Upon information and belief, Defendant ICE attends trade shows along with Defendant Seim where together Defendants Seim and ICE unfairly compete with Plaintiffs by advertising for sale pumps that infringe Plaintiffs' '821 patent as their own devices.

30. Defendant ICE's infringement has been willful, intentional and deliberate, with knowledge of and in conscious disregard of the '821 patent and Plaintiffs' rights.

31. Defendant ICE's misappropriation and infringement of Plaintiffs' designs through the infringement of the '821 patent has caused and will continue to cause damage and irreparable harm to Plaintiffs unless Defendant ICE's infringing activities are enjoined by this Court. Defendant ICE's misappropriation and infringement have allowed Defendant ICE to obtain substantial profits and market share in the United States submersible pump market causing substantial and irreparable economic harm to Plaintiffs.

32. Plaintiff IMO has no adequate remedy at law.

33. Plaintiff Allweiler has no adequate remedy at law.

COUNT III

UNFAIR COMPETITION AND VIOLATION OF THE LANHAM ACT §43(A) AGAINST SEIM AND ICE

34. Plaintiffs Allweiler and IMO hereby repeat and reallege the allegations of paragraphs 1 through 33 as if fully set forth herein.

35. Plaintiffs Imo and Allweiler, through their commitment to innovative and quality designed and crafted products, have developed significant goodwill in the elevator pump markets and have enjoyed a prosperous relationship with retailers over the years.

36. Defendants ICE and Seim, by themselves and in concert with each other, have passed off elevator pumps manufactured by Seim and utilizing Plaintiffs' patent technology as their own designs. By passing off their pumps as created and designed by Seim, Defendants Seim and ICE have caused and will likely continue to cause confusion as to origin, affiliation, sponsorship, connection, and association with the patented technology embodied by the elevator pumps. Defendants' conduct in passing off these designs as their own is in violation of Section 43(a) of the Lanham Act, 15 U.S.C. §1125(a).

37. Plaintiffs IMO and Allweiler have been and continue to be injured and damaged by Defendants' activities in passing off infringing elevator pumps as their own. If Defendants' unfair competition and infringement are allowed to continue, Plaintiffs will suffer irreparable injury for which they will have no adequate remedy at law.

38. As a result of Defendants' unfair competition, Plaintiffs IMO and Allweiler have sustained and continue to incur losses due to lost product sales and profits related thereto, plus interest on lost profits and reasonable and necessary attorney's fees. Plaintiffs also continue to incur damage to their goodwill and market reputation based upon Defendants' unfair competition. Plaintiffs IMO and Allweiler seek to recover these damages and additional reasonable attorney's fees necessary to enjoin further unfair competition by Defendants.

39. As Defendants undertook to pass off the infringing products and deceive customers as to the source of origin for the technology contained therein, Plaintiffs IMO and Allweiler seek the award of actual damages, exemplary damages, costs, and all Defendants' profits.

COUNT IV

ATTORNEY'S FEES

40. Plaintiffs Allweiler and IMO hereby repeat and reallege the allegations of paragraphs 1 through 39 as if fully set forth herein.

41. Plaintiffs seek their reasonable attorney's fees as allowed by law. The willful nature of Defendants' infringement renders this case exceptional within the meaning of 35 U.S.C. §285, entitling Plaintiffs to an award of attorney's fees.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs Allweiler and IMO respectfully pray that the Court grant the following relief:

1. That the court preliminarily and permanently enjoin Defendants from making, assembling, importing, using, selling, and/or offering for sale, or inducing others to make, use, sell, and/or offering to sell, products that infringe the ‘821 patent;

2. That Plaintiffs have and recover damages from Defendants, pursuant to 35 U.S.C. §284, including interest from the date of infringement;

3. For an award of treble the amount of compensatory damages found pursuant to 35 U.S.C. §284;

4. For an award of punitive damages based on the willful and wanton nature of Defendants’ activities;

5. That the Court declare this case exceptional and tax the Defendants with Plaintiffs’ reasonable attorney’s fees pursuant to 35 U.S.C. §285;

6. That the Court tax the Defendants with the cost of this action;

7. That the Court hold Defendants joint and severally liable for their misconduct because they or their agents participated therein or they knowingly accepted benefits from such wrongful conduct;

8. That the Court order the impounding and destruction of all products in the Defendants’ possession, custody, or control that infringe the ‘821 patent and of all the products that can be used to make or advertise the infringing product;

9. That the Court grant such other and further relief as it deems just and proper;

JURY DEMAND

10. That all issues so triable be tried by jury.

Dated: June 28, 2007

Respectfully submitted,

/s/Jeffrey A. Cohen
JEFFREY A. COHEN, ESQ. (JC - 7975)

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CERTIFICATION PURSUANT TO L.CIV.R. 11.2

I hereby certify that the matter in controversy is not the subject of any other action pending in any court or of a pending arbitration proceeding, and no other action or arbitration proceeding is contemplated.

By: /s/ Jeffrey A. Cohen
JEFFREY A. COHEN, ESQ.

Dated: June 29, 2007

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Attorneys for Plaintiffs IMO Industries, Inc. and Allweiler AG

EXHIBIT 1

US005123821A

United States Patent [19]

[11] Patent Number: 5,123,821

[45] Date of Patent: Jun. 23, 1992

Willibald et al.

[54] SCREW SPINDLE PUMP WITH A REDUCED PULSATION EFFECT

[75] Inventors: Klaus Willibald, Bodman-Ludwigshafen; Rolf Quast, Singen, both of Fed. Rep. of Germany

[73] Assignee: Allweiler AG, Radolfzell, Fed. Rep. of Germany

[21] Appl. No.: 617,678

[22] Filed: Nov. 26, 1990

[30] Foreign Application Priority Data

Mar. 8, 1990 [DE] Fed. Rep. of Germany 4007273

[51] Int. Cl.[5] F04C 2/16

[52] U.S. Cl. 418/197; 418/201.3

[58] Field of Search 418/191, 194, 197, 201.3

[56] References Cited

U.S. PATENT DOCUMENTS

2,652,192	9/1953	Chilton	418/197
2,952,216	9/1960	Wildhaber	418/197
3,103,894	9/1963	Sennet	418/197
3,814,557	6/1974	Volz	418/197
4,018,549	4/1977	Segerström	418/197
4,522,576	6/1985	Carré et al.	418/201.3

FOREIGN PATENT DOCUMENTS

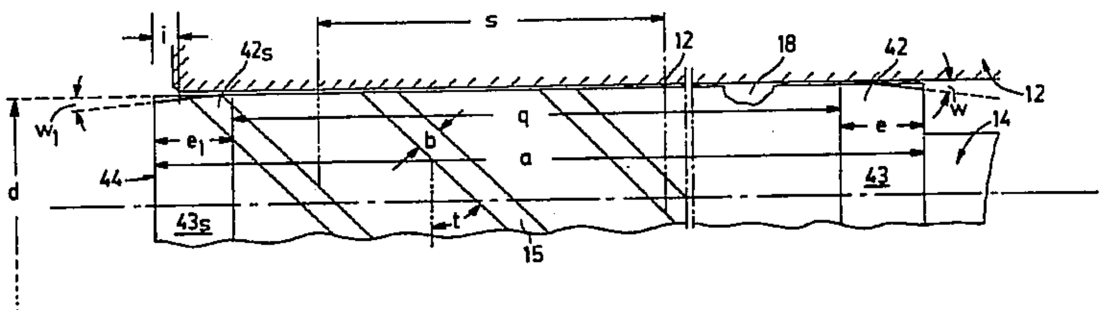
0209984	1/1987	European Pat. Off. .	
1403882	12/1968	Fed. Rep. of Germany .	
3815158	11/1989	Fed. Rep. of Germany .	
1243471	9/1960	France	418/197
52-38615	3/1977	Japan	418/201.3

Primary Examiner—Richard A. Bertsch
Assistant Examiner—David L. Cavanaugh
Attorney, Agent, or Firm—Bachman & LaPointe

[57] ABSTRACT

In a displacement pump having at least one screw spindle which is mounted in an opening in a housing surrounding same between a suction chamber and a pressure chamber, the profile termination of the spindle, at the pressure end, is turned off in a conical configuration at the outside diameter (d), and the angle of inclination (w) of the conical surface (43) is below 10°. In addition the spindle is to be provided at its end on the suction side with a conical surface with an angle of inclination (w_1) which is below 5°, preferably below 3°.

11 Claims, 2 Drawing Sheets



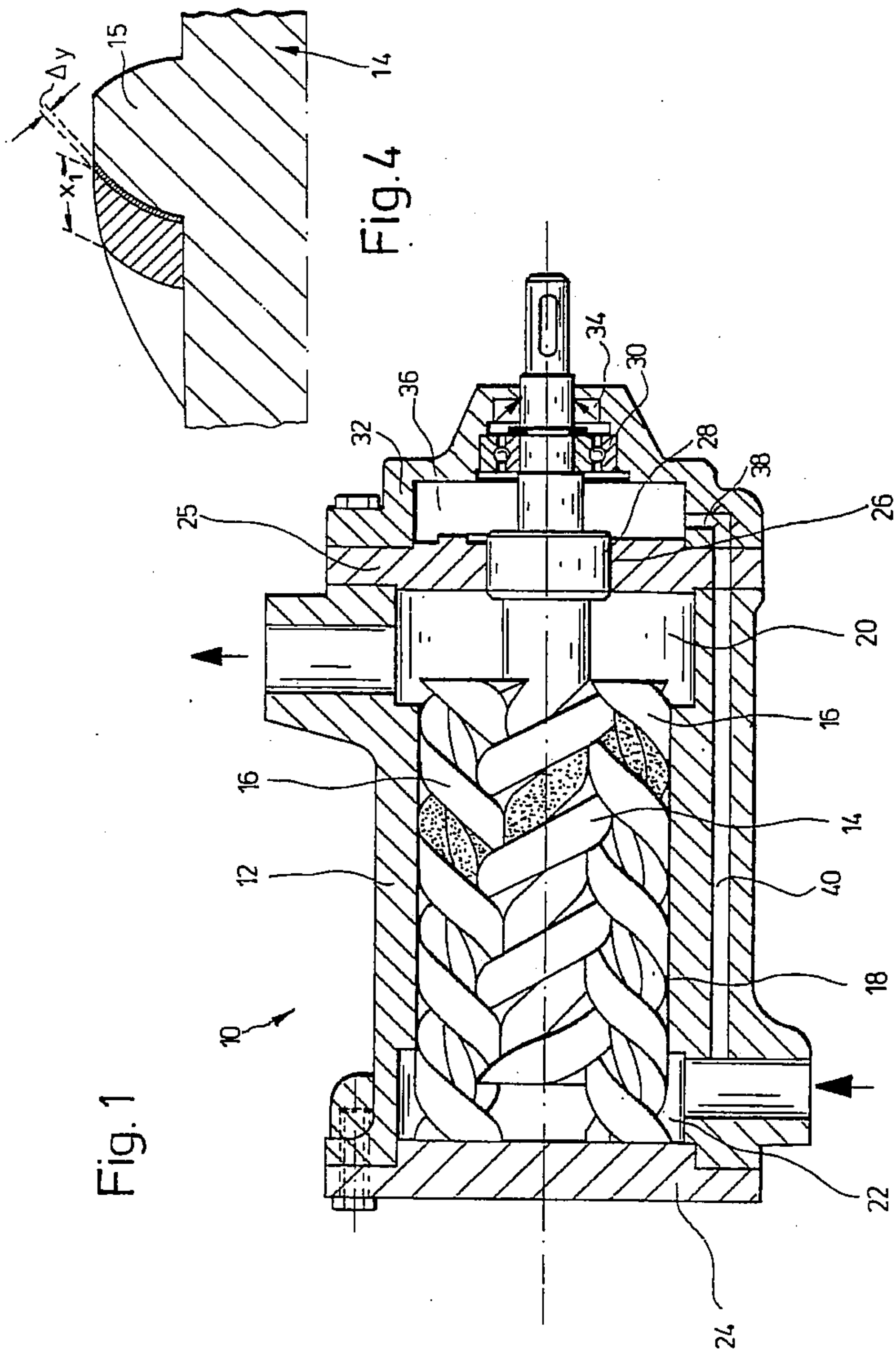


Fig. 4
15
14
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x1
Fig. 1
10
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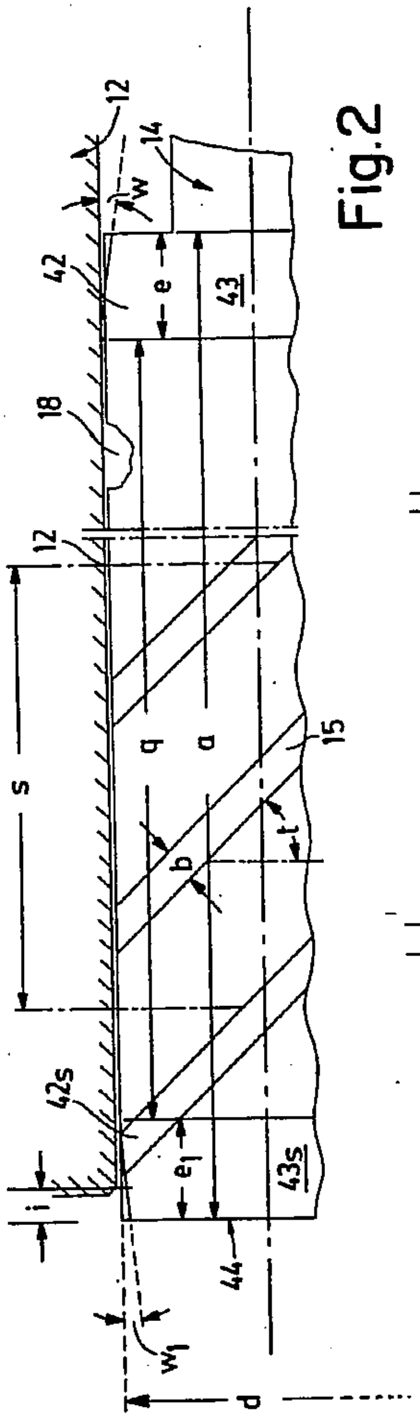
12
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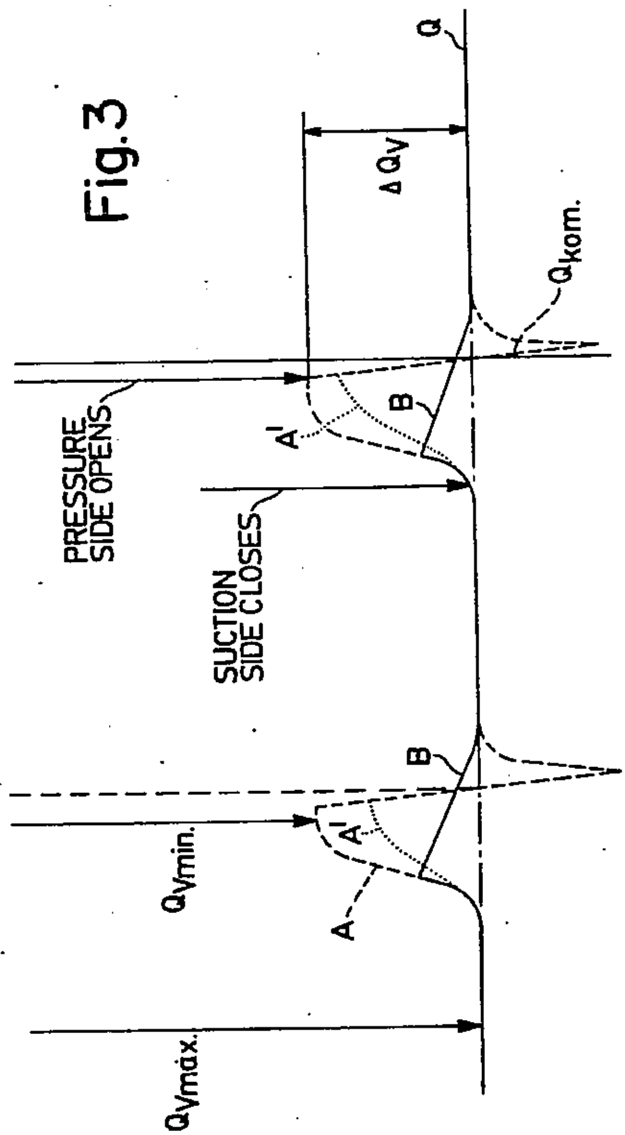
Fig.2


Q
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PRESSURE SIDE OPENS
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A'
A
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Fig.3

SCREW SPINDLE PUMP WITH A REDUCED PULSATION EFFECT

DESCRIPTION

The invention relates to a displacement pump, in particular a screw spindle pump, as described for example in German laid-open application (DE-OS) No 38 15 158.

In the method disclosed therein for reducing pressure pulsation, the typical pressure pulsation has superimposed thereon a forced inverse pressure pulsation which can be produced by periodically bleeding off a part of the delivery flow on the pressure side of the conveyor screws. That method is made possible by an aperture member on the pressure side, which involves a discharge flow to the suction side, being periodically covered over by means of a closure member in dependence on the rotational position of the drive spindle. That publication also describes the point that incorporated into the receiving bores at the pressure end of the housing are taper bevels which taper towards the suction chamber.

With knowledge of that state of the art, the inventor set himself the aim of further improving a displacement pump of the kind described above, without the addition of further machine components.

SUMMARY OF THE INVENTION

That object is attained by a displacement pump, in particular a screw spindle pump, comprising at least one screw spindle which is mounted in an opening in a housing surrounding same between a suction chamber and a pressure chamber, wherein the profile termination of the spindle at the pressure end, is turned off in a conical configuration at the outside diameter (d) and the angle of inclination (w) of the conical surface is below 10°. An aspect of particular significance in regard to the reduction of a pulsation effect is an extremely shallow conical surface with an angle of inclination of below 10°, preferably even below 3°.

That bevel at the pressure side provides that the chamber at the pressure side is gradually opened in a defined manner at the appropriate time; in that way the rise in pressure or volume flow which occurs due to closure of the suction side can be compensated for the major part thereof. The output pulsation is markedly reduced.

In accordance with a further feature of the invention the profile termination at the suction end may also be provided with a shallow conical surface of that kind, in which respect however the axial length of the last-mentioned conical surface is to be less than the axial length of the conical surface at the pressure end.

That provides that the pulsation effect is reduced by specific matching of the operative length of the system and the conical configuration at the pressure end and possibly also at the suction end.

In accordance with another independent feature the tooth thickness of the drive spindle is to be reduced towards the profile termination or the tooth gap of the idler spindle, which corresponds to said tooth thickness, is to be increased in width in the same direction.

BRIEF DESCRIPTION OF THE DRAWINGS

Further advantages, features and details of the invention will be apparent from the following description of preferred embodiments and with reference to the drawings in which:

FIG. 1 is a view in longitudinal section through a screw spindle pump,

FIG. 2 is a view on an enlarged scale and in section through part of the screw spindle pump;

FIG. 3 is a diagram illustrating the pressure pulsation or volume flow pulsation of the screw spindle pump, and

FIG. 4 is a diagrammatic view in section relating to the tooth thickness dimensioning.

DETAILED DESCRIPTION

A screw spindle pump **10** comprises in a housing **12** a drive spindle **14** of an outside diameter d and two laterally disposed idler spindles **16**. The spindles **14** and **16** are mounted in mutually overlapping receiving bores **18** in the housing **12**.

The housing **12** is closed both at its pressure end and also at its suction end by respective pump end members **25** and **24** respectively, forming a pressure chamber **20** and a suction chamber **22**. The drive spindle **14** which is passed through the pump end member **25** at the pressure end is provided in the region of a passage bore **26** with an axial thrust compensating piston **28**, and is additionally supported by a bearing **30** in an end member attachment portion **32**. A shaft seal **34** is also disposed in the latter.

The internal space **36** in the end member attachment portion **32** is relieved of the load of the delivery pressure; the liquid entering from the pressure chamber **20** is discharged by way of a relief passage **38** which communicates with the suction chamber **22** by way of a communicating bore **40** in the housing **12**.

FIG. 2 makes it clear that the drive spindle **14**, of the profile length, is turned off at its ends in a conical configuration, wherein the length of the cone portion **42** at the pressure end is identified by e, the length of the cone portion 42_s at the suction end, which projects with its end surface **44** by a distance i, is identified by e_1, the cylindrical length remaining on the drive spindle **14** between the conical surfaces **43** and 43_s is identified by q, the pitch angle of the screw flight **15**, of which only part is shown in FIG. 2, on the drive spindle **14** or the idler spindle **16** is identified by t, and the pitch is indicated by s. The cone angle on the pressure side, as indicated at w, or the cone angle on the suction side, as indicated at w_1, is preferably 2°.

FIG. 3 shows in graph form the optimization in respect of length by virtue of a pre-compression effect according to the invention, with the letters used therein bearing the following meanings:

A: output pulsation;

B: pulsation when using the precompression effect;

ΔQv: wastage volume flow;

Q_{kom}: compression volume flow.

The matching in respect of length of the entire system is so selected that an increase in sealing lines is produced during a part of the delivery period, as indicated in FIG. 3; that means a rise from Qvmax to Qvmin. By specifically varying the sealing quality by way of the described cone configuration **42**, 'hard' or violent opening, due to the spindle geometry, is avoided, in particular on the pressure side.

Starting from the initial pulsation effect therefore, the pulsation image is altered by the provision of the described conical surface **43** at the end of the spindle at the pressure end, and that results in a reduction of ΔQv and

Q_{kom}. The increase in the length of the conical surface 43 which is inclined in terms of cross-section provides that on the one hand the pressure side opens earlier while on the other hand the cross-sections become continuously larger during the opening procedure. It may thus be sufficient to provide the pressure side with the conical configuration 42 and to leave the spindle end on the suction side cylindrical.

In regard to the three-spindle screw spindle pump 10 shown, the operational system may be described in the following terms:

On the basis of a given number of chambers n, which is a measurement of the pressure build-up internal to the pump, the ratio of length to pitch, that is to say a/s, represents an analog parameter in respect of the geometrical configuration; the greater that ratio is, the less is the increase in pressure per unit of length.

For applying the precompression process, the following requirements have to be met in regard to length matching:

$$a/s = 1 + (2\cdot n - 1)\cdot X \quad \text{with } n \in N_o, \text{ i.e. } 1, 2, \ldots$$

wherein

x is a pre-factor with $0.15 < x < 0.4$, and

n describes the number of chambers acting on average.

The pre-factor x is a measurement in respect of the pre-compression effect which moreover, in dependence on profile, only occurs for values above 0.1–0.15.

It should be noted that the information set out below relates to the particularly advantageous bevelling according to the invention of the drive spindle 14.

With a constant angle w ($0 < w < 3°$) the conical configuration 42 at the pressure end must be adapted to that dimension x, that is to say to the pre-compression effect achieved. Thus for example for an angle w of about 2°, the length e is so selected that in the normal situation $e \leqq x\cdot s$ applies; here for example with $x = 0.25$; $n = 3$; $s = 80$ mm, that is to say $a/s = 2.25$ and with a conical configuration 42 on the pressure side, of a length e of 20 mm, only very small residual pulsation occurs.

The conical configuration 42_s at the suction end quite generally, permits adaptation of the closing characteristics, as indicated at A' in FIG. 2. The conical configuration 42_s must be precisely matched to the conical configuration 42 at the pressure end, on the basis of a defined relationship a/s in respect of length. Thus for example the length e_1 of the conical configuration 42_s is desirably to be less than the length e of the other conical configuration 42. Furthermore, with an unaltered dimension in respect of the spindle array 14, 16, the length e of the conical configuration 42 at the pressure end is overall to be made smaller.

Careful matching of the overall geometry results in an effective reduction in pulsation over a wide range of pressures of from 10 to 80 bars and in the viscosity range of from 20 to 200 mm^3/s.

At any event a clearly reduced pulsation effect is achieved without involving additional machine components.

In an alternate embodiment, the tooth thickness b of the screw flight 15 on the drive spindle 14 is reduced at its profile termination. The tooth gap on the idler spindle 16 may also be increased in width.

The structural alteration in the tooth thickness b or the tooth gaps towards the profile termination is to be such that the pre-opening action can occur sufficiently early; the length of the alteration x_1 as shown in FIG. 4 in regard to the profile involved must be marked in relation to the spindle pitch s. On the other hand the reduction in the tooth thickness or the increase in the width of the tooth gap must have a slight gradient Δy; x_1.

We claim:

1. A screw spindle pump which comprises: a housing having an opening therein; a suction chamber and a pressure chamber in the housing spaced from each other; a drive spindle and at least one idler spindle mounted in the opening in the housing between the suction chamber and the pressure chamber; wherein the profile termination of at least the drive spindle at the pressure end is turned off in a conical configuration at the outside diameter and the angle of inclination of the conical surface is below 10°.

2. A pump according to claim 1 including two laterally disposed idler spindles.

3. A pump according to claim 2 wherein the drive spindle and idler spindles are mounted in mutually overlapping relationship.

4. A pump according to claim 3 wherein the angle of inclination is less than 3°.

5. A pump according to claim 1 wherein at its suction end at least the drive spindle has a conical surface with an angle of inclination (w_1).

6. A pump according to claim 5 wherein the angle of inclination at the pressure and suction ends is below 5°.

7. A pump according to claim 1 wherein said drive and idler spindles include said angle of inclination.

8. A screw spindle pump according to claim 1 which including: a drive spindle having a tooth thickness and mounted in the opening in the housing between the suction and pressure chambers; wherein the tooth thickness of the drive spindle is reduced towards its profile termination.

9. A pump according to claim 8 including at least one idler spindle having a tooth gap and mounted in the opening in the housing, wherein the tooth gap of the idler spindle corresponds to the tooth thickness of the drive spindle and wherein said tooth gap is increased in width towards its profile termination.

10. A screw spindle pump which comprises: a housing having an opening therein; a suction chamber and a pressure chamber in the housing spaced from each other; a drive spindle mounted in the opening in the housing between the suction and the pressure chambers; wherein the profile termination of the drive spindle at the pressure and suction ends is turned off in a conical configuration at the outside diameter thereof and the angle of inclination of the conical surfaces is below 10°; and wherein the axial length of the conical surface at the pressure end is greater than the axial length of the conical surface at the suction end.

11. A pump according to claim 10 including at least one idler spindle mounted in the opening in the housing.

* * * * *

EXHIBIT 2

EXCLUSIVE LICENSE AGREEMENT

LICENSE AGREEMENT made August 17, 2006, between Allweiler AG ("Licensor"), a German corporation, having a place of business at Allweilerstrasse 1, D-78315 Radolfzell, Germany, and IMO INDUSTRIES, INC. ("Licensee"), a Delaware corporation, having a place of business at 1710 Airport Rd., Monroe, North Carolina 28110, USA.

W I T N E S S E T H

Whereas letters patent of the United States No. 5,123,821 for SCREW SPINDLE PUMP WITH A REDUCED PULSATION EFFECT, issued to the Licensor on June 23, 1992; and

Whereas the Licensee has been operating under an exclusive license from the Licensor to practice and enforce such letters patent since July 18, 2001 and now the parties wish to memorialize the terms of the agreement for which the parties have been operating under;

It is therefore agreed:

1. **EXCLUSIVE LICENSE.** The Licensor hereby grants to the Licensee the exclusive right and license, in the United States of America and its territories, to manufacture, have manufactured, use, sell, and have sold devices covered by letters patent of the United States No. 5,123,821 issued to and owned by the Licensor. The license includes the right to sublicense and the right to assign this License Agreement.

2. **ROYALTIES.** The Licensee shall pay to the Licensor a royalty of three percent (3%) for each device manufactured and sold by the Licensee covered by such patent. The Licensee shall keep an accurate account of the devices manufactured and sold under the scope of the license granted hereunder and shall render a statement in writing to the Licensor within 30 days after the end of each calendar quarter during the term of this License Agreement, and shall, concurrently with the rendering of

such statement, pay to the Licensor the amount of the royalties accrued during the corresponding calendar quarter. The Licensor shall have the right, at his own expense and not more often than once in any calendar year, to have an independent certified public accountant acceptable to Licensee examine the books of the Licensee to verify the royalty statements and royalties due Licensor pursuant to this License Agreement.

3. **PAID-UP LICENSE.** Upon the payment to Licensor of , the license granted hereunder shall be deemed fully paid-up, and Licensee shall have no obligations to make further royalty payments to Licensor pursuant to Article 2 of this License Agreement.

4. **TERM.** The term of this License Agreement shall be to the end of the term for which such letters patent were granted, provided, however, that either party may on 30 days' written notice to the other terminate this License Agreement and the license granted hereunder.

5. **INDEMNITY.** The Licensor shall indemnify the Licensee against all damages, costs, and expenses as a result of the infringement by Licensee of any patents by the manufacture or sale of devices covered by this License Agreement. This indemnity shall survive the termination of this License Agreement.

6. **NOTICE.** Any notice to be given pursuant to the terms of this License Agreement shall be addressed as follows:

Licensor:

Allweiler AG
Allweilerstrasse 1
D-78315 Radolfzell
Germany

Licensee:

William Roller
Vice President
IMO INDUSTRIES, INC.
1710 Airport Road
Monroe, North Carolina, 28110 USA

7. **JURISDICTION.** This Agreement shall be interpreted under the laws of the State of North Carolina.

IN WITNESS WHEREOF, the parties have executed this License Agreement.

ALLWEILER, AG

By: _____

ALLWEILER AG
D-78315 Radolfzell

(SEAL)
Name: Frank Kirchner
Title: CFO

ATTEST:

TITLE: Treasury Manager
Allweiler AG

IMO INDUSTRIES, INC.

By: _____

(SEAL)
Name: William Roller
Title: VP GM

ATTEST:

TITLE: VP Business Development