

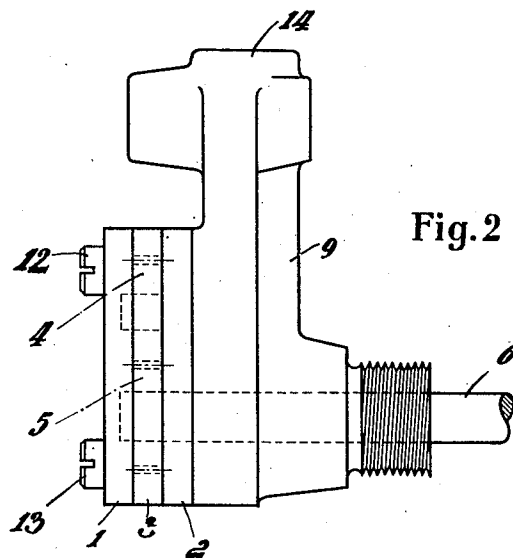
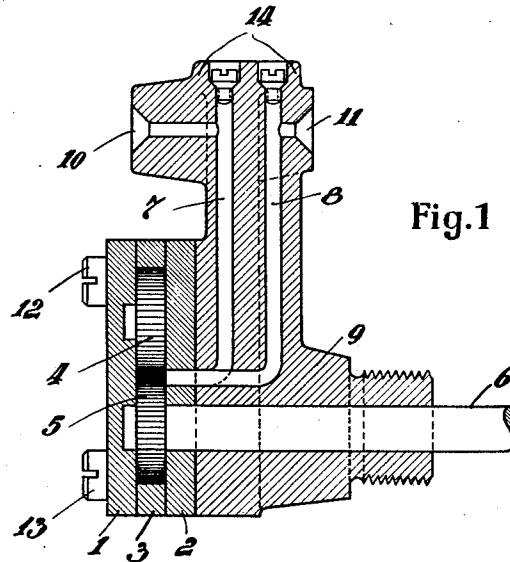
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GEAR PUMP

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GEAR PUMP

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The present invention relates to a gear pump, more particularly for artificial silk spinning machines. In most cases such pumps consist of the actual pump body and the mounting member. The gear pump serves to supply the requisite spinning solution in uniform quantity to the spinning nozzles. The actual pump body consists of a number of individual plates bolted together, the central plate in the interior carrying the gear wheels for conveying the spinning solution. Thus all rotating parts serving to convey the spinning solution are accommodated within the interior of the pump body.

Naturally such a gear pump is subjected to mechanical wear and in the case of the production of artificial silk there are also chemical influences to be taken into account.

In the present case the mechanical wear which occurs is not comparable with the ordinary wear in gear pumps, but here account has to be taken of an abnormal wear which is occasioned on the one hand by the small tolerances necessary in the interior of the pump in order that the quantity conveyed should be precise and, on the other hand is increased by the high pressure arising in the conveyance of the spinning solution. Materials of the ordinary kind are therefore not suitable for the manufacture of the pump body because the pump would rapidly lose the prescribed accuracy and would have to be replaced.

Hitherto, the pump body or the parts constituting the pump body were made from steel capable of being hardened. Primarily use was made of an unalloyed carbon steel, which after hardening is certainly capable of satisfying the mechanical requirements but cannot withstand the chemical action which arises. To overcome the latter difficulty it has already been attempted to employ an alloyed steel which is substantially capable of withstanding both the mechanical and the chemical action. With the spinning solution customary in the past, such pumps have given quite good results. More recently, however, in the production of artificial silk, solid and liquid materials in a finely divided state have been added to the spinning solution so as to give matt silk, and this method is finding wide-spread use. Frequently the chemically aggressive stabilizers are added to these dispersions. It has now been found that the steel alloys hitherto employed for the pump bodies and the rotating parts are not capable of withstanding the considerable mechanical and chemical action caused by the additives. In particular the steel alloys which have hitherto been employed which have a hardness

such that they can be filed, have been found incapable of sufficiently withstanding the mechanical wear occasioned by the powders which in part are very hard. Primarily however, the life of these pumps drops very considerably. This latter phenomenon can be attributed primarily to the fact, due to the small crystals which are added, the components of the pump are subjected to higher mechanical stresses and thus there is an associated increase in wear. This necessitates a frequent replacement of the pumps of the spinning machines, so that the operation has to be interrupted at short intervals, resulting in an increase in the cost of manufacture of the artificial silk.

The object of the present invention is to avoid these disadvantages and to provide a gear pump which has a more satisfactory life. The invention resides in that for the production of the pump body consisting of the casing and of the rotating parts which come into contact with the spinning solution, use is made of a chromium steel rich in carbon the composition of which is so chosen that after hardening to increase the mechanical resistance a hardness of at least 60 Rockwell C. and more is obtained with a simultaneous increase in the chemical resistance. Preferably a steel alloy is employed which has a carbon content of 0.7–1.1% and a chromium content of 12–16%. Particularly favourable results have been obtained by using an alloy containing at least 0.9% of carbon. In order to ensure complete resistance of the steel alloy to chemical action, it is advisable in all cases to add up to 1.5% of molybdenum to the steel alloy. For example a steel alloy of the following composition has proved very satisfactory for artificial silk spinning pumps: 1% C, 12.5% Cr, 0.8% Mo. By using the above described steel the gear pumps for production of artificial silk are capable of satisfying completely both the chemical and the mechanical requirements. Even with the increased requirements arising in the production of matt silk, these pumps are satisfactory in every respect and are characterized by an appreciably longer life.

By using the above described steel the obtaining of a hardness of at least 60 Rockwell C. and more, is ensured and at the same time a drop in the resistance to chemical action is not only avoided but the resistance to chemical action is even increased.

The suitability of this steel for the production of spinning pumps was surprising, particularly as it lies outside the limits of the ordinary rust-

less steels and nothing was known of its resistance to chemical action, more particularly in respect of the components of the spinning solutions. It was not to be foreseen that if this steel was employed for spinning pumps it would satisfy not only the increased mechanical requirements but also the chemical requirements which arise.

Due to the increased life of the spinning pumps the consumption of alloyed steel is correspondingly reduced, which is a very considerable advantage.

Apart from this, frequent interruptions in the manufacturing operation are avoided, which has a favourable influence on the production and cost of artificial silk.

The annexed drawing illustrates the invention by way of example, in which Fig. 1 represents a section, and Fig. 2 a view of a spinning pump.

The pump body consists of two outer plates 1 and 2 and a middle plate 3 in which the gear wheels 4, 5 are arranged. Wheel 5 is rotated by a shaft 6 whilst gear wheel 14 is rotated by mere intermeshing with gear wheel 5. A channel system 7, 8 in the piece 9 connects the pump chambers (not represented) situated at both sides of the intermeshing point with the upper part 14 of the clamping piece 9, which is provided with ducts 10, 11, communicating with channels 7 and 8 respectively and having tapered ends, which are adapted to fit on tapered ends of ducts leading to the spinning solution vessel and to the spinning nozzle respectively.

The pump body including the plates and the rotating parts are made of a steel alloy containing 1% carbon, 12.5% chromium and 0.8% molybdenum.

The pump body is attached by suitable means for instance bolts or screws 12, 13 to the holding or clamping piece 9 which can be made of any suitable material for instance cast iron.

What I claim is:

1. A gear wheel spinning pump comprising a pump casing and rotatable gear wheels, said casing and gear wheels consisting of a steel alloy containing 0.7 to 1.1% carbon and 12 to 16% chromium and having a hardness of at least 60 Rockwell C.

2. A gear wheel spinning pump comprising a pump casing and gear wheels which consist of a steel alloy containing 0.7 to 1.1% carbon, 12 to 16% chromium and up to 1.5% molybdenum and having a hardness of at least 60 Rockwell C.

3. A gear wheel spinning pump comprising a pump casing and gear wheels which consist of a steel alloy containing 0.9 to 1.1% carbon and 12 to 16% chromium and having a hardness of at least 60 Rockwell C.

4. A gear wheel spinning pump comprising a pump casing and gear wheels which consist of a steel alloy containing 0.9 to 1.1% carbon, 12 to 16% chromium and up to 1.5% molybdenum and having a hardness of at least 60 Rockwell C.

5. A gear wheel spinning pump comprising a pump casing and gear wheels which consist of a steel alloy containing 1% carbon and 12.5% chromium and having a hardness of at least 60 Rockwell C.

6. A gear wheel spinning pump comprising a pump casing and gear wheels which consist of a steel alloy containing 1% carbon, 12.5% chromium and 0.8% molybdenum and having a hardness of at least 60 Rockwell C.

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