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R. KNOLLENBERG
APPARATUS FOR HOMOGENIZING LIQUIDS

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Fig. 1.

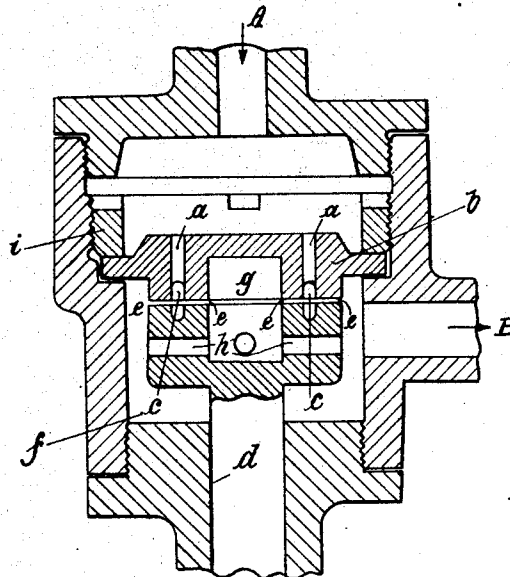
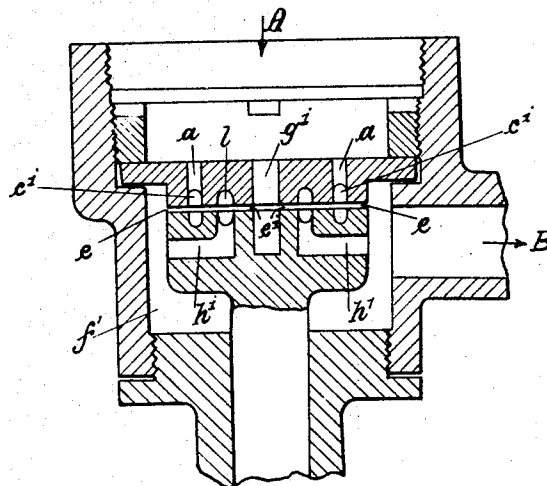


Fig. 2.



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APPARATUS FOR HOMOGENIZING LIQUIDS.

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To all whom it may concern:

Be it known that I, RUDOLF KNOLLENBERG, a citizen of Germany, residing at Lubeck, Germany, have invented new and useful Improvements in Apparatus for Homogenizing Liquids, of which the following is a specification.

The difficulty of obtaining high efficiency with adjustable homogenizing nozzles is due to the fact that extremely narrow homogenizing gaps are required for this purpose. The gaps may only be 1/100 mm and less in width and must be of uniform width right round the nozzle. The smaller the homogenizing gap is to be for a given output and a given compression pressure in a homogenizing plant, the greater must be the diameter of the nozzle. But the greater the nozzle, the greater becomes the practical difficulty of obtaining homogenizing gaps of the same width right round the nozzle. In addition to this the load on the nozzle increases very greatly, so that adjustment becomes more and more difficult. The width of the gap is on the other hand limited for the practical reason, that gaps which are too narrow become easily stopped up. In order to prevent narrow gaps becoming stopped up, it has already been proposed to use rotatable homogenizing nozzles. Such nozzles, however, have the disadvantage that they gradually grind deeply into the seating, whereby the seating surface is widened, thus reducing the efficiency. In non-rotating adjustable nozzles, on the other hand, there is the difficulty of making the nozzle and the seating exactly concentric, as the two parts referred to must be mounted in two separately constructed casings. If the parts are not accurately centered, the efficiency is bound to drop, as the widths of the gaps will be different.

The subject of the present invention is a homogenizing nozzle, which is capable of adjustment with respect to an opposed member and which does not have the drawbacks referred to above.

According to the present invention an annular groove is provided in the surfaces bounding the homogenizing gap of such a homogenizing nozzle, to which groove the liquid to be homogenized flows through passages in the opposing member, after which it flows through the gap to the outlet. Preferably there is also provided a central recess, which is open to the outlet and gives

the homogenizing gap an annular shape, the arrangement being such that a portion of the liquid to be homogenized can flow from the annular groove to the recess.

In a further constructional form according to the invention the central recess is open towards the inlet and is connected to the outlet by the inner part of the gap and an annular passage, which subdivides the homogenizing gap between the annular groove and the recess.

By this arrangement the broad homogenizing gap is so subdivided, that the liquid is more easily pressed through, the homogenizing nozzle being very considerably relieved of the liquid pressure. The escape of the homogenizing liquid is effected in a particularly favourable manner.

In the accompanying drawing two constructional examples of the invention are shown diagrammatically,

Fig. 1 being an axial section through one constructional form and

Fig. 2 an axial section through another constructional form.

In the example shown in Fig. 1 the homogenizing nozzle *d* is adjustable with respect to the opposing member *b*. The opposing member is mounted in the casing with a certain amount of play, so that it can be easily centred. After being centred, the opposing member is fixed by means of a screw ring *i* or the like. The homogenizing nozzle and the opposing member both have a central recess *g*, through which the homogenizing gap *e* formed between them is given an annular shape. The recess *g* is in this case closed to the inlet *A* and is connected to the outlet *B* by passages *h*. The annular surface *e* is further subdivided by a groove *c* approximately in the middle thereof, which may be cut in one or other of the opposing surfaces or in both surfaces, but which in every case is connected by passages *a* with the inlet.

The apparatus works in the following manner:—After, by releasing the screw ring *i*, adjusting the member *b* and again tightening the screw ring *i*, the parts have been accurately centred, the liquid to be homogenized is caused to flow in under pressure at the inlet *A*. The liquid passes through the passages *a* into the annular groove *c* and from there forces its way to both sides through the gap *e*. The liquid passes outwards directly into the space *f* and to the

outlet B, the portions of the liquid flowing inwards passing out of the recess g through the passages h and also to the space f .

In the constructional example shown in Fig. 2 the homogenizing gap is still further subdivided. The central recess g^1 is in this case closed to the outlet side and opens to the inlet side. Between the recess g^1 and the annular groove c^1 the surface of the gap is again subdivided by the annular passage l , which is connected by passages h^1 to the outlet space f^1 . The liquid flows from the recess g^1 through the inner parts e^1 of the gap and passes to the annular passage l , to which liquid also flows from the outside from the annular groove c^1 .

What I claim is:—

1. An apparatus for homogenizing liquids, comprising in combination a homogenizing nozzle, a member facing the nozzle, a gap between the nozzle and the said member, a central recess and annular grooves in the surfaces of the nozzle and the opposing member facing the gap, which are so subdivided that the liquid under pressure can flow out of a plurality of homogenizing gaps, which are in fixed relation to one another, to the outlet space of the apparatus, as set forth.
2. An apparatus for homogenizing liquids, comprising in combination a homogenizing nozzle, a member facing the nozzle, a gap between the nozzle and the said member, a

central recess and an annular groove in the surfaces of the nozzle and the opposing member facing the gap and passages in the nozzle extending from the central recess to the outlet space of the apparatus surrounding the nozzle, which allows the liquid under pressure to emerge from the gap both outwardly and inwardly and the liquid flowing to the central recess to flow to the outlet space of the apparatus through the passages in the nozzle, as set forth.

3. An apparatus for homogenizing liquids, comprising in combination a homogenizing nozzle, a member facing the nozzle, a gap between the nozzle and the said member, a central recess and an annular groove in the surfaces of the nozzle and the opposing member facing the gap, passages in the nozzle extending from the central recess to the outlet space of the apparatus surrounding the nozzle and an additional groove between the central recess and the groove in the surfaces facing the gap, which additional groove is capable of receiving the liquid passing from the outer groove inwardly and from the central recess outwardly and of causing it to flow through the passages in the homogenizing nozzle to the outlet space of the apparatus, as set forth.

In testimony whereof I affix my signature.

RUDOLF KNOLLENBERG.