(No Model.)

C. KELLGRÉN.

COOLING APPARATUS.

No. 516,206. Patented Mar. 13, 1894.

Fig. 1.

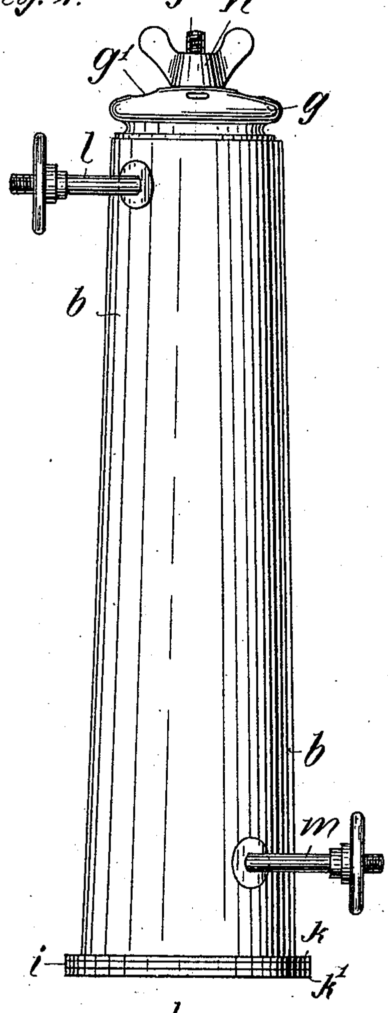
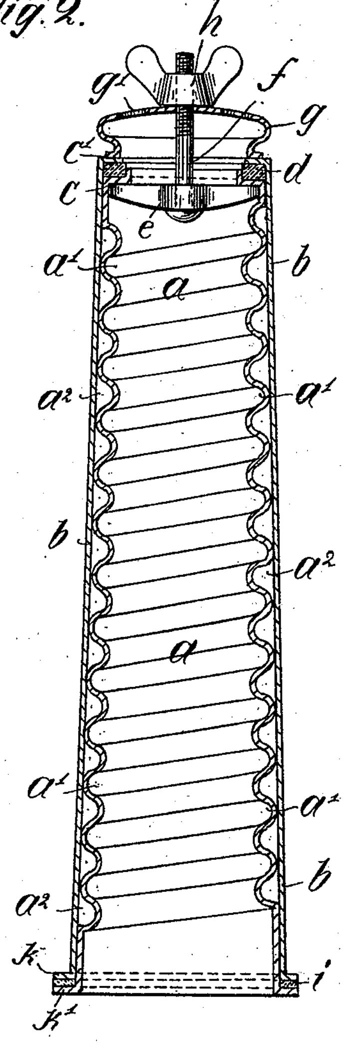


Fig. 2.



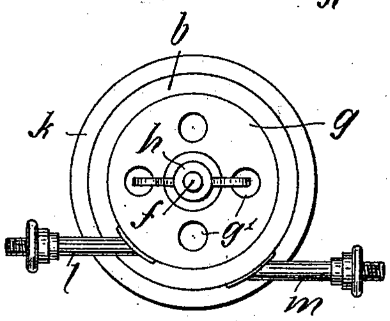


Fig. 3.

Witnesses.
Emil Kayser.
Arthur Walther.

Inventor.
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by [illegible]
Attorney.

UNITED STATES PATENT OFFICE.

CARL KELLGRÉN, OF SÜRTH, NEAR COLOGNE, GERMANY, ASSIGNOR TO THE SÜTHER MASCHINENFABRIK, VORMALS H. HAMMERSCHMIDT, OF SAME PLACE.

COOLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 516,206, dated March 13, 1894.

Application filed September 15, 1893. Serial No. 485,621. (No model.)

To all whom it may concern:

Be it known that I, CARL KELLGRÉN, engineer, a subject of the King of Sweden and Norway, residing in Sürth, near Cologne, in the Province of the Rhine, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Cooling Apparatus, of which the following is a specification.

My invention relates to cooling-apparatus, in which the liquid to be cooled is led in a long way through the coils of a serpent-like receiver, the outer surface of which is washed by the cooling-liquid; and my improvements in such cooling-apparatus relate to the combination of a smooth outer tube with a corrugated inner tube, the corrugations of which run in a screw-like way, both tubes being of conical shape, so that, on putting them together, the open cavities of the corrugations are covered or closed by the inner smooth surface of the outer tube or casing; and the objects of my improvements are to offer a cooling-apparatus of simple construction but high efficiency, which may be taken to pieces, cleaned and put together without the least difficulty.

In order to make my invention more clear, I refer to the accompanying drawings, in which similar letters denote similar parts throughout the different views, and in which—

Figure 1 is an outer or side-view of the improved cooler; Fig. 2 a longitudinal section through the same, and Fig. 3 an upper view.

The apparatus consists of the corrugated inner tube *a* of conical shape, and the correspondingly shaped outer smooth tube *b*, the inner surface of which touches all the elevations *a'* of tube *a*, when both parts, *a* and *b*, are firmly connected, and, in fact, presses on said elevations, so as to separate the cavities a^2 on one and the same side, and to turn the same into a continuous, closed channel, as shown in Fig. 2. The upper ends of the tubes *a* and *b* are provided with the flanges *c* and *c'* respectively, between which the packing *d* is inserted. A cross-bar *e* having in its center the bolt *f* leans against flange *c*, the bolt extending through a central hole of the cover *g*. The latter has its seat on flange *c'* and is connected with the bolt by means of the nut *h*. Thus, when screwing the nut home, the tubes are drawn into another, and the packing *d* at the top, as well as the packing *i* at the foot, between the flanges *k* and *k'* respectively, is compressed, so that the coils a^2 are closed as described in the foregoing paragraph, and the cooling liquid is prevented from coming into contact with the liquid to be cooled. The liquid is led into the channel a^2 through pipe *l*, fixed to tube *b*, and is led away from the channel through pipe *m*, also fixed to tube *b*. The whole apparatus is placed into a vat with water, so that the latter washes the outer surface of tube *b*, as well as the inner surface of tube *a*, the cover *g* having some perforations *g'* for allowing the water to circulate. It is, as a matter of course, not excluded, that in some cases the liquid to be cooled may be filled into the vat, and that the cooling-liquid may be led to the serpent-channel a^2. If the apparatus shall be cleaned, it is simply necessary to loosen the nut *h* from the bolt *f*, and to draw the tube *a* out of tube *b*. Every part of the cooling-apparatus will be easily accessible now at each place, so that a thorough cleaning may be performed. Having done this, the parts *a*, *b* and *g* are again connected by the parts *e*, *f* and *h*, and the tight closure between the tops of the elevations *a'* and the tube *b* is effected by screwing the nut firmly home, so that said elevations are pressed against the inner surface of tube *b*.

Having now described my invention, I declare that what I desire to secure by Letters Patent is—

1. In a cooling apparatus, the combination with a conical tube *a* having corrugations *a'* a^2 running around it in a screw-like way, of a conical smooth tube *b*, adapted to cover or close the cavities of said corrugations, the elevations of the latter lying against said tube *b*, for the purpose as described.

2. In a cooling-apparatus, the combination with a conical tube *a* having corrugations *a'* a^2 running around it in a screw-like way, of a conical smooth tube *b*, adapted to cover or close the cavities of said corrugations, the elevations of the latter lying against said tube *b*, both tubes being arranged to be clamped

endwise against each other, for the purpose as described.

3. In a cooling-apparatus, the combination with a conical tube *a* having corrugations *a'* a^2 running around it in a screw-like way, of a conical smooth tube *b*, adapted to cover or close the cavities of said corrugations, the elevations of the latter lying against said tube *b*, both tubes being arranged to be clamped endwise against each other by cross-bar *e*, bolt *f* and nut *h*, the latter pressing on the cover *g*, for the purpose as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CARL KELLGRÉN.

Witnesses:
S. MERRILL, Jr.,
JOGESH C. BOSE.