

(No Model.)

2 Sheets—Sheet 1.

T. D. FAIRFIELD, J. L. CLARK & R. HUGHES.
APPARATUS FOR CHILLING PARAFFINE AND OTHER OILS.

No. 333,209.

Patented Dec. 29, 1885.

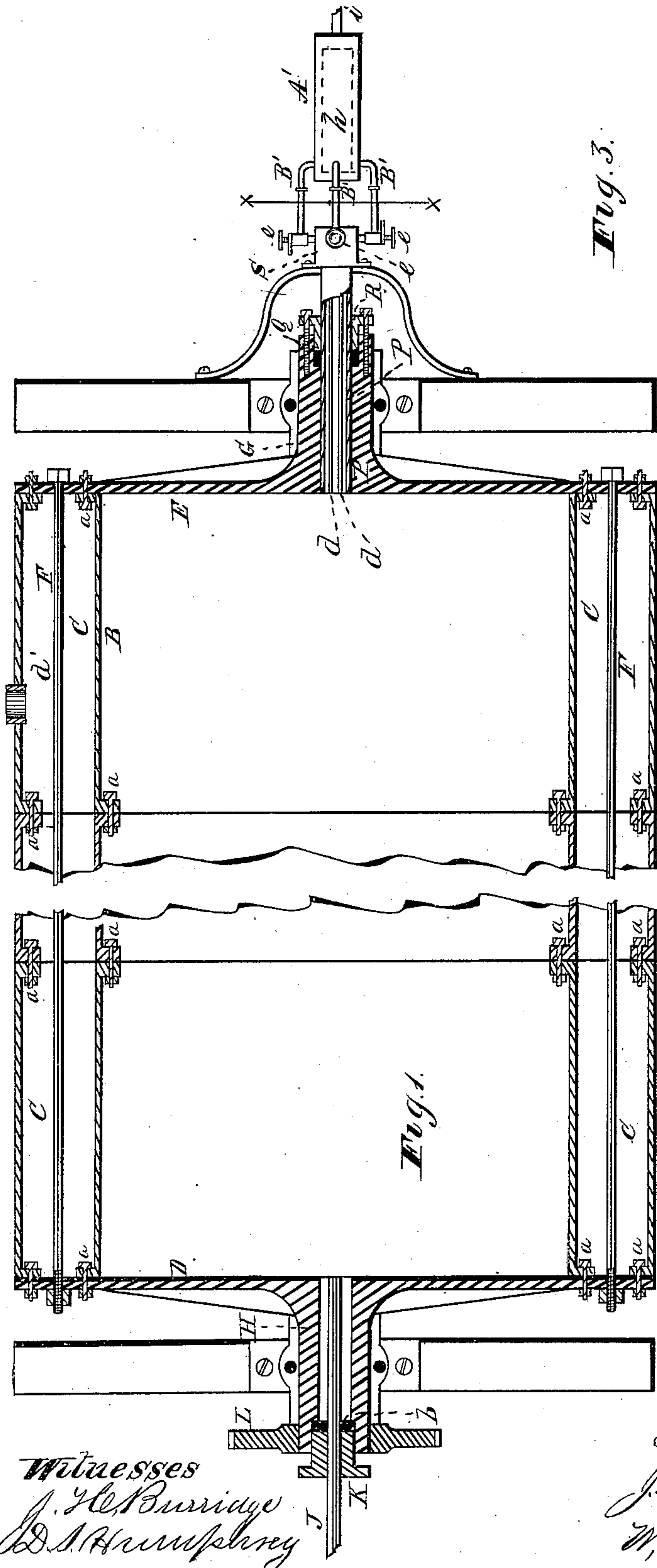


Fig. 1.

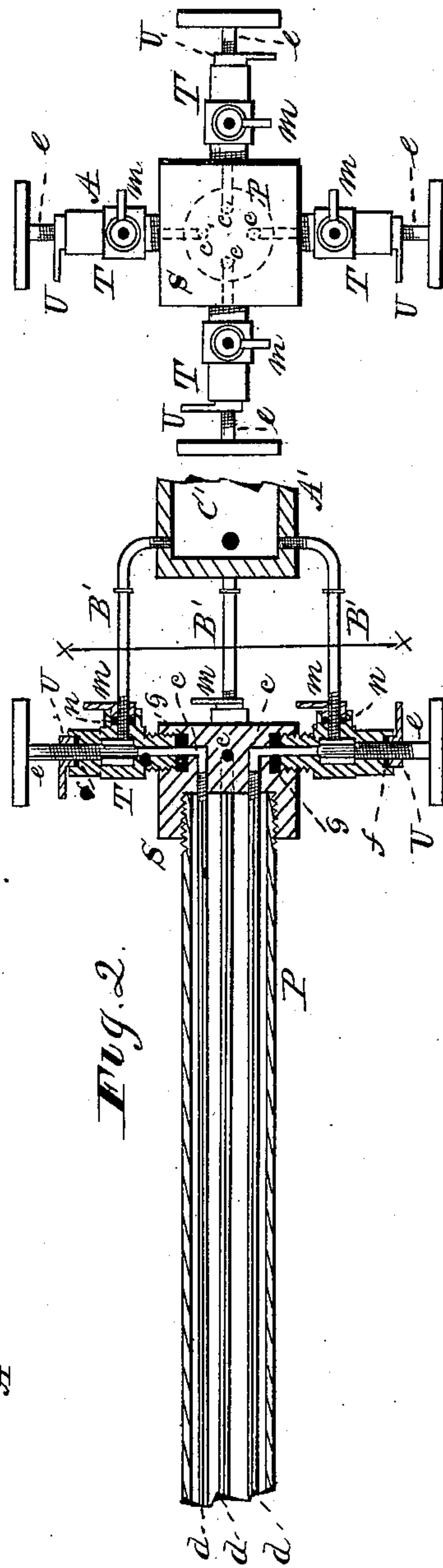


Fig. 2.

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Witnesses
J. H. Burridge
D. A. Humphrey

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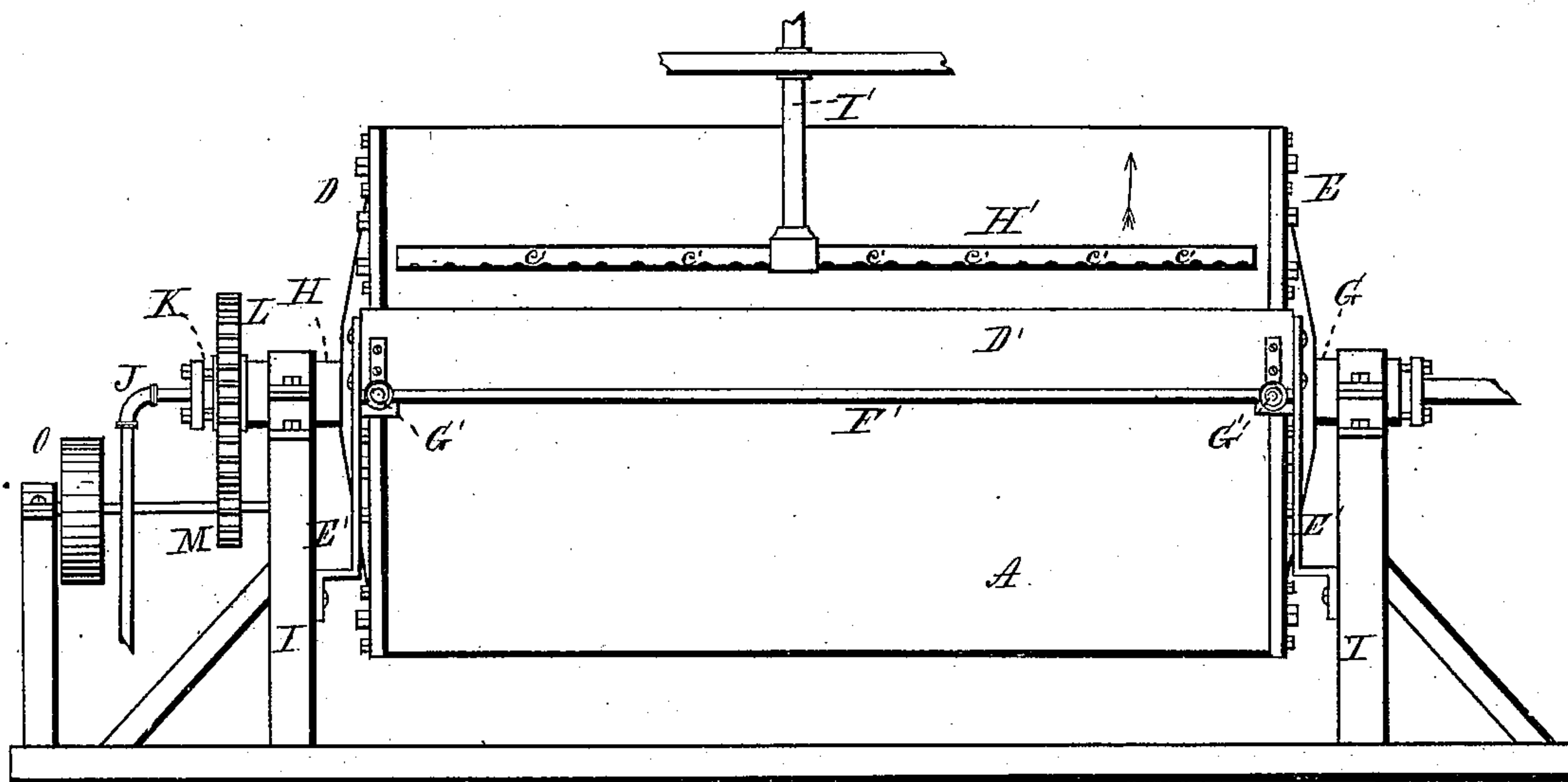


Fig 4

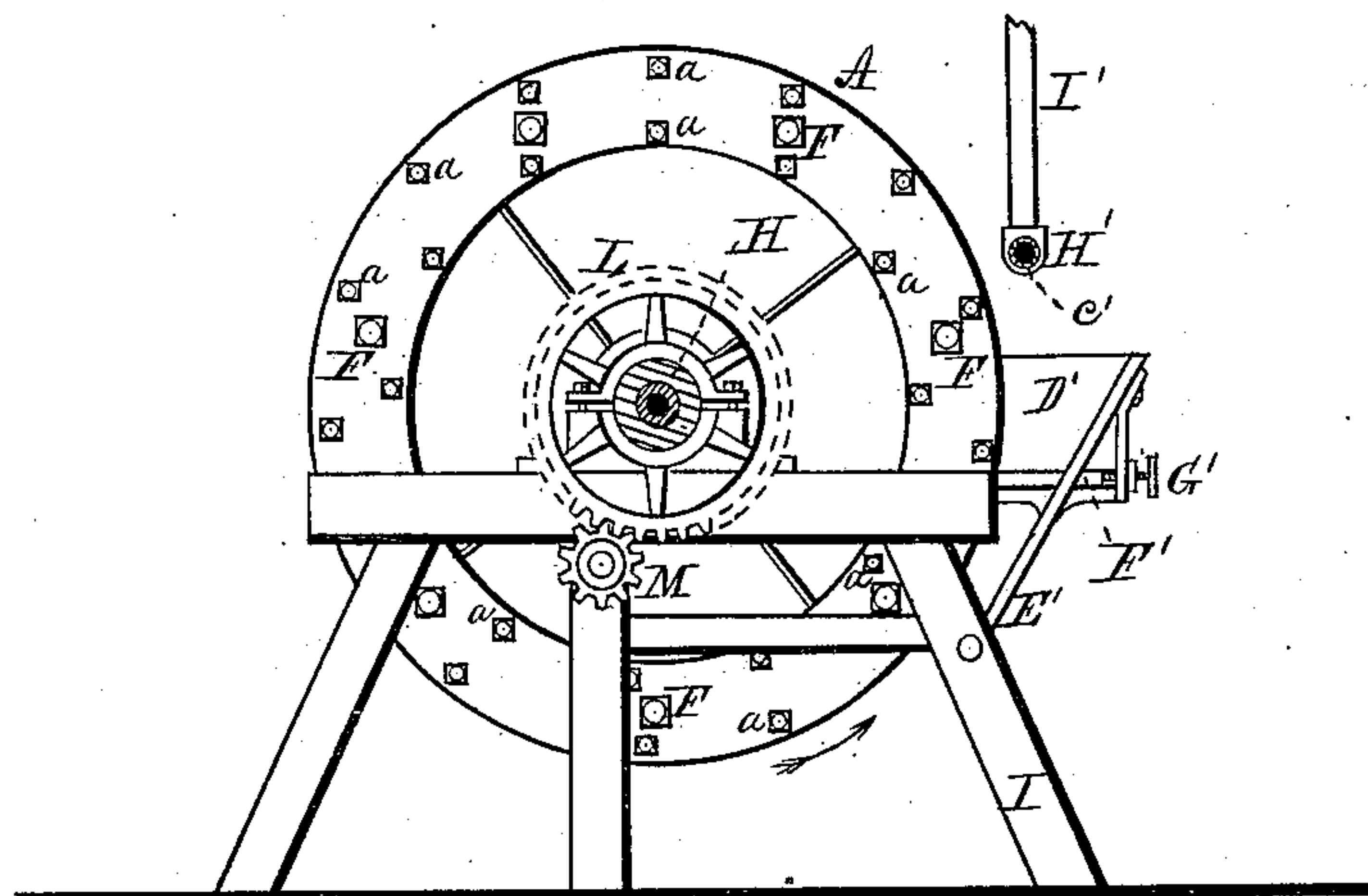


Fig. 5.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CHILLING PARAFFINE AND OTHER OILS.

SPECIFICATION forming part of Letters Patent No. 333,209, dated December 29, 1885.

Application filed May 11, 1885. Serial No. 165,090. (No model.)

To all whom it may concern:

Be it known that we, THOMAS D. FAIRFIELD, JOSHUA L. CLARK, and ROBERT HUGHES, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Apparatus for Chilling Paraffine-Oil and other Oils; and we do hereby declare that the following is a full and complete description thereof.

10 The accompanying drawings, making a part of the following specification, illustrate the construction of the aforesaid apparatus, in which—

15 Figure 1 represents a transverse longitudinal section of the apparatus. Fig. 2 is an enlarged detached sectional view showing certain parts of the apparatus not fully shown in in Fig. 1. Fig. 3 is an end view of a complete apparatus taken through the line *x x*. Fig. 20 4 is a side elevation of the body of the apparatus, drawn on a reduced scale. Fig. 5 is an end elevation having a portion of the details removed therefrom.

25 Like letters of reference denote like parts in the several views.

30 The body of the apparatus consists of a concentric duplex metal cylinder. The external one, A, Figs. 1 and 4, has a smooth exterior surface. Within said cylinder A is another cylinder, B, an integral part of the external one. Longitudinally the cylinders are made up in sections, more or less in number as the length of the cylinders and size of the apparatus may require. The ends of the several sections are closely fitted to each other, so as to make a water-tight joint, and which are securely fastened together by the bolts *a a*, Figs. 1 and 5. In said Fig. 1 it will be noticed that between the inner and outer cylinder there is an annular space, C, the purpose of which will hereinafter be made known.

45 D and E are the heads of the cylinder, made vapor and water tight in their connection therewith, and secured thereto by the bolt-rods F, Figs. 1 and 5, which pass through the length of the annular space or chamber to the outside of the heads, by means of which the

heads are drawn firmly to the ends of the cylinders, as seen in Fig. 1.

Each of the cylinder-heads is provided with a tubular trunnion, respectively G and H, by which the cylinder is journaled in the standards I, provided with suitable bearings for that purpose. The tubular trunnions are in communication with the interior of the inner cylinder, as seen in Fig. 1.

55 In the trunnion H is inserted the end of the stationary pipe J, and is made secure therein from leakage by a stuffing-box, of which *b*, Fig. 1, is the packing, and K the gland thereof. On the trunnion H is secured a cog-wheel, L, made to engage a pinion, M, driven by a belt on the pulley O, Fig. 4, by means of which the cylinders are revolved, for a purpose presently shown.

65 In the trunnion G is inserted a pipe, P, Fig. 1, an enlarged detached view of which is shown in Fig. 2. Said pipe is much larger than the pipe J, inserted in the trunnion H, but which is also stationary, and in like manner made close-fitting therein by a stuffing-box, of which Q, Fig. 1, is the packing, and R the gland. The pipe P opens into the interior cylinder, as seen in Fig. 1. The end of said pipe projecting from the stuffing-box is screwed into a head, S, Fig. 2. In each side of said head is a conduit, *c*, extending so far therein as to reach the line of the pipe P, at which they turn at right angles, and terminate at the end of said pipe, as shown in Fig. 2, also indicated by the broken lines in Fig. 3.

80 Although the several conduits terminate at the end of the pipe P it will be noticed that they are not in open relation therewith, but are in communication with the interior of the cylinder B by means of the pipes or tubes *d*, passing through the pipe P and screwed into the conduits, thereby putting them in communication with the cylinder above alluded to. Four conduits with their respective pipe-connections with the cylinder are shown in the drawings, but which, however, may be more or less in number. One only may be used, but it is preferred to use several of them. Each

of the conduits is provided with a stop-valve, consisting of a screw, *e*, Figs. 2 and 3, inserted in the valve-chamber T, in which it is made close-fitting by a stuffing-box, whereof *f* is the packing and U the screw-gland. The end of said screw *e* terminates in a rounded point, and adapted to close the conduit, as seen in Fig. 2. The chamber of the screw-valve *e*, above mentioned, is screwed into the head S and made tight therein by a packing, *g*. The several valves and their respective chambers are duplicates, and each one is in communication with a receiver, A', by the pipes B', respectively, one end of which is screwed into the valve-chamber and the opposite end connected to the receiver, as shown in Figs. 1 and 2, in which it will be observed that the connection of the pipes with their respective valve-chambers is made close-fitting by a stuffing-box, of which *m* is the gland and *n* the packing. The receiver A' is provided with a large interior, C', in which the pipes B' terminate, as seen in Fig. 2 and indicated by the broken lines *h* in Fig. 1.

Along the side of cylinder A is arranged a box or trough, D', Figs. 4 and 5, which is supported in its relation to the cylinder by brackets E', projecting from the standards I. The bottom and ends of the troughs are in close proximity to the face of the cylinder, the cylinder forming the inner side of the trough. Directly under the trough is a scraper, F, which may be moved toward or away from the cylinder by the adjusting-screws G', for a purpose presently mentioned. Above the trough is arranged, longitudinally therewith, a pipe, H', Figs. 4 and 5. The lower side of the pipe is perforated with holes *c'*, and is supported in its relation to the cylinder and trough by a pipe, I', secured in place by any suitable means, and by which the pipe H' is put in communication with a tank or other vessel containing the oil to be chilled.

The operation of the apparatus above described is as follows: By a pipe, *i*, the receiver A' is put in communication with a vessel (not shown in the drawings) containing fluid ammonia, and the annular space C, between the two cylinders, is filled with ice and salt, or with any other suitable cold-producing agent, introduced therein through an opening, *d'*, in the cylinder A. By means of the cog-wheel and pinion above mentioned the cylinder is made to revolve in the direction of the arrows, Figs. 4 and 5, during the rotative movement of the cylinders. The fluid ammonia is admitted to the interior cylinder, B, by opening one or more of the valves, *e*, as the amount of ammonia may be necessary to reduce the temperature of the cylinder or that the size of the cylinder may require. On opening the valves the ammonia passes into the cylinder B through the pipes or tubes *d*, and therein immediately vaporizes, filling the large interior of the cylinder with ammoniacal vapor pro-

duced by the expansion of the fluid ammonia conducted therein from the receiver of a vapor-condenser. (Not shown in the drawings). The sudden and great expansion of the fluid into vapor produces (in virtue of a well-known law ruling the expansion of the aqua-ammonia into vapor) an intense coldness of the cylinders, together with the heat-absorbing contents of the annular space C, and the cylinder A is reduced to a very low degree of temperature, so that the oil deposited upon the surface thereof is immediately chilled or frozen to a solid condition. The oil is supplied to the cylinder from the trough D', kept full by the pipe *h'*, from which it is continued to be discharged into the trough and therefrom taken upon the surface of the revolving cylinder and chilled as aforesaid. The frozen oil is removed from the cylinder by the scraper F', which, for that purpose is adjusted close to the surface of the cylinder, and the oil continuously scraped therefrom so long as it is kept revolving and the oil supplied to its surface from the trough. The chilled oil as it is removed from the cylinder by the scraper falls into a receptacle arranged thereunder to receive it, and from which it is taken and prepared for the press. The ammoniacal vapor is educted from the cylinder through the pipe J, and conveyed thereby back to the condenser to be again liquefied and used as hereinbefore described.

It is well understood that the more immediate the vaporizing of a fluid takes place and the more it is expanded at the time the greater will be the cold produced, which is the reason for making the cylinder of large size, thereby giving ample room in which the fluid ammonia may expand. The fluid being conveyed therein through the small pipes, it retains its condensed condition until it is discharged into the large interior of the cylinder, in which it suddenly vaporizes and expands, with a consequent freezing effect, as and for the purpose before mentioned.

The cylinder is described as made up, longitudinally, of sections. This way of constructing it is not essential, but the most convenient.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. For chilling or freezing paraffinized oils, the combination of the concentric revolving cylinders A and B, having between them a tight annular chamber adapted to contain a refrigerant, trunnions G and H on which the cylinders are supported and revolve in a suitable frame, pipe P, secured in the trunnion G by a stuffing-box, and having therein gas-tubes, the inner ends of which terminating in the interior of the cylinder B and their opposite ends terminating in the head S, in open relation, respectively, with the conduits therein, valve-chambers T, and valves and educ-

tion-pipe J, substantially as described, and for the purpose specified.

2. The combination, with the valve-chambers, of the head S, conduits and tubes *d*, and
5 cylinders, the pipes B', and receiver, for the purpose specified, and substantially as set forth.

3. The combination of the revolving concentric cylinders, trough D', perforated supply,

and scraper, as and for the purpose specified. 10

In testimony whereof we affix our signatures in presence of two witnesses.

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