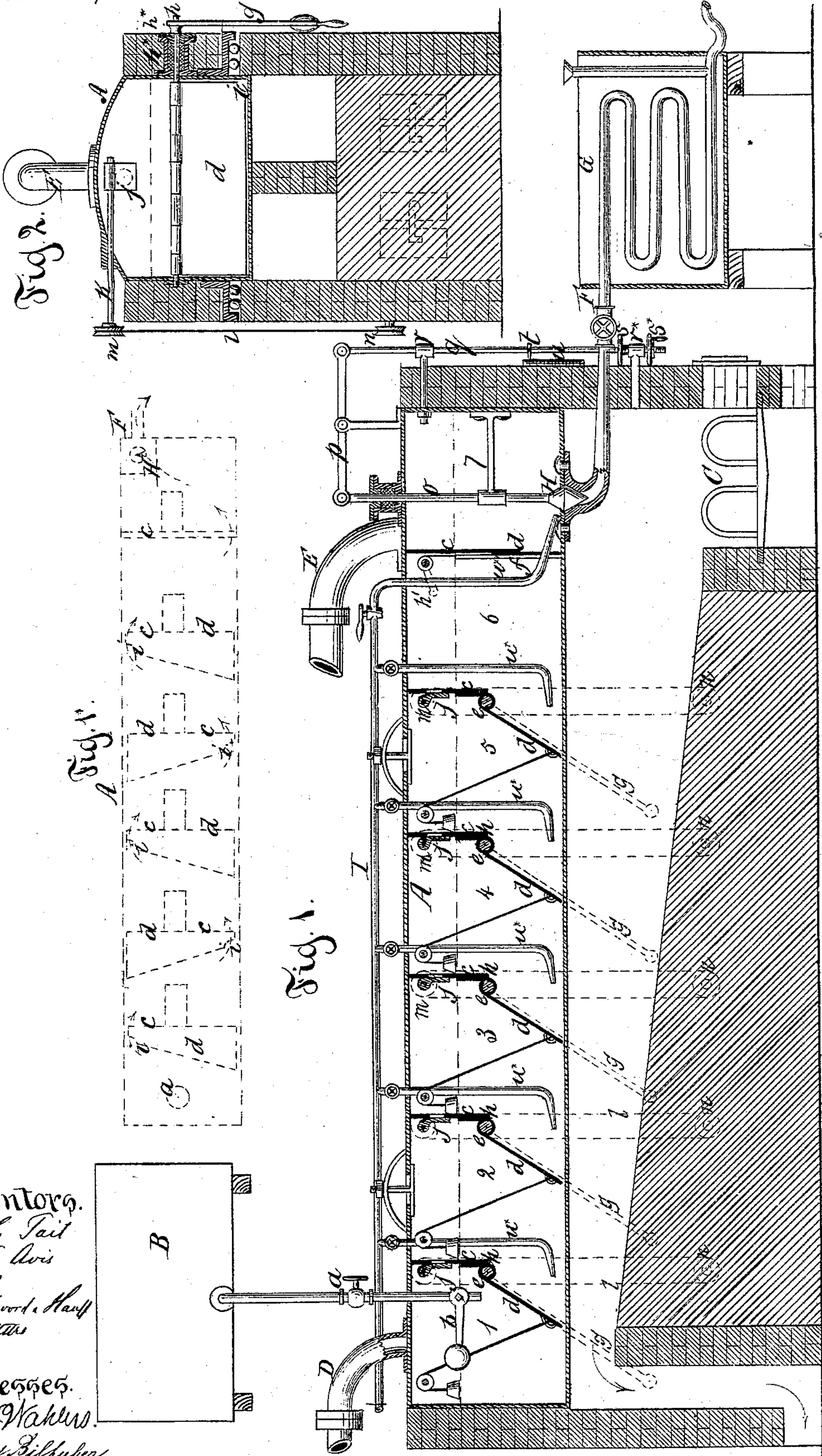


**A. H. TAIT & J. W. AVIS.**  
**Still for Petroleum and other Liquids.**  
 No. 135,673. Patented Feb. 11, 1873.

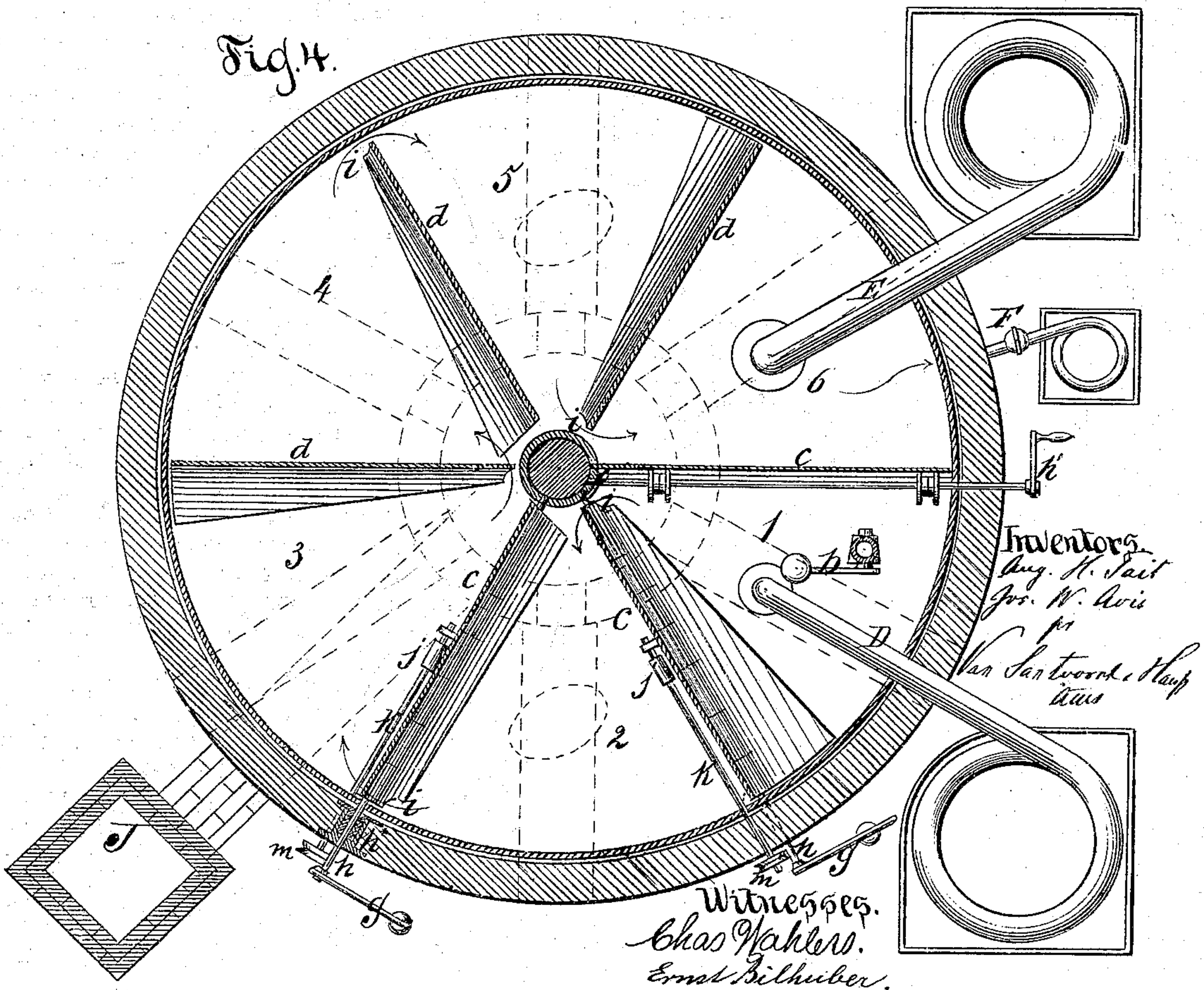
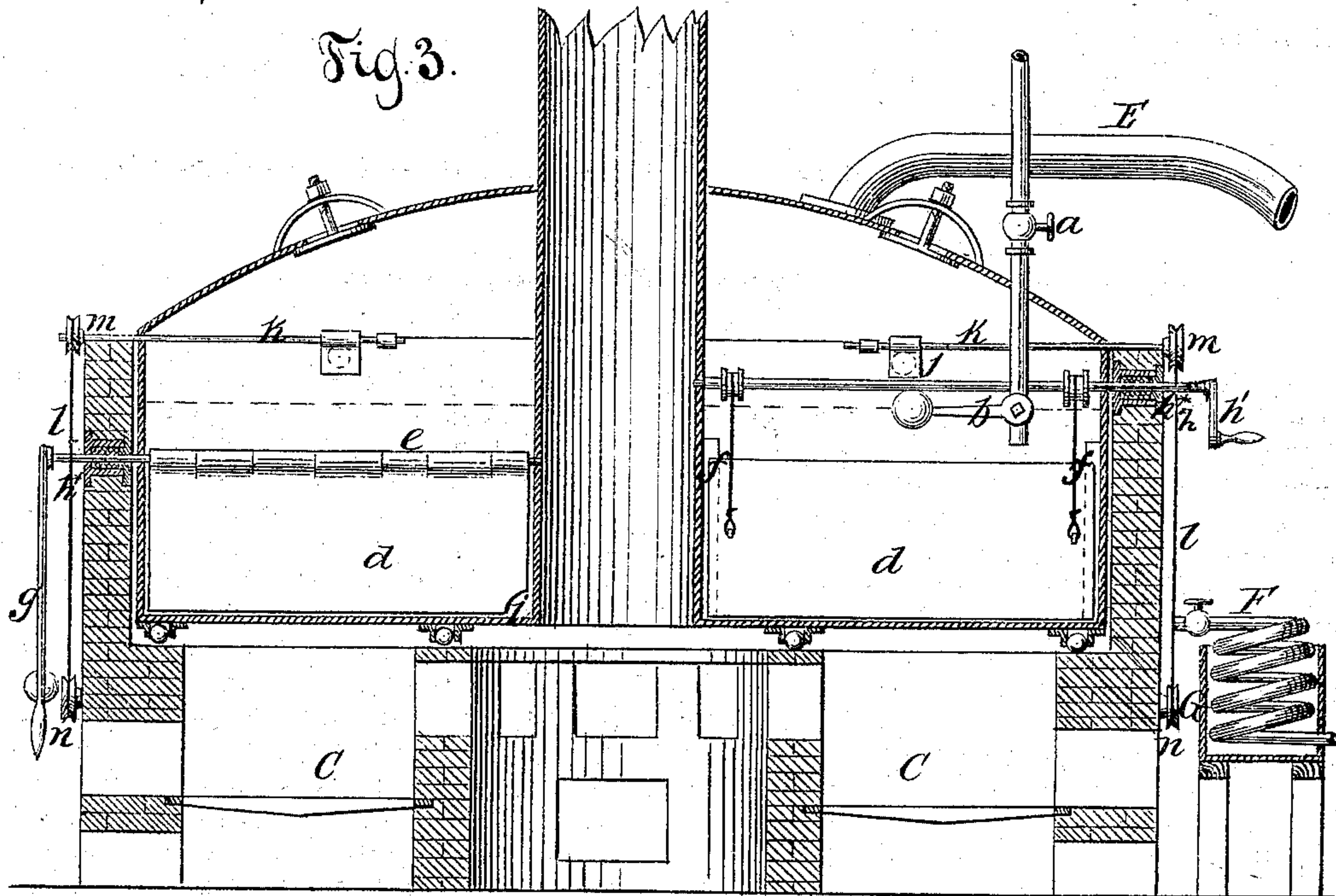


Inventors.  
 Aug. H. Tait  
 Jos. W. Avis  
 Per  
 Van Santvoord & Hauff  
 Attys

Witnesses.  
 Chas. W. Harris.  
 Ernst. B. Huber.



**A. H. TAIT & J. W. AVIS.**  
**Stills for Petroleum and other Liquids.**  
 No. 135,673. Patented Feb. 11, 1873.





# UNITED STATES PATENT OFFICE.

AUGUSTUS H. TAIT, OF JERSEY CITY, NEW JERSEY, AND JOSEPH W. AVIS, OF MATTEAWAN, NEW YORK; SAID TAIT ASSIGNOR TO SAID AVIS.

## IMPROVEMENT IN STILL'S FOR PETROLEUM AND OTHER LIQUIDS.

Specification forming part of Letters Patent No. 135,673, dated February 11, 1873.

*To all whom it may concern:*

Be it known that we, AUGUSTUS H. TAIT, of Jersey City, in the county of Hudson and State of New Jersey, and JOSEPH W. AVIS, of Matteawan, county of Dutchess and State of New York, have invented a new and useful Improvement in Stills for Petroleum and other Liquids; and we do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming a part of this specification, in which drawing—

Figure 1 represents a sectional side view of our still. Fig. 2 is a transverse section of the same. Fig. 3 is a vertical central section of a modification thereof. Fig. 4 is a horizontal section of the same.

Similar letters indicate corresponding parts.

Our present invention relates to certain improvements in that class of stills through which the liquid to be distilled is passed in a zigzag course, by means of partitions provided with apertures at their opposite ends. Our improvements consist in making the partitions of the still in sections, connected to each other in such a manner that the lower section of each partition can be lowered or raised by means of a hinge-joint, or by slides, or otherwise, and that by raising the movable sections the operation of cleaning the still is materially facilitated; also, in the arrangement of shafts extending from the vapor-valves in the upper or stationary sections of the partitions of the still through the sides of the still, for the purpose of opening and closing said valves from the outside; further, in the arrangement of a tar condenser or cooler communicating directly with the interior of the still; also, in the arrangement of a conical plug-valve fitting into a seat formed in the mouth of the pipe leading to the tar-condenser, said valve being connected to hand-wheels on the outside of the still in a convenient position to be reached by the person in charge, in such a manner that said valve can be readily opened, more or less, as may be required, or that it can be closed in case the tar-discharge pipe should become broken, and thereby serious accidents are avoided; further, in the arrangement of a steam-jet opposite the seat of the

tar-discharge valve, in such a manner that any sediment formed on said seat can be readily removed either by wet or by superheated steam; also, in a circular still divided by radiating partitions in a number of compartments communicating with each other through apertures in said partitions alternately in their inner and outer ends, so as to compel the liquid to pass through said still in a zigzag course.

In the drawing, the letter A designates the body of our still, which is supplied with crude oil from the feed-tank B by means of a pipe provided with a stop-cock, *a*, which serves to regulate the feed. With this pipe is also combined a float-valve, *b*, to close the feed-pipe when the liquid in the still has reached the desired load-line. The still is divided by a number of partitions, *c*, into a number of compartments, 1 2 3 4 5 6 7, and the crude oil is let into compartment No. 1, which is situated at the end furthest from the fire-place C. From this compartment extends the goose-neck D, to carry off the naphtha and the light vapors of the oil. Each of the partitions *c* is made in two sections, and the lower sections *d* are connected to the stationary upper sections by hinge-joints *e*, or by slides *f*, so that the same can be raised and lowered. This purpose is effected either by levers *g*, which are mounted on the outer ends of the rods *h* forming parts of the joints, or it may be effected by a crank, *h'*, which is mounted on a shaft connected to the sliding sections by racks and pinions, or in any other desirable manner. The rods *h*, or the shafts supporting the cranks *h'*, extend through stuffing-boxes *h\**, secured on the sides of the still, and the packing which we use in said stuffing-boxes consists, by preference, of fibrous asbestos, which will not be destroyed by the heat; but any other suitable material may be used as packing. In the movable sections of the partitions are apertures *i*, (see Fig. 2,) alternately on opposite sides of the still, so that when said sections are down the oil or other liquid is compelled to flow through the still in a zigzag course. In the upper part of the stationary sections of the partitions are valves *j*, which are connected to shafts K extending out through stuffing-boxes in the sides of the still, so that they can be opened and closed from the outside. These stuffing-boxes



are packed with fibrous asbestos, or any other suitable material.

The operation of opening and closing the valves *j* is facilitated by chains *l* extending over pulleys *m* mounted on said shafts, and also over pulleys *n* mounted on studs secured in the brick wall which supports and incloses the still. The burning-oil vapors escape through a goose-neck, *E*, emanating from compartment No. 7, which is situated right over the fire-place. From the bottom part of this last compartment extends a pipe, *F*, which connects directly with a tar-cooler, *G*, and which serves to carry off the tar, and said compartment also receives the vapors from as many additional compartments as may be opened into it by the vapor-valve *j*. The mouth of the tar-discharge pipe *F* is bored out to form the seat for a conical check or stop valve, *H*, which connects by a rod, *o*, with one end of a lever, *p*, from the opposite end of which extends a rod, *q*, that passes through two or more eyebolts, *r r\**, secured in the still, and is provided at its end with a screw-thread to receive two hand-wheels, *s s\**, one of which is situated below and the other above the eyebolt *r\**, so that by turning the lower hand-wheel the valve *H* can be lifted out of its seat, and by turning the upper hand-wheel in the proper direction said valve is depressed and locked down in its seat. An index, *t*, which is secured to the rod *q*, and which travels over a scale, *u*, serves to indicate the position of the valve, and it enables the attendant to raise said valve to the desired distance from its seat. By these means the discharge of the tar can be regulated, and, furthermore, if the pipe *F* breaks its mouth can be quickly closed by means of the valve *H* before any damage is done by the heated tar or liquid, which, when allowed to escape from the still, would be liable to set fire to the establishment. Over the still *A* extends a steam-pipe, *I*, which is provided with a series of branch pipes, *u\* u\*\**, one of which terminates right over the seat of the valve *H*. If this last-named branch pipe *u\*\** is opened a jet of steam is blown against the valve-seat, and all tar or other sediment liable to collect therein is readily removed. The branch pipes *u\** terminate opposite the holes or passages in the partition *c*, and the jets of steam injected through these pipes serve to keep these passages clean. The steam injected through the pipes *u\* u\*\** is, by preference, superheated; but, if desired, wet steam may be used for this purpose.

In Fig. 1\* we have shown a horizontal section of our still, with the movable sections *d* placed in oblique positions, inclining alternately in opposite directions, whereby the flow of the liquid from one compartment to the other is materially facilitated.

In Figs. 3 and 4 we have shown our improvements as applied to a circular still, which is divided in a number of compartments by radiating partitions *c*, provided with apertures *i* alternately at their inner and outer ends, so as to compel the liquid to flow through the still in a zigzag course.

The circular still represented in Fig. 3 is provided with a center fire-flue, while that represented in Fig. 4 is provided with a bottom fire-flue leading from the central combustion-chamber to a smoke-stack, *J*, situated at the side of the still.

We wish it to be understood that, in the still for refining petroleum oil or other liquids on the continuous principle, we do not confine ourselves to stills of the particular form above set forth, as we can work equally well under the aforesaid principle with any other shaped still, either with or without a chimney-flue in the center.

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

1. The arrangement in a still of partitions made in sections, the lower sections being made movable by means of hinge joints or slides, or otherwise, substantially as described.

2. The combination of shafts, operated by chains or other means on the outside of the still, with the vapor-valves in the stationary sections of the partitions of a still, substantially as set forth.

3. A tar-condenser communicating directly with the still, in combination with a valve, *H*, and cleaning-pipe *f*, substantially as described.

4. The arrangement of a check or stop valve inside the still on the mouth of the tar-discharge pipe, leading from the still to the tar-condenser, said valve being operated by a hand-wheel or other means from the outside of the still, substantially as set forth.

5. The arrangement of an index for the purpose of determining the position of the valve leading to the tar-discharge pipe, substantially in the manner shown and described.

6. A circular still divided in compartments by means of radiating partitions provided with apertures situated alternately at the inner and outer ends of said partitions, to cause the liquid to flow through the still in a zigzag course, substantially as set forth.

7. The arrangement of steam-jets, carrying wet or superheated steam and acting on the passages in the partitions of the still, substantially as described.

A. H. TAIT.

JOSEPH W. AVIS.

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.