No. 735,873. PATENTED AUG. 11, 1903.

C. H. HATTON.

PARAFFIN DIRECT COOLING DEVICE.

APPLICATION FILED APR. 4, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

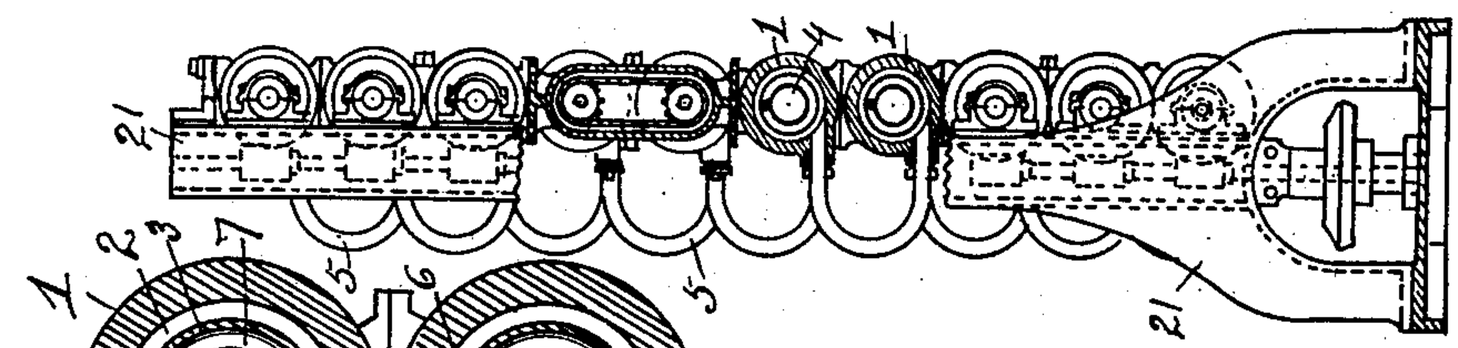

Fig. 2.

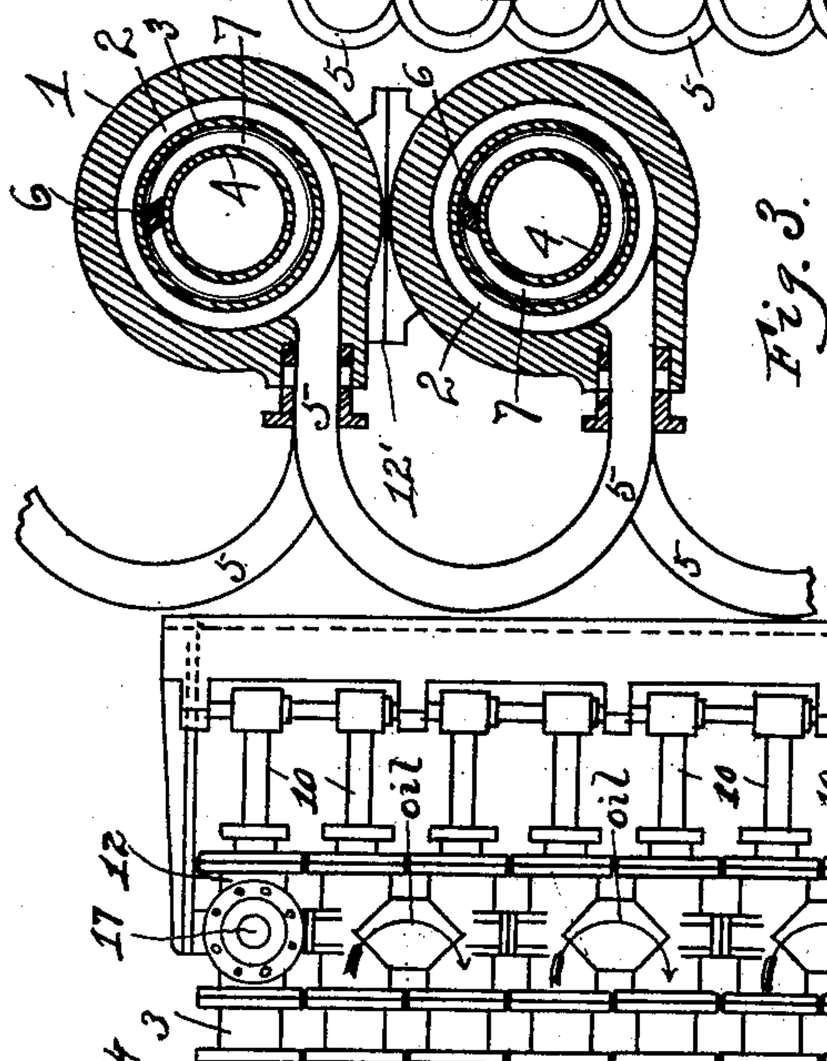

Fig. 3.

Fig. 1.

WITNESSES:
Matthew Sibler
Carolyn M. Theobald.

C. H. Hatton.
INVENTOR
BY R. J. McCarty
his ATTORNEY

No. 735,873. PATENTED AUG. 11, 1903.

C. H. HATTON.

PARAFFIN DIRECT COOLING DEVICE.

APPLICATION FILED APR. 4, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

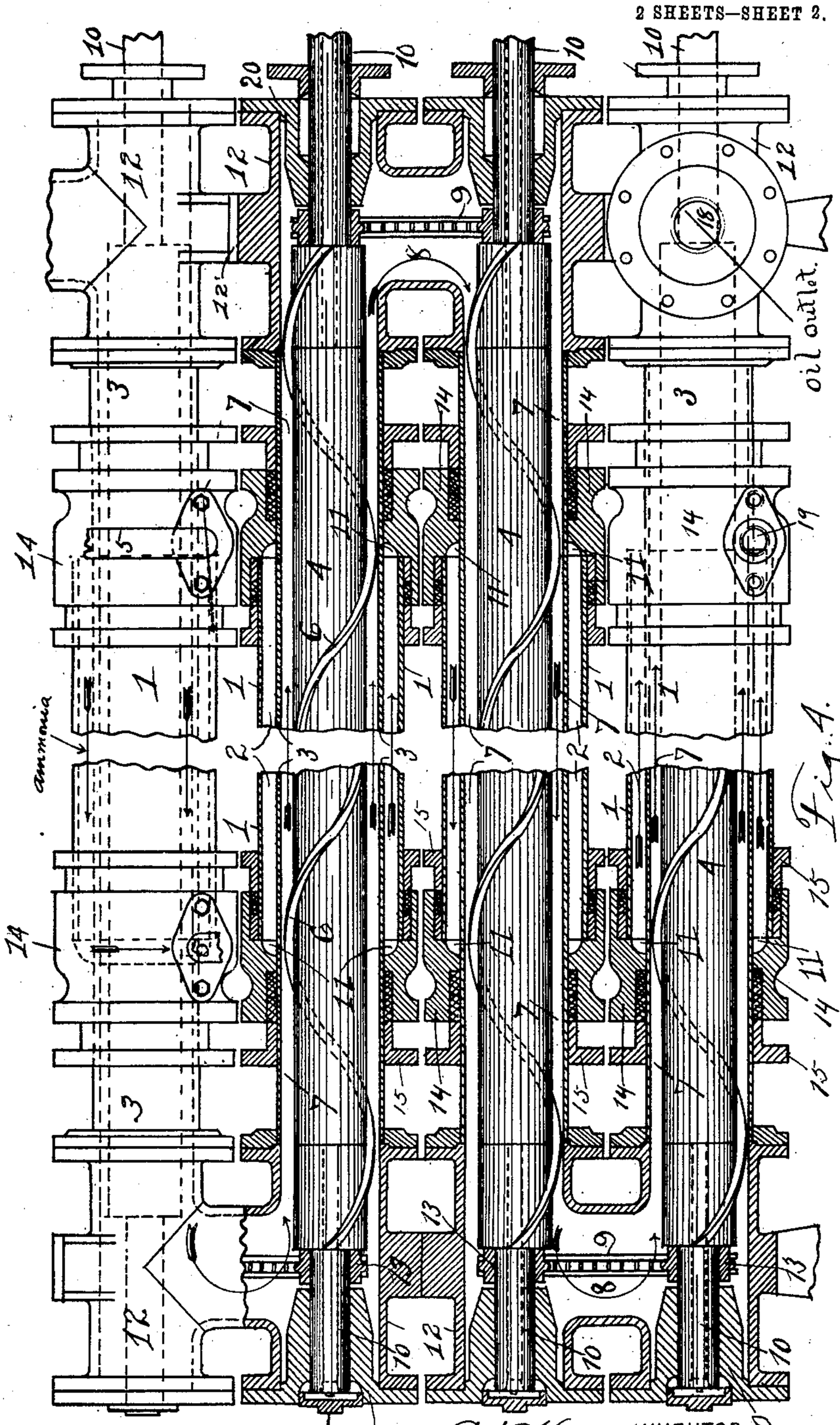

Fig. 4.

WITNESSES:

Matthews Siebler

Carolyn M. Theobald.

C. H. Hatton INVENTOR

BY R. J. McCarty

his ATTORNEY

No. 735,873. Patented August 11, 1903.

UNITED STATES PATENT OFFICE.

CHARLES H. HATTON, OF EMLENTON, PENNSYLVANIA, ASSIGNOR TO THE EMLENTON REFINING CO., OF EMLENTON, PENNSYLVANIA.

PARAFFIN DIRECT-COOLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 735,873, dated August 11, 1903.

Application filed April 4, 1903. Serial No. 151,044. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. HATTON, a citizen of the United States, residing at Emlenton, in the county of Venango and State of Pennsylvania, have invented certain new and useful Improvements in Paraffin Direct-Cooling Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to an apparatus for the production of paraffin or wax from oil.

The object of the invention is to provide a machine or apparatus wherein the oil is chilled directly, as hereinafter more fully described, and pointed out in the claims.

Preceding a detailed description of the invention reference is made to the accompanying drawings, of which—

Figure 1 is a side elevation of an apparatus of the type specified, portions of which are broken away and other portions shown in section. Fig. 2 is a front elevation, portions of which are shown in section and other portions are broken away. Fig. 3 is an enlarged sectional view of two sets of pipes—namely, ammonia-gas pipes and oil-pipes with screw conveyers. Fig. 4 is an enlarged elevation of a portion of the apparatus, parts of the pipes being shown in section.

In a detail description of the invention similar reference characters indicate corresponding parts.

12 designates headers arranged at opposite ends of oil-pipes 3 in series one above the other, in which positions said headers are rigidly united by means of flanges 12′. These headers constitute the oil-pipe returns from the upper to the lower of each series of said pipes, said oil-pipes being inclosed within the ammonia-gas pipes 1, the ends of which are connected with ammonia-pipe headers 14. Each of said ammonia-gas-pipe headers 14 is connected with the lower adjacent pipe-header 14 by means of a pipe 5, and thereby there is provided a continuous circulation of ammonia-gas through chambers 2, ports 11, and the pipes 5. The interior surfaces of the oil-pipes 3 are chilled by this constant circulation of ammonia-gas through said channels 2. It will be seen that the ammonia-gas comes in contact with the outer surface of the oil-pipes 3 and chills the inner surfaces thereof, against which the oil is directed and rapidly congealed.

Each of the ammonia-gas-pipe headers 14 is provided with suitable packing-glands 15, which prevent any leakage of the ammonia-gas at those points.

The various arrows shown in Figs. 1 and 4 indicate the circuits made by the ammonia-gas and the oil, said ammonia-gas being introduced at point 16 in the uppermost header 14 to the right, as shown in Fig. 1, and the oil being introduced at point 17 in the uppermost header 12 at the right, as shown in Fig. 1, or the ammonia-gas may be introduced at any point or parts other than as shown. As before stated, the interior surfaces of the oil-pipes 3 are directly chilled by the circulation of ammonia-gas through the headers 14 and pipes 5. The oil coming in contact with these chilled surfaces is congealed in solid form on the interior surfaces of the pipes 3.

4 designates a shaft which is preferably hollow and having a spiral conveyer-rib 6 arranged around its periphery, the whole constituting a spiral conveyer for removing the wax from the interior of the pipes 3. The diameter of said shaft 4 and the spiral rib 6 combined is such that brings the said rib in very close proximity to the interior surface of said oil-pipes, and in the rotation of said spiral conveyer the wax or paraffin is removed from the interior surfaces of said oil-pipes. The spiral conveyer is provided with gudgeons 10, which have bearings 20 in the oil-pipe headers 12 at each end, bearings also being on the upright frame 21 at one end.

8 designates the throats or passages which form the communications between the ends of the oil-chambers 7. Within each of these throats there is a chain 9, which passes around sprocket-wheels 13, which are connected up with each pair of the spiral conveyers. These chains serve as agitators to prevent any clogging up of the throats 8 or the passages between the oil-chambers.

The gudgeons 10 at one end are driven by suitable gearing 21′, which is driven from a primary shaft 22 by suitable interposed gearing 22′. It will therefore be seen that the spiral conveyers 4 are subjected to a uniform rotary movement, during which the wax or paraffin accumulating against the chilled surfaces of the oil-pipes is scraped off of the said surfaces and is conveyed from said pipes. The spiral conveyers 4 have openings extending longitudinally through their centers from end to end, as indicated in dotted lines extending through the gudgeons 10. These bores or openings are normally closed by a screw-plug, the extreme ends of the gudgeons being also inclosed by caps 23, which fit into the outer faces of the bearings 20. The object and purpose of these bores extending through the spiral conveyers are for introducing steam or hot water should it become necessary to melt out the oil-chambers 7 in the event that they should become clogged up. This is an important feature, for the reason that such heat may be applied directly to the screw conveyer that might be so affected when the remainder of said screw conveyers are not so affected, and thus the necessity of applying heat to the entire apparatus is avoided.

From the foregoing description it will be apparent that the oil is directed immediately to the chilled surface, which surface is maintained in a constantly-chilled condition by the contact with the outer sides of the oil-pipes, and that no intervening cooling agency, such as brine, is employed.

The oil-pipes 3 are to be six inches in diameter, preferably, and the conveyer-shafts 4 are to be four inches. This leaves spaces of two inches surrounding said conveyer-shafts, which are occupied by the conveyer flights or ribs 6, so that the oil passing through said space is a comparatively small body in thickness, and the consequence is such body will be quickly chilled when subjected to the surrounding chilled surface of pipes 3. The efficiency of the apparatus depends largely upon the means herein shown and described for passing the oil in a comparatively thin body through the pipes 3 and in which the chilling operation speedily takes place.

Having described my invention, I claim—

1. In an apparatus of the type specified, a series of oil-pipes each of which is arranged within an outer pipe whereby there is provided around the outer surface of each of said oil-pipes a cooling-chamber adapted to receive a cooling agent and whereby the interior surface of each of said oil-pipes is maintained in a chilled condition, means for injecting oil into the initial one of said oil-pipes, passages forming communications between the ends of the oil-pipes, passages forming communications between the cooling-chambers, spiral conveyers within the oil-pipes and adapted to convey the oil in a chilled or congealed state from the interior surfaces of said oil-pipes, and agitators operated from said spiral conveyers, the said agitators being within the passages forming communications between the oil-pipes, substantially as specified.

2. In an apparatus of the type specified, a series of oil-pipes arranged within a series of outer pipes and providing a series of cooling-chambers around the outer surfaces of said oil-pipes, headers connecting the ends of both series of pipes independently and forming passages at the ends of the oil-pipes and the cooling-chamber pipes through which the cooling agent passes from one cooling-pipe to another, and the oil passes from one oil-pipe to another, agitators arranged in the headers and serving to keep clear the passages at the ends of the oil-pipes which provide communications between said oil-pipes, a series of spiral conveyers within said oil-pipes and adapted to convey the congealed oil from the interior surface of said oil-pipes, and means for introducing heat to the interior of said spiral conveyers to melt the accumulations of congealed oil therein in the event that any one of said oil-pipes should become clogged up, substantially as specified.

3. In an apparatus of the type specified, a series of oil-pipes arranged within a series of outer pipes and providing a cooling-chamber around each of said oil-pipes, said cooling-chambers being connected at their ends by headers, and the oil-chambers extending at their ends beyond the cooling-chambers and connected with their respective headers at said ends, said headers providing a series of throats which form passages between the oil-chambers, a series of spiral conveyers passing through the oil-chambers and adapted to convey the congealed oil from the interior surfaces of the oil-pipes, and agitators within said throats, said agitators being actuated by the spiral conveyers and adapted to prevent any clogging up of the passages between the oil-chambers, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES H. HATTON.

Witnesses:
R. J. McCARTY,
W. B. NEVIN.