A Floating Pneumatic Elevating and Grain Discharging Plant

By Frederick C. Coleman

AN interesting floating pneumatic elevating and discharging grain installation has just recently been put into service at Emden, the rapidly-developing German port on the North Sea at the mouth of the river Ems. The elevator, which was built by Messrs. Gebrüder Seek of Dresden for the Elevator Gesellschaft of Emden, is illustrated in the photographs and consists of a floating iron pontoon, in which there are divisions for boiler and engine installations, together with living, kitchen and lavatory accommodation for the staff, and ample storage room for materials. The machinery installation in the pontoon consists of one compound vertical steam engine, connected with the necessary air pumps of vertical type to which they are direct coupled. The speed of the steam engine can be varied even when running by means of a hand wheel and regulator on the shaft. In the same room as the steam engine for driving the pumps are the condensation apparatus, the Lenz and boiler feed pumps and a special engine for the production of light and power, which is also of vertical type and coupled direct. There is also a third steam engine with a belt drive for a small dynamo to produce electric energy for power purposes. The engines, pumps and gears receive their steam from the boiler, arranged close to the engine-room, and work at a pressure of 12 atmospheres. To the left and the right of the boiler-room are the coal stores and the water tank from which the boilers are fed. Above the engine room is the iron mast which carries the pneumatic transport apparatus and weighing machines. As may be gathered from our illustrations, a portion of the mast is covered with sheet iron and is provided with staircase, platform, windows, doors, etc., and the whole is well fixed to the floating pontoon. On the top of the tower, at the platform level, are placed the receiver and discharger of the transport installation, and to these are connected four carrying tubes which are made movable both vertically and horizontally, and are fitted at the ends with suction nozzles so that the amount of air carried up with the grain can be regulated to a nicety. Pipes are then led from the receiver to the pumps and air vessel, which are fixed on the side of the tower.

To meet delays which might occur during weighing operations or by disturbances in the air lock, there are provided inlet valves as well as automatic safety valves, arranged in the air tubing and air chamber, which come into operation when the normal working pressure is exceeded. In the air chamber is also an arrangement to prevent grain being carried over into the same. To prevent any dust entering these there is arranged in the interior of the receiver and discharger a patent dust-collecting arrangement. This separates the dust from the grain, and allows them to mix only after the latter has passed through the vacuum chamber of the receiver. A special advantage of this arrangement is that complicated cloth or water filters are avoided, and thus there is a great saving of space and labor. The whole installation is very simple and entirely automatic. Below the receiver is the discharging device, which is adjustable and driven by an electric motor. The current is regulated by a switchgear, set at a specified resistance, and if this is exceeded (which happens under abnormal conditions) the power is automatically switched off so that both discharger and motor stop working. Beneath the discharging device an iron hopper is arranged with a double slide, from which the grain is fed into an automatic weigher. Thence the grain is brought into another hopper and then by means of telescopic tubing it is discharged into small boats.

The plant is arranged to take a sacking machine of a capacity of 50 tons per hour, and will empty steamers and load lighters (in bulk) at the rate of 120 tons

View showing elevation of the floating grain discharger operating in the pneumatic transportation of grain.

Ultra-violet light water sterilization apparatus for army use.

A municipal ultra-violet light installation for the sterilization of drinking water.

in the same time. In all working and living compartments of the elevator, electric lighting and steam heating are provided, and the signaling arrangements for communicating between the different working positions are specially designed.

Purifying Water by the Action of Ultra-violet Light

By Dr. M. von Recklinghausen

IT is highly important that a good drinking water shall be free from microbes, because many disease germs, such as the bacteria of typhoid, cholera, etc., are transmitted by water. A single person has caused infection to springs with typhoid and thus caused epidemics in which many people died. Hence modern hygienics demands, first of all, sound drinking water for public distribution as well as for private use. Many springs deliver good wholesome water, very low in their microbial contents, particularly in *bacterium coli*. How can these sources deliver pure water if they are supplied with water from rivers or effluents heavily charged with the refuse of towns and villages? Simply by following the methods of nature. Nature employs two means for purification. The first is the action of sun or daylight on the microbes floating in the water. It has long been known that the sun has so strong a bactericidal effect, that rivers are purified some miles below the entrance of city effluent, so that the water contains scarcely more microbes than before entering the city.

The second means employed by nature for purifying water, is filtration over natural sand beds, such as river alluvials, thereby mechanically freeing the water of suspended matter and of germs.

Until recently only the latter process has been artificially employed. For nearly eighty years water plants have been provided with sand filter beds so that the water which they deliver is nearly always physically good. In other words, it is free from suspended matter. Bacteriologically, however, the water is not always up to the standard which modern hygienics demands. For instance, Miquel, the famous French water hygienist, demands for water of the very best quality a microbial content not higher than ten per cubic centimeter. And the number of *bacterium coli* must not exceed ten per thousand cubic centimeters. To obtain such results the first one of the above mentioned natural methods of killing microbes is now practically applied; namely, exposing water to a strong light. The strong bactericidal or sterilizing action of the sunlight is due to the ultra-violet rays in the solar spectrum. Hence, we must choose a light which is extremely rich in these ultra-violet rays. We must create a miniature "artificial sun." In the quartz mercury vapor lamp, which closely followed the fundamental work done by P. C. Hewitt in illuminating mercury vapor lamps, such a source of ultra-violet rays has been found.

Purification, or sterilization, of water by ultra-violet rays has become increasingly important within the last three years. The principles which form the basis of the water sterilization by mercury quartz lamps are as follows:

First. Water, being easily penetrated by ultra-violet rays, may be exposed in a thick layer to the rays. But the water must be free from floating matter. Usually it must first be filtered.

Second. The apparatus must be so arranged that the ultra-violet rays are produced with a minimum of electric energy; also the ultra-violet ray lamps must have an economical life.

Third. The apparatus must be so constructed that the maximum amount of ultra-violet light enters the water. In other words, as little light as possible should be lost.

Fourth. The apparatus must be so constructed that the water passes under the influence of the strong light several times. This is effected either by leading the wa-

(Concluded on page 57)

You can bring
your motor car or
boat up to date
quickly, easily and in-
expensively by having it
equipped now with

Aplco Electric Lights

"The right way to light the way"

With the Aplco System installed you
enjoy your car much more while you
own it; and it will bring a higher price
when you sell it.

Here are the definite advantages
of the Aplco system:

You can turn all lights on or
off with one switch, at your hand.

Your road is brilliantly lighted
feet ahead. Night riding is
no longer a nerve strain; it's delight-
ful.

You need not worry about hav-
ing "ice" enough; the self-made as-
sured and stored up battery which
lights are light or not.

You'll find it always safe, al-
ways and convenient. You have
no danger, no noise; no filling
of lamps, no recharging of batte-

ry. You have the Aplco System in-
stalled in any car, a complete
equipped or costly installation; quick
and simple. It's doing for
you, and working now, with
present service.

There's an Aplco dealer near
your garage, easily installed
in no time. If there
isn't one, write to us and we
will send you to arrange.

Apple Electric

62 Canal Street, Dayton, Ohio

Purifying Water by the Action of Ultra-violet Light

(Concluded from page 48.)

ter over and over again to the same lamp,
or by passing it successively into the
luminous zone of several lamps. Besides,
the apparatus must be so constructed that
the water, while under the influence of
the light, is stirred up so as to turn over
and over microscopic suspended matter
which might have escaped filtration and
which might screen microbes from the
light.

A typical European sterilizer is to be
found in one of the suburbs of Rouen,
France. For over two years this installa-
tion has supplied water sterilized by
ultra-violet rays. Since the introduction
of the system not a single typhoid case
has been known among the subscribers,
whereas the percentage of typhoid cases
in neighboring districts is appreciable.

The most recent types of sterilizing ap-
paratus are characterized chiefly by the
fact that they use the light in a more eco-
nomical way than any apparatus hitherto
constructed. The principles involved are
such that the construction of very large
sterilizing units is possible.

The apparatus consists of a tank or
long canal through which the water flows.
Baffle plates are interposed to stir up the
water as it flows. Into the walls of this
tank are inserted at intervals of several
feet, quartz tubes fitted water-tight to
vertical plates constituting part of the
walls of the sterilizing tank. These quartz
tubes are about two inches in diameter
and eight inches long, and are closed at
the end. The vertical plates are provided
with external metal boxes which carry
the lamp supports. The lamps are not
unlike a pistol in shape and are charac-
terized by a very narrow U-shaped lumi-
nous tube, of such length and diameter
that it nearly fills the two-inch quartz
tubes. All the light produced by these
"pistol" lamps therefore enters the water
through these quartz tubes, whereas the
lamp itself is protected from contact with
the water by these same tubes. This is
of importance, because the production of
ultra-violet rays in quartz mercury vapor
lamps is more economical the higher the
temperature of the tube (the lamps
usually run at a temperature of about
800 deg. Cent.). It is, therefore, neces-
sary to prevent the lamps from touching
the water, which would cool them down
to such an extent that the production of
ultra-violet rays would be very low and
uneconomical.

The sterilizing canal is equipped with
a maximum of twelve such lamps, each
using 1,500 watts. One of the installa-
tions has been running for eight months
and sterilizes the water in a municipal
plant at the rate of 1,700,000 gallons per
day. Most of the time only a few of the
lamps are illuminated.

In larger water plants, several such
canals may be operated in parallel. If
the unit is small fewer lamps, even only
a single one, may be employed and the
sterilizing tank reduced correspondingly
in size. In the latter case the baffle plates
must be so arranged that the water is led
several times near the single source of
light.

The small apparatus illustrated in the
accompanying engraving has been used for
military work as a field sterilizer. The
complete equipment in this case, mounted
on a gun carriage, consists of a gasoline
motor generator set, water pump, filter,
and the ultra-violet ray sterilizer.

A similar outfit has supplied water to
a field hospital during the French-Moroc-
co campaign where it has been in constant
use for nearly two years for supplying
water for drinking and surgical purposes.
The report by the surgeon in charge states
that there has been no case of hospital in-
fection or typhoid during all this time,
proving thereby the utility of this steriliz-
ing apparatus.

It is evident that the application of
ultra-violet rays in water purification has
developed into an industry which promises
to do away with the disastrous effect of
the many maladies which are spread by
the water.

IT was a new and star-
tling idea to pack an-
80 CENT-tobacco in a
5 Cent tin—just HALF the
size of the ordinary tin.

Why did we do it?

The
80 cent
TOBACCO
in the
Handy
5¢
TIN

Because the 5 Cent tin holds just
enough tobacco to keep FRESH
until it is smoked.

You don't buy your tobacco cheap-
er. You buy the RIGHT AMOUNT
at a time.

That simple idea has SOLVED
the vexed problem of fresh tobacco
in a handy pocket package.

Stag is something more
than one of the world's finest
tobaccos. Its FRAGRANCE
is the most delightful thing
in the whole history of smok-
ing. No other tobacco has it,
or can have it.

A single tin of Stag will
show any smoker what he has been missing.

Sold only in 5 Cent tins and 90 Cent pound glass humidor jars.

'EVER-LASTING-LY GOOD'

STAG