

I. WOLF.

APPARATUS FOR MANUFACTURING, STORING, TREATING, OR TRANSPORTING CORROSIVE
LIQUIDS OR SUBSTANCES.

1,285,537.

APPLICATION FILED FEB. 23, 1918.

Patented Nov. 19, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

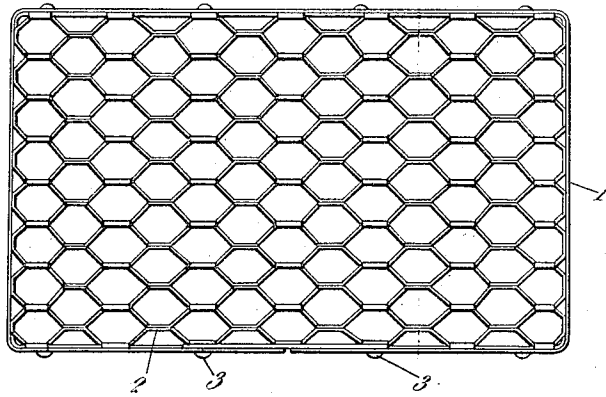


Fig. 2.

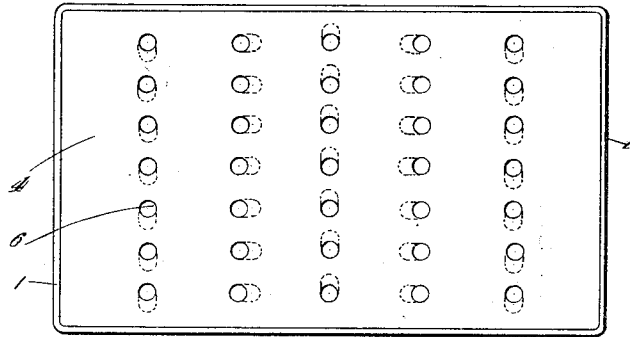
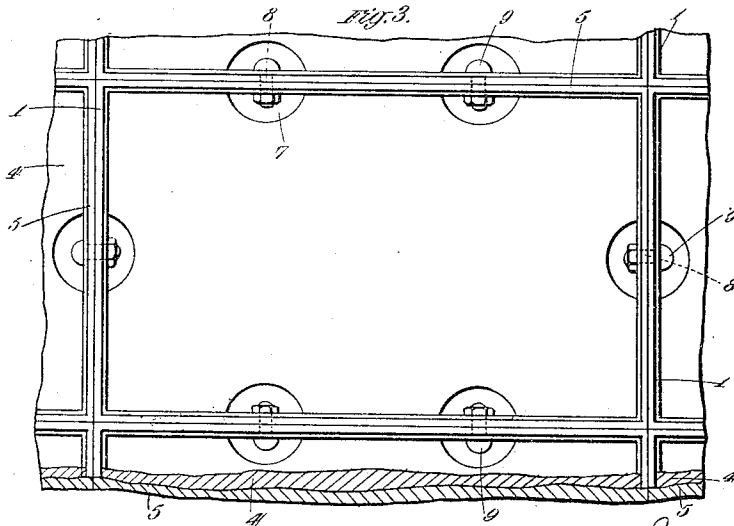


Fig. 3.



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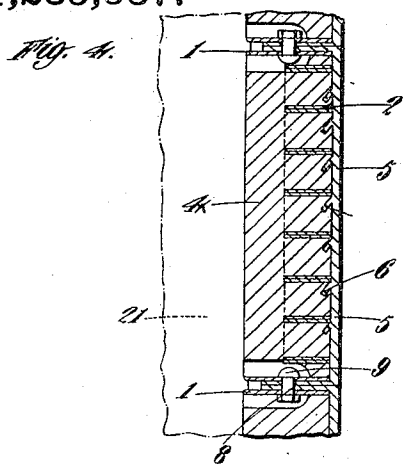
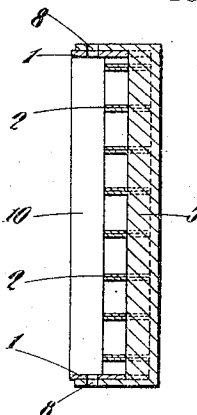
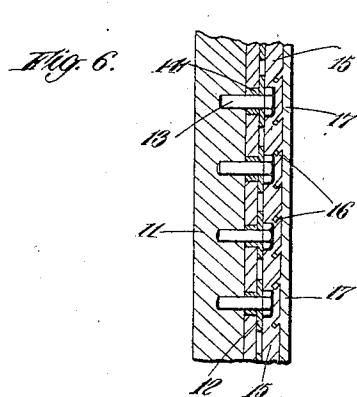
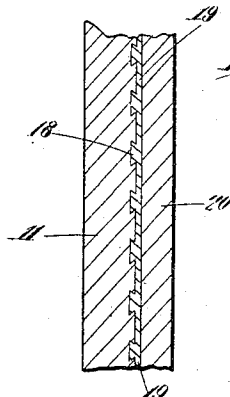
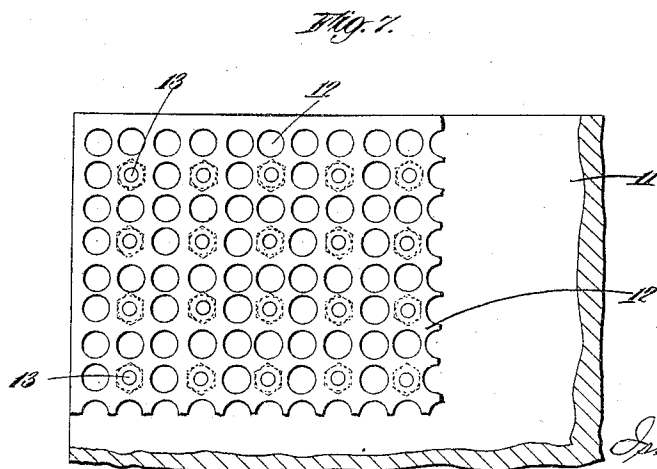
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2 SHEETS—SHEET 2.

1,285,537.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MANUFACTURING, STORING, TREATING, OR TRANSPORTING CORRO-
SIVE LIQUIDS OR SUBSTANCES.

1,285,537.

Specification of Letters Patent. Patented Nov. 19, 1918.

Application filed February 23, 1918. Serial No. 213,920.

To all whom it may concern:

Be it known that I, ISAAC WOLF, a sub-
ject of the King of Great Britain, residing
at 12 Ravensdale Mansions, Haringey Park,
Crouch End, in the county of London, Eng-
land, have invented certain new and useful
Improvements in or Relating to Apparatus
for Manufacturing, Storing, Treating, or
Transporting Corrosive Liquids or Sub-
stances, of which the following is a specifica-
tion.

This invention relates to apparatus of the
kind having a lining which is connected to
the main body of the apparatus by means of
suitable supports and to which the lining is
applied by casting or otherwise, the chief
object of the invention being to provide an
improved construction of apparatus such as
a tank, pan, retort, mechanical stirrer or like
article or structure, for use in manufactur-
ing, storing, treating or transporting chemi-
cals.

According to one feature of the invention
the apparatus comprises a main body or
structure composed of metal and provided
with supports in the form of perforated
metallic sheets which are connected to and
spaced at a distance apart from the body of
the apparatus and around or within which
the chemical proof lining material is adapt-
ed to be applied. Said supports are consti-
tuted by sheets of perforated, skeleton or
expanded metalwork secured over the entire
surfaces to be protected so as to form an
interior open metallic lining therefor and
so applied as to leave a space of any desired
area between the body of the apparatus and
the said openwork metallic lining. Alter-
natively the main body or structure of the
apparatus is itself composed of expanded
metalwork over or within the cells on one
side of which a metallic lining material is
adapted to be cast. The metallic lining may
be composed of lead, nickel, or other metallic
chemical-proof substances. If desired a
material which will serve as a base for the
chemical-proof lining may first be applied
to the expanded metalwork or pressed or
worked through the interstices of the open-
work metallic lining until the said space is
completely filled in with a homogeneous
mass of the material, further layers of the
base material being then applied until it is
of the desired thickness. The chemical-
proof lining is thereafter securely attached
to the base material preferably by forming

in the surface thereof a large number of
holes, grooves, indentations or recesses,
which may be inclined and located in sym-
metrical rows with their axes disposed in
different planes. Alternatively, undercut
grooves or recesses may be employed. The
holes or the like become filled up with the
chemical-proof lining and in this manner
serve to key it securely to the base material.
Where a base material is employed the
chemical-proof lining may either be metallic
or composed of a mineral substance.

According to another feature of the inven-
tion and in cases where the apparatus itself
is composed of expanded metalwork the
sheets or strips of expanded metalwork are
carried in metal frames of any suitable size
and shape in order that, when the chemical-
proof lining has been applied thereto, the
frames may serve as stock or standardized
units or sections from which apparatus of
any desired size or shape can be built up
by bolting or otherwise securing a number
of the frames together. In practice I prefer
first to apply to the said expanded metal-
work a base layer of metal or a metal alloy,
or a mineral substance such as cement, and
to apply the actual mineral or metallic
chemical-proof lining to the said base layer.

In order that the said invention may be
clearly understood and readily carried into
effect the same will now be described with
reference to the accompanying drawing
which shows by way of example several
constructional forms of the invention and in
which:—

Figure 1 is a plan view of part of a stock
unit or section constructed according to the
invention showing the expanded metalwork
and the frame for carrying the same.

Fig. 2 is a front view thereof after the
section has been completely filled up with a
mineral substance and openings formed
therein for attaching a metallic or mineral
chemical-proof lining thereto.

Fig. 3 is a rear view of a complete stock
unit or section after the chemical proof
lining has been applied and showing the
method of assembling the same and;

Fig. 4 is a cross sectional end view corre-
sponding to Fig. 3.

Fig. 5 is a cross sectional end view of a
modified arrangement in which a metallic
chemical proof lining material is applied
directly to the expanded or open metalwork.

Figs. 6 and 8 are cross sectional end views

of part of an apparatus and show other methods of attaching the lining material thereto and

Fig. 7 is a face view of the arrangement shown at Fig. 6 and illustrating part of the supports before the chemical-proof lining material has been applied thereto.

Referring to Figs. 1 to 4, 1 is the frame, 2 is the expanded metalwork attached thereto by means of rivets 3, and 4 is the mineral substance which is employed to fill up the frame and to serve as a base for the actual chemical proof lining material 5 which in the example shown is composed of lead. 6, 6, are the inclined openings in the base material 4 which serve to secure the lining material 5 thereto. The metalwork 2 may be of any desired thickness and formed with any desired size of openings. In the example shown the metalwork 2 is approximately half the depth of the frame and is secured thereto so that one of its faces is flush with that face of the frame to which the lead 5 is to be attached. The mineral substance 4 is cast or molded around the metalwork 2, and the inclined openings 6 in the face thereof, as also openings 7 in the rear thereof, are formed therein while the material is still in a semi-plastic condition. The lead 5 is cast over and around the edges of the section as shown and bolt holes 8 drilled through the frame 1 and the lead. The sections are thereafter placed edge to edge and secured together by bolts and nuts 9, the junctions between the several sections being finally filled up or rendered chemical-proof by fusing the contiguous surfaces of the lead or in any other suitable manner. When the apparatus has been assembled the openings 7 may be filled up with cement or by means of removable plugs, and if desired an outer layer of suitable material 21 of any desired thickness, (as indicated in dot and pick at Fig. 4), may thereafter be applied to the exterior of the built-up apparatus. In the arrangement shown at Fig. 5 the base material 4 is dispensed with and the lining 5 is applied directly to the metalwork 2. The openings in the metalwork 2 as shown are partially filled with the lining material which extends over the interior face of the frame and around the edges thereof to any desired thickness. The stock units or sections so made are employed in a similar manner to those illustrated at Figs. 1 to 4. The space 10 when the built-up structure is completed may, if desired, be filled up with concrete applied to any desired degree of thickness, and forming an outer wall for the apparatus.

Referring to Figs. 6 and 7, 11 is part of the outer supporting wall of an apparatus.

12 is a sheet of open metalwork attached thereto by means of screws 13 and spaced apart therefrom by means of washers 14. 15 is a layer of mineral substance which is cast or molded around the sheet 12. 16 are inclined openings similar to those shown in Fig. 2 which are formed therein while the material is in a plastic state and 17 is an outer layer of metal applied to the base 15. In the example shown in Fig. 8, 11 is part of the wall of an apparatus, 18 are keyways formed therein, 19 is a thin basic layer of metallic substance cast into and over the keyways 18, and 20 is a layer of mineral substance, such as chemical-proof cement or sulfur, applied to the metallic substance 19, so as to protect it from deterioration due to continued chemical action thereon. Where a silicious substance or a substance which only melts at such high temperatures that it cannot be applied by usual means is employed, I may blow the same in powdered form through an oxy-coal-gas, oxy-hydrogen or oxy-acetylene flame, or the like either introducing the powdered material into the gases before they leave the burner orifices or directly into the flame so that the protective substance is fused and coated on in one operation, or the material may be blown through an electric arc or arcs with the same result. The material and gases may be pre-heated. Alternatively, I may apply the powdered substance in a cold state and afterward fuse it.

What I claim and desire to secure by Letters Patent is:—

1. In apparatus for use in manufacturing, storing, treating, and transporting chemicals, a metallic frame, expanded metal work carried by and located within said frame, a base material supported by said metal work, and a lining of acid-proof material attached to and covering said base material.

2. In apparatus for use in manufacturing, storing, treating and transporting chemicals, a frame, a foraminous support located within and attached to the frame, a base material carried by said support, and a lining of acid-proof material attached to and covering said base material.

3. Apparatus for use in manufacturing, storing, treating and transporting chemicals, comprising a main structure built up from stock units, means for connecting said stock units together, each of said stock units comprising a frame, a foraminous support located within and attached to the frame, a base material carried by said support, and a lining of acid-proof material attached to and covering said base material.

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