

Dec. 16, 1924.

1,519,965

M. HOVHANNESSIAN
ART OF LAYING OUT DRAWINGS

Filed May 27, 1921

3 Sheets-Sheet 1

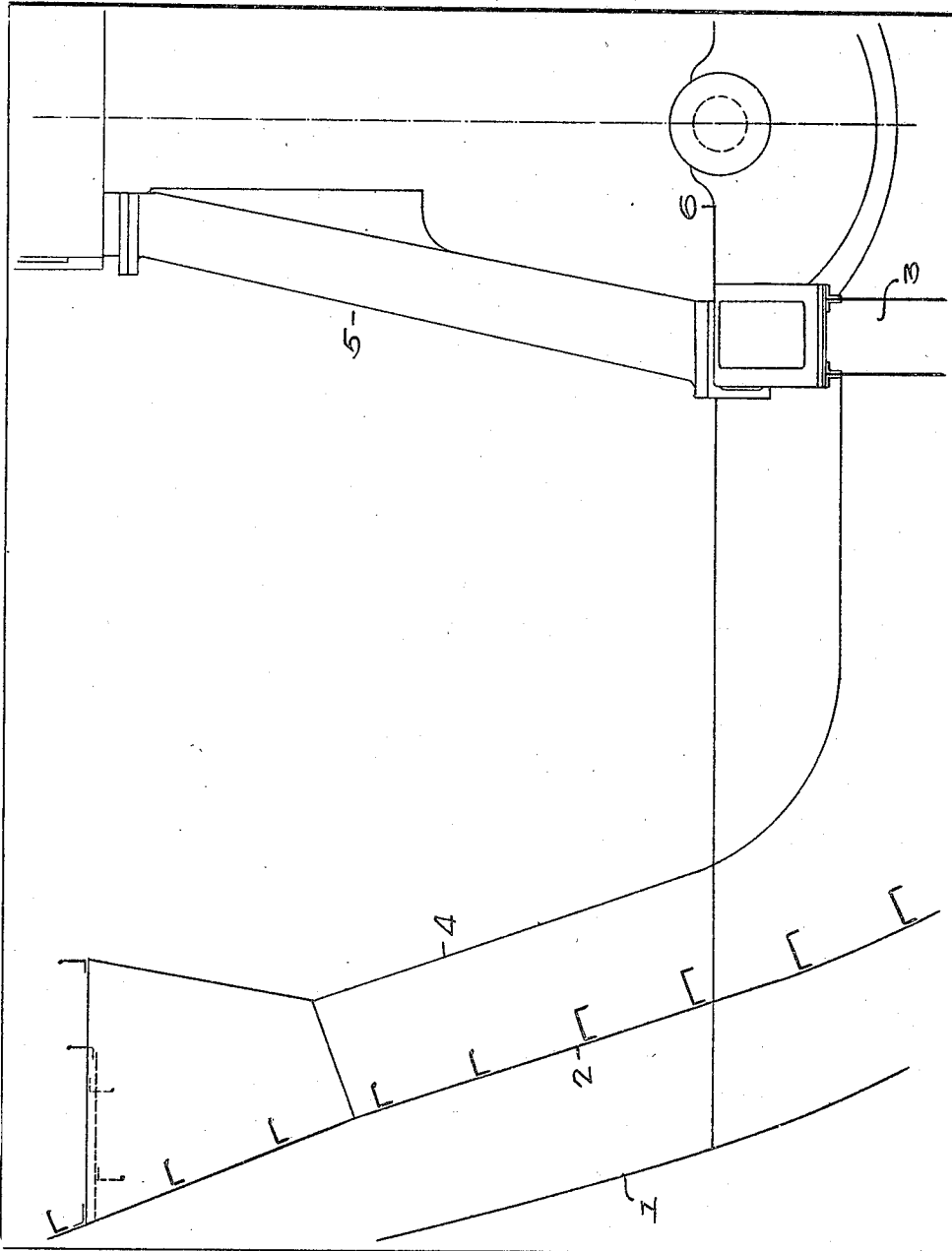


Fig. 1.

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Megerdich Hovhannessian.
by his Attorneys—
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3 Sheets-Sheet 2

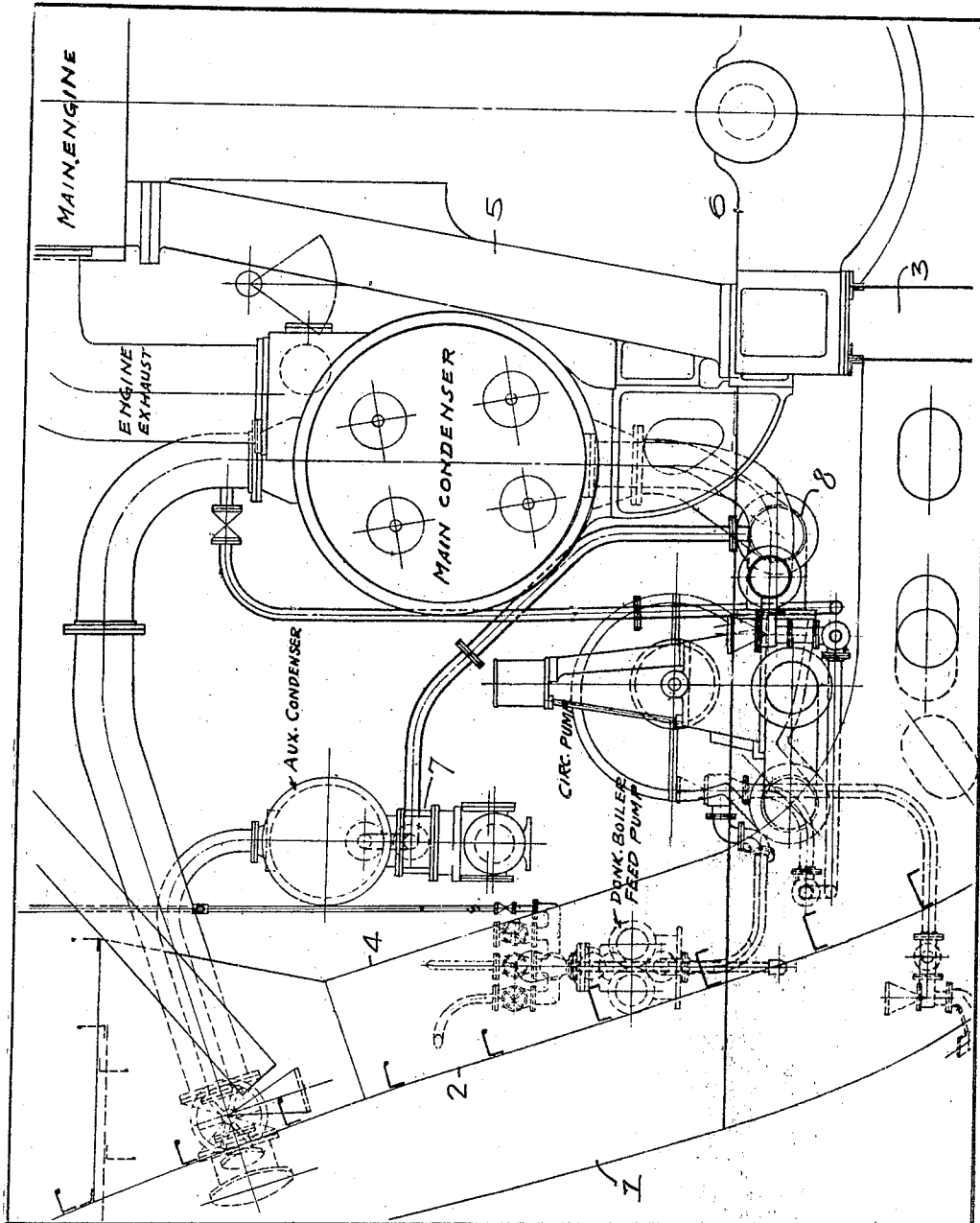


Fig. 2.

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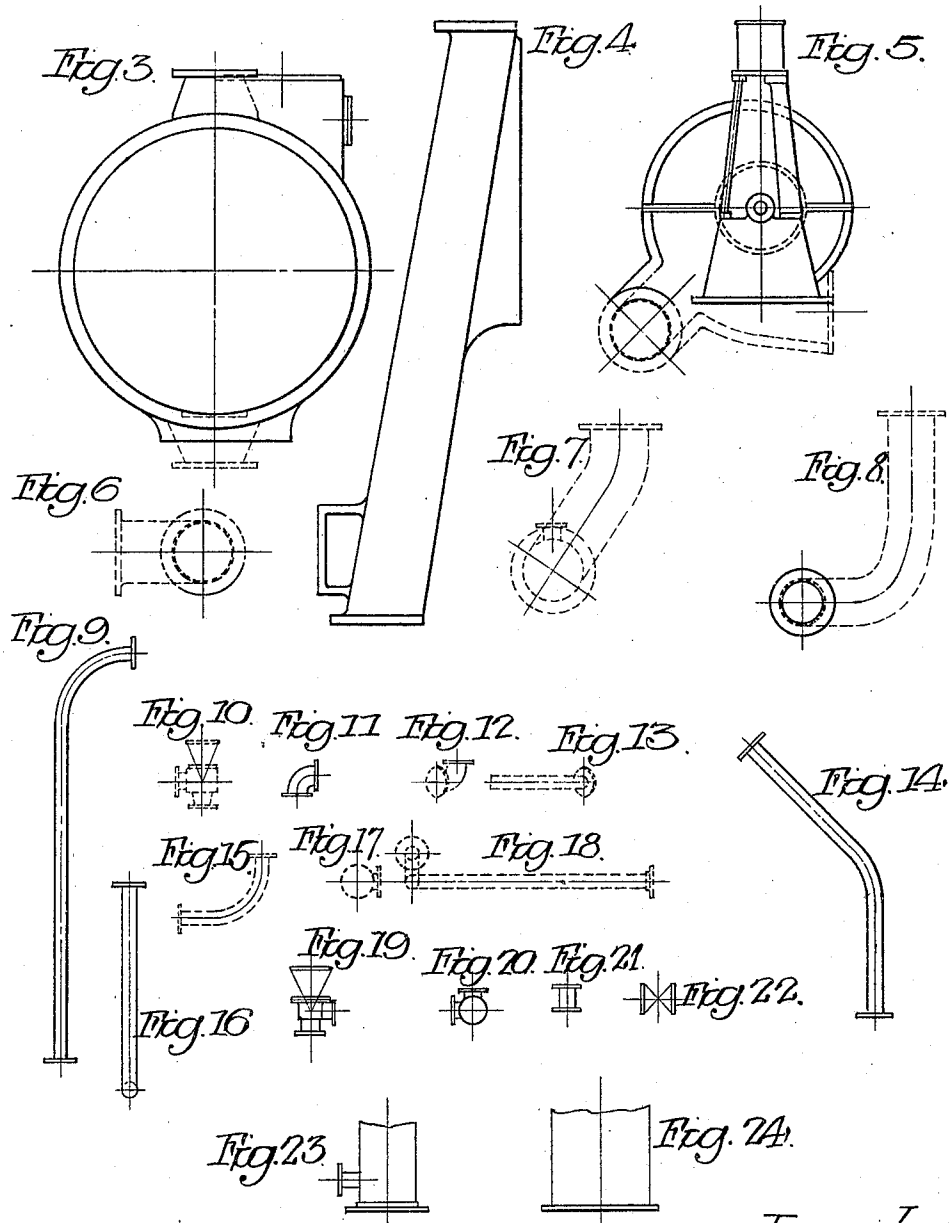
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

MEGERDICH HOVHANNESIAN, OF SOUTH BETHLEHEM, PENNSYLVANIA.

ART OF LAYING OUT DRAWINGS.

Application filed May 27, 1921. Serial No. 473,077.

To all whom it may concern:

Be it known that I, MEGERDICH HOVHANNESIAN, a citizen of the United States, residing in South Bethlehem, Pennsylvania, have invented the Art of Laying Out Drawings, of which the following is a specification.

One object of my invention is to provide a novel method of laying out or making up drawings or representations illustrating a relatively complicated structure or assembly of apparatus, such as the piping, fittings and machines of a ship's boiler or engine room, with a view to reducing the time and labor required.

A further object of the invention is to provide a novel assembly or means for the representation of a system of apparatus or structures such as above indicated, which may be utilized for the preparation of tracings or photographs desired for use in manufacturing or assembling such systems, etc.,—the various parts required for the utilization of my invention being simple, inexpensive and convenient to make and use.

These objects and other advantageous ends I attain as hereinafter set forth, reference being had to the accompanying drawings, in which,

Fig. 1 is a view of a typical layout sheet which may be employed in carrying out my invention;

Fig. 2 is a view of a drawing or representation built up or laid out in accordance with my invention, from the drawing shown in Fig. 1 as a basis; and

Figs. 3 to 24 inclusive are plans of typical specimens of the transparent pieces upon which are drawn or printed the representation of fittings, machines or structures utilized to a greater or less extent in making up the finished layout shown in Fig. 2.

In accordance with my invention I provide a supporting sheet preferably of drawing paper or transparent sheet of celluloid, which while it may be blank, usually has printed, drawn or otherwise applied to it a drawing of the frame or other main structure defining the space or limits within which certain apparatus is to be installed. For example, in Fig. 1 I have illustrated a foundation or base sheet on which are drawn certain lines representing a portion of the transverse section of a ship, taken through part of the engine room, and of these lines 1 represents the outer plates of the ship's

side, 2 the plates constituting the inner or main side walls of the ship, 3 certain of the longitudinal frame members and 4 one of the ribs. Further, 5 represents one of the columns of an engine and 6 a portion of the base structure supporting said column which with the other parts noted, defines a certain space within which the condenser, circulating pumps and certain piping, fittings and auxiliary apparatus are to be installed.

In order to lay out this apparatus within the available space above defined, in accordance with my invention I utilize a previously prepared set of drawings or pictures of the standard or available apparatus, piping, fittings, etc., made to a predetermined scale upon transparent sheet material such as celluloid or the like, and preferably cut out so that they have the outlines defined by their marginal or boundary lines.

In the relatively simple case illustrated, I first take from this stock of previously prepared pictures, certain such as those indicated in Figs. 3, and 5, illustrating a main condenser and a circulating pump respectively, and arbitrarily place these in various experimental positions upon the sheet indicated in Fig. 1 until I finally ascertain those positions best suited to the requirements of the case in hand. These main pictures are then permanently or removably attached to the base sheet by paste, tacks, pins, etc.

I then select from my stock of pictures certain others which represent standard pipes, flanges, valves and the like required to connect up the above pieces of apparatus illustrated by the main pictures 3 and 5, and place them on the supporting or base sheet in the positions necessary to properly connect said apparatus in accordance with good engineering practice. As the pictures representing the standard pipes, fittings, etc. are placed, they also are temporarily or permanently fastened either to the supporting sheet or to the pictures over which they lie or extend.

Owing to the fact that all of the pictures are transparent, the course taken by any particular pipe line may be quickly and easily followed by the designer and its position with relation to any other line or piece of apparatus may be determined with the utmost ease, so that if, for example, it should be found that a proposed line of pipe running between the pump 7 and the intake pipe 8 of the main condenser, would

interfere with the latter if run in a certain way, its position may be shifted or if a specially built or formed pipe is required, it may be conveniently sketched or drawn in on the supporting sheet. Similarly any other special pipes, fittings, etc., not represented among the set of pictures on hand, are drawn to scale upon the base sheet or on a piece of transparent material and fastened in the proper positions so that finally there is obtained a complete representation in elevation or plan of the assembled apparatus.

Where in the view being prepared a pipe or pipe fitting, machine, etc. would be overlaid by some other structure owing to the fact that the former was in a position further from the observer than the latter, the lines constituting the underlying picture would be scratched, rubbed or colored or so drawn as to have a dotted or dot-and-dash formation, thus indicating in a conventional manner the relative positions of the parts which they represent. Obviously any combination of apparatus, pipes, structures, etc., without departing from my invention, may be built up or assembled upon a blank base or supporting sheet, though the latter is usually employed with the previously applied picture or representation of some main apparatus or space-defining structure.

From the above description it will be understood that the layout or representation of the various pieces of apparatus would be built up on the supporting sheet piece by piece, each picture or section being quickly and easily adjusted or its position shifted as may be required, until finally the finished layout has the appearance indicated in Fig. 2. The underlying pictures are dotted, whereas as a matter of fact the apparatus which they represent lies behind other pieces of apparatus, and wherever the previously prepared supply of pictures is lacking owing to the necessity for specially built piping for example, the latter is drawn or sketched in on the supporting or base sheet or on a sheet of transparent material, so that the completed layout has the same appearance as would a finished drawing prepared in the usual manner. Such a layout is then photographed or printed in order to provide a print from which the actual apparatus may be laid out or assembled, or if desired a tracing may be made of this layout in a manner similar to that followed in tracing ordinary original drawings. Thereafter prints are made from the tracing and utilized in the customary manner.

In any case by building up or preparing a layout as above described, it is possible to save a large percentage of the time and labor which would be required in designing a drawing of the same structures or apparatus by the method at present followed, and

by my invention the work may be done with less likelihood of error owing to the use of transparent pictures which constitute the component parts of such layout. While my invention is particularly adapted to the designing of the piping system and apparatus commonly required in the engine and boiler rooms of vessels or other power plants, it may be utilized with equal advantage for preparing or laying out ventilating, heating, conveying systems or the like.

It is to be noted that certain of the previously prepared pictures may be drawn or represented with dotted instead of full lines or by coloring so that without requiring change they may be utilized to represent parts lying back of or under other parts since in the finished layout they will be visible through the pieces which overlies them.

It is not necessary in carrying out my invention that the base sheet should have upon it any previously prepared drawing or pictorial representation since if desired the various pictures of apparatus, piping, fittings, etc., may be assembled upon a blank sheet in the desired relative positions, fastened thereto after the necessary dotted line effects have been secured where required, and the finished layout traced, printed or photographed after any parts which it may not have been possible to represent by the transparent pictures have been drawn in on the base sheet.

It may be noted that one valuable application of my invention would consist in the building up of a more or less complete apparatus in accordance with the foregoing description upon a transparent base sheet of transparent drawings and the use of one or more of these representations of different machines in laying out the pumping apparatus, power plant, auxiliary machinery, etc., with a view to properly positioning the various devices in a given space such as the engine or boiler room of a vessel.

Obviously my invention would be particularly adapted for this use since by means of the built up representations of machines, etc., an engineer could determine the best possible positions for the apparatus and thereby save considerable time in laying out the plant.

I claim:

1. The method of preparing representations of structural drawings of solid objects which consists in assembling pictures of the main structural elements upon a base sheet in definite relative positions, assembling pictures of piping and fittings between the pictorial representations of the main structural elements to show the operative connections between the main structural elements, and superimposing upon the picture thus formed pictures of apparatus and con-

nections which occupy a plane between the observer and the previously formed picture, the superimposed pictures being formed on transparent material so that the underlying pictures may be visible therethrough.

2. The method of preparing representations of structural drawings of solid objects which consists in assembling pictures of the main structural elements upon a base sheet in definite relative positions; assembling pictures of piping and fittings between the pictorial representations of the main structural elements to show the operative connections between the main structural elements; superimposing upon the picture thus

formed pictures of apparatus and connections which occupy a plane between the observer and the previously formed picture, the superimposed pictures being formed on transparent material so that the underlying picture may be seen therethrough; and then scratching the lines of those portions of the underlying pictures which appear beneath the solid parts of the superimposed pictures to form dotted lines so that the composite picture thus formed will show the respective planes which the said structural elements and connections occupy.

In witness whereof I affix my signature.
MEGERDICH HOVHANNESSIAN.