

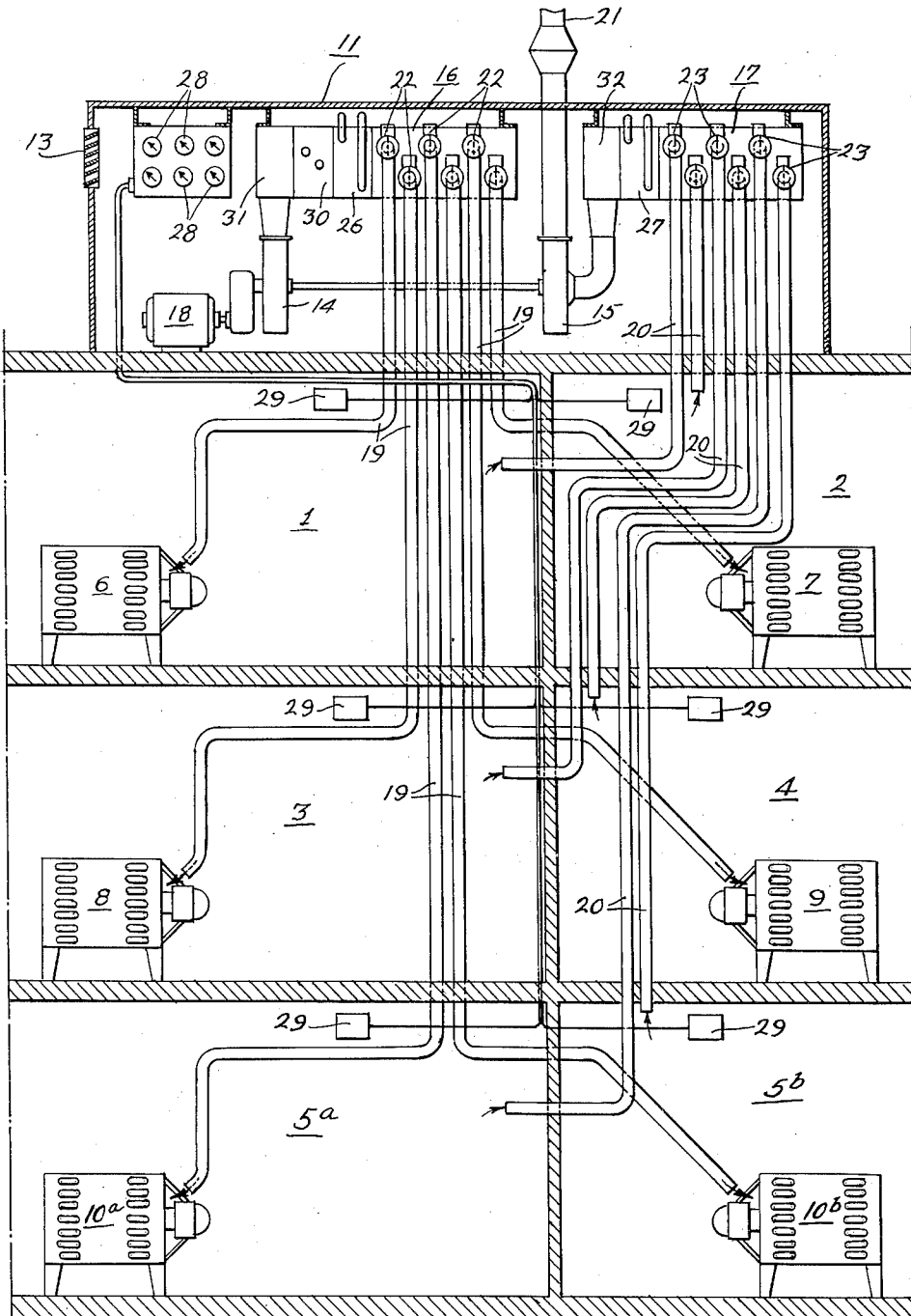
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SYSTEM FOR AIR CONDITIONING HOLDS

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3,041,954

SYSTEM FOR AIR CONDITIONING HOLDS

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The present invention relates to an improvement in a system for air conditioning holds, preferably refrigerated cargo spaces in ships, said holds being divided in a number of separate spaces, each space being provided with a separate means for circulating and cooling of the air in the space. Owing to the many different kinds of goods, which are loaded in modern large cargo ships and the need to maintain an air condition suited to the goods, it has proved necessary to divide the hold into a number of separate partitioned spaces. Each of such spaces is nowadays provided with a separate circulating means, preferably equipped with cooling coils. It has however involved considerable and time-wasting work to control the condition in the different spaces and also to make the necessary adjustments by a differentiated supply and discharge of the necessary ventilating air. The invention, the object of which is to eliminate said drawbacks, is characterized by locating a common air-conditioning unit for all the spaces at a central point for instance above deck, preferably in the so called mast-house. The unit is preferably provided with means for cleaning, heating, cooling or humidifying of outdoor air together with means for supplying treated outdoor air to the different spaces and discharging corresponding quantities of air from said spaces. The air is supplied to and discharged from the different spaces at high velocity by means of a number of narrow ducts, said ducts—at their connection to said unit—being provided with dampers for an individual adjustment of the air quantities. Measuring means for the air condition are disposed in the different spaces, and the reading instruments for them are arranged at a central point in order to enable central control and regulation of the air condition in the different spaces by varying the quantity of the supplied and discharged air respectively.

Thanks to the use of very narrow ducts it has now become rather easy to make the necessary apertures and passages through the decks. Decks and walls are provided with tubes passing through and welded to the same, and the ducts, being made of standardized elements of galvanized sheet iron, are connected to said tubes thus eliminating any leakage between different spaces.

The ducts for the supply of air from the central conditioning unit are suitably arranged to terminate close to the local conditioning means at the suction side of the same. According to a suitable embodiment of the invention, the central conditioning unit is provided with means to automatically maintain the static pressure of the supplied and discharged air respectively constant.

By the invention an exact individual regulation of the air quantities is possible—thanks to the fact that an adjustment does not influence the present air quantities to other spaces. To secure a sufficient ventilation of the spaces in the cases when there is no need to keep said separate local circulating means running the central air conditioning unit in accordance with a suitable embodiment of the invention object, is arranged to deliver a considerably increased air quantity, for instance by providing the unit with a two-speed motor.

The invention will now be described more in detail

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with reference to the accompanying drawing showing a cross-section through a cargo ship provided with a conditioning system according to the invention.

In the drawing 1, 2, 3, 4, 5a and 5b designate different spaces of a ship hold, each of said spaces being provided with means 6, 7, 8, 9 and 10a and 10b respectively for circulation and, if required, cooling of the air in the respective spaces. 11 designates a so-called mast-house, in which according to the invention a central air conditioning unit is arranged, said unit comprising a supply fan 14 and a discharge fan 15 which in the illustrated embodiment are driven by a common motor 18. The fans are connected to a pressure chamber 16 and a suction chamber 17 respectively, in which chamber conditioning means 26 and 27 are arranged for cleaning, heating, cooling or dehumidifying of outdoor air introduced through an air-inlet 13. The air exhausted by the fan 15 is discharged through a duct 21 terminating at a suitable height above the mast house. From the pressure chamber 16 a number of narrow ducts 19 lead to the different spaces 1-5b. In the same manner the suction chamber is connected to the spaces 1-5b by a corresponding number of similar ducts 20. For facilitating individual adjustment of the air quantities, regulating dampers, designated 22 and 23 respectively, are arranged in said ducts at their connection to the central air conditioning unit.

The reading instruments 28 for the measuring means 29 disposed in the different spaces are mounted at a central point in order to enable central control and regulation of the air condition in the different spaces by varying the quantity of the supplied and discharged air respectively. In order to diminish the growth of bacterium in the holds an ozone delivering means 30 can be included in the air conditioning unit. Volume governors 31 and 32 are provided to automatically maintain the static pressures of the supplied and discharged air respectively constant.

What we claim is:

1. In a system for air conditioning a plurality of separate cargo spaces in ships, a separate fixed-output means for circulating and cooling the air and separate conditioning-measuring means in each space, a common air conditioning unit as a central point for all the spaces, said unit having means to precondition outdoor air, a conduit means to supply a selected quantity of said preconditioned outdoor air to the different spaces and to discharge a corresponding quantity of air from said spaces at high velocity, said conduit means including a separate duct for each space, terminating at one end closely adjacent the circulating and cooling means in said space at the suction side thereof and at the other end in said unit, a damper in each duct at its connection to said unit for individual adjustment of the air quantity, and a reading instrument for each measuring means at said central point to afford central control of the associated damper and regulation of the air condition in the associated space by varying the quantity of the supplied and discharged air respectively.

2. In a system for air conditioning a plurality of separate cargo spaces in ships, a separate fixed-output means for circulating and cooling the air and separate conditioning-measuring means in each space, a common air conditioning unit as a central point for all the spaces, said unit having means to precondition outdoor air, a conduit means to supply a selected quantity of said preconditioned outdoor air to the different spaces and to discharge a corresponding quantity of air from said spaces at high velocity, said conduit means including a separate duct for each space, open at one end in said space and at the other end in said unit, a damper in each duct at its connection to said unit for individual adjustment

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of the air quantity, and a reading instrument for each measuring means at said central point to afford central control of the associated damper and regulation of the air condition in the associated space by varying the quantity of the supplied and discharged air respectively, said air conditioning unit including means to automatically maintain the static pressure of the supplied and discharged air respectively at a constant value.

3. In a system for air conditioning a plurality of separate cargo spaces in ships, a separate fixed-output local means for circulating and cooling the air and separate condition-measuring means in each space, a common air conditioning unit at a central point for all the spaces, said unit having means to precondition outdoor air, a conduit means to supply a selected quantity of said preconditioned outdoor air to the different spaces and to discharge a corresponding quantity of air from said spaces at high velocity, said conduit means including a separate duct for each space, open at one end in said space and at the other end in said unit, a damper in each duct at its connection to said unit for individual adjustment

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of the air quantity, means for regulating the unit to supply a considerably increased quantity of air to secure a sufficient ventilation of the spaces when said separate local circulating means are inoperative, and a reading instrument for each measuring means at said central point to afford central control of the associated damper and regulation of the air condition in the associated space by varying the quantity of the supplied and discharged air respectively.

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