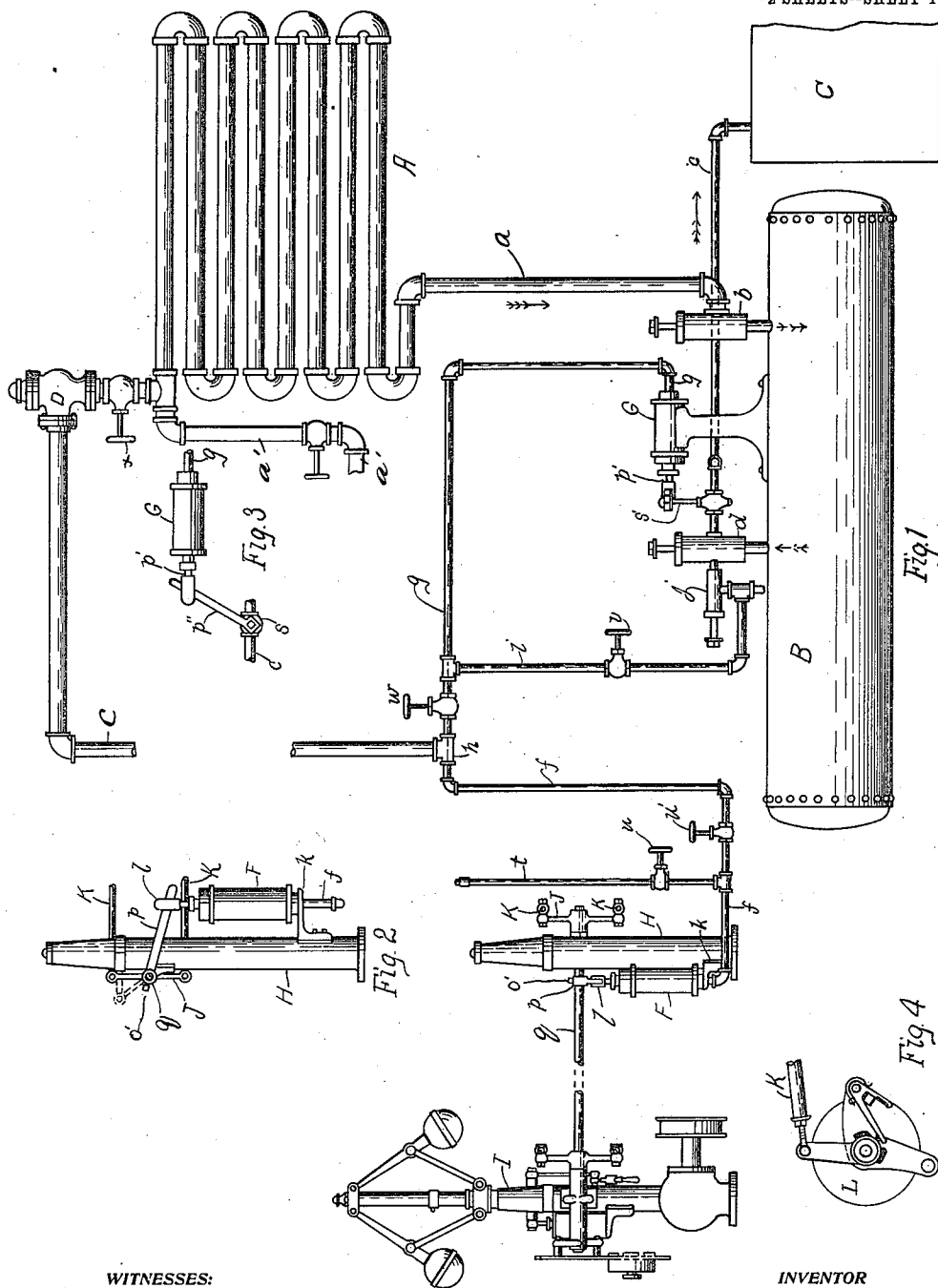


E. E. TRAPP.
SAFETY DEVICE FOR REFRIGERATING MACHINES.
APPLICATION FILED AUG. 23, 1909.

949,555.

Patented Feb. 15, 1910.

2 SHEETS—SHEET 1.



WITNESSES:
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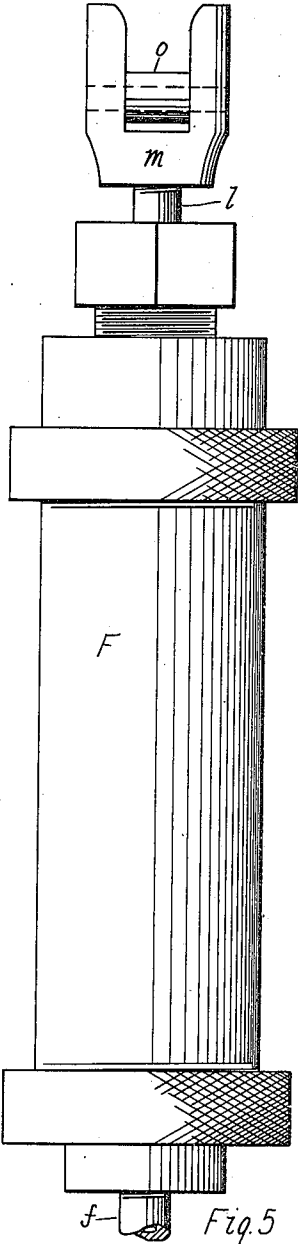


Fig. 5

WITNESSES:

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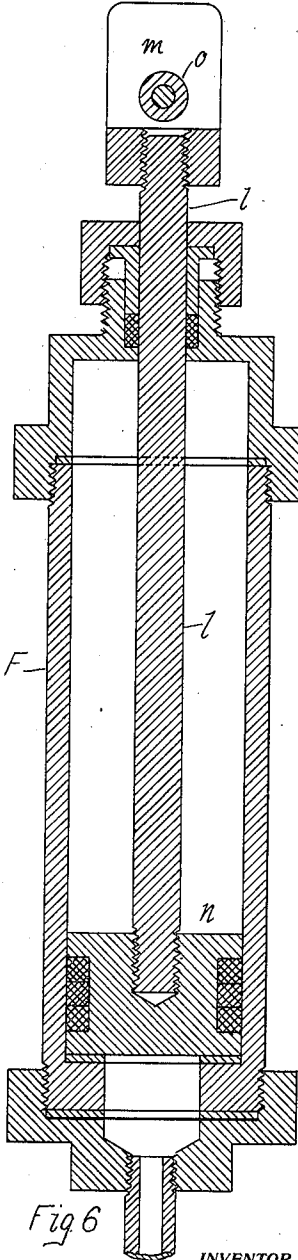


Fig. 6

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UNITED STATES PATENT OFFICE.

EMERY E. TRAPP, OF SIOUX CITY, IOWA.

SAFETY DEVICE FOR REFRIGERATING-MACHINES.

949,555.

Specification of Letters Patent.

Patented Feb. 15, 1910.

Application filed August 23, 1909. Serial No. 514,158.

To all whom it may concern:

Be it known that I, EMERY E. TRAPP, a citizen of the United States, and a resident of Sioux City, in the county of Woodbury and State of Iowa, have invented new and useful Improvements in Safety Devices for Refrigerating-Machines, of which the following is a specification.

My invention relates to refrigerating machines and the object of the invention is a safety device whereby explosions may be prevented when the pressure upon the machine becomes too great.

The invention is especially adapted for ammonia refrigerating systems, and it is well known that the pressure of the ammonia gas in such machines often suddenly rises to a degree resulting in an explosion unless the machine is at once stopped. The machine must, therefore, be constantly watched to avert a danger always present. My device operates to stop the operation of the steam engine by which the system is controlled and also to shut off the supply of ammonia from the condenser coils the instant the pressure of ammonia gas rises to the danger point. In the accompanying illustration I have shown my device in connection with so much of the machine as may be necessary to a proper understanding of the invention.

The invention consists of a cylinder operated by the overpressure of ammonia gas from the condenser coils, and connected with the steam supply of the engine so that the steam is cut off by the movement of the cylinder. A similar cylinder operates to stop the supply of ammonia from the condenser to the expansion tank.

One of the objects of the invention is the saving of the overflow of ammonia.

In the drawing Figure 1 is a view in side elevation of my invention in condenser coils, receiver, expansion tank, governor and connecting pipes of a refrigerating machine. Fig. 2 is an enlarged view in end elevation of operating cylinder and cam arms supported by a stand. Fig. 3 is a plan view of cylinder, piston and wrench and valve, and a section of pipe used in connection with the ammonia supply. Fig. 4 is a view in side elevation of cam controlling the steam valve of the engine and part of cam arm. Fig. 5 is an enlarged detail view of cylinder in side elevation. Fig. 6 is a longitudinal section of Fig. 5.

Referring to the drawing in which like

parts are designated by similar letters of reference, A is the condenser coils having an inlet pipe *a'* and being connected with the receiver B by the pipe *a* through the liquid valve *b*. The receiver is connected with expansion tank C by the usual pipe *c* and expansion valve *d*. Attached to the upper part of the condenser coils is a relief valve D of usual construction and adapted to be regulated to any desired pressure. To the valve is connected the pipe *e* to which are attached by the tee *h* the pipes *f* and *g* leading respectively to the operating cylinder F and the similar cylinder G. A branch pipe *i* leads from the pipe *g* to the ammonia valve *j* normally closed which is connected with and similar to the valve *d*. The cylinder F is supported uprightly on a bracket *k* secured to a stand H. It is provided with the usual packing and packing gland and a piston *l* having a forked end *m* screwed thereon, and a piston head *n*. Secured in the forked end is a shaft *o* to which is pivoted a piston rod *p*. The piston rod is secured at its opposite end by a screw bolt *o'* to the governor shaft *q* which is pivotally supported at one end by the stand and at the other end by the governor I. To the end of the shaft *q* are secured the connecting rods J, joined to the cam arms K, K, which are connected with and operate the cam valve L which controls the steam supply of the engine.

When the pressure of the ammonia gas overflows the condenser coils and overcomes the pressure of the relief valve, it finds an outlet through the pipes *e* and *f* and into the cylinder F. The pressure of the ammonia gas in the cylinder lifts the piston and raises the pivoted end of the piston rod, which, acting on the shaft *q*, turns the shaft, moving the cam arms and cuts off the steam supply in the valve, Fig. 4. At the same time the overflow of ammonia gas finds its way through the pipe *g* into the cylinder G, which is similar in all respects to the cylinder F. To its similar piston *p'* is pivoted a piston rod or wrench *p''* whose opposite end is secured to a valve stem *s'* which operates a valve *s* in the pipe *c*. The pressure of ammonia gas in the pipe operates the piston *p'* which through the wrench *p''* and valve stem *s'* closes the valve *s* in the pipe and shuts off the supply of ammonia gas from the coils. Before the machine can be again started it is necessary that the am-

monia gas be discharged or pumped out from the cylinders and pipes. A stand pipe *t*, connected to the pipe *f* near the cylinder *F*, opens into the air and is closed during the operation of the machine by the valve *u*. By opening this valve and closing the valve *u'* in the pipe *f* the ammonia gas will be discharged from the cylinder *F* and the piston released, permitting the steam to be turned on. Then by closing the valve *u* and the valve *d* and opening the valves *u'* and *j* and starting the machine, the gas will be pumped out of the pipes *e*, *f*, *g* and *i*, the cylinder *G* and the valve *j*, into the expansion tank by the operation of the machine itself and the device restored to normal position. Valves *v* and *w* are provided respectively in the pipes *i* and *g* in order that the pipes may be cut off from the pump if desired. A similar valve *x* is provided at the entrance to the relief valve *D*.

My invention by slight adaptation may be fitted to any kind of engine and by minor changes in structure is readily attached to other systems of refrigeration without departing from the principle or spirit of the invention.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is,—

1. The combination, in a refrigerating machine, with the steam valve of an engine and the means controlling the same, of the condenser coils of the machine, a cylinder and piston operated by the overpressure of the coils and means connecting the piston with the means controlling the steam valve whereby the valve is closed by the operation of the cylinder and piston, substantially as described.

2. In a refrigerating machine, the combination with the steam valve of an engine and the means controlling the same, of the condenser coils of the machine, a cylinder and piston operated by the overpressure from the coils, means connecting the piston with the means controlling the valve whereby the valve is closed by the operation of the cylinder and piston and the machine stopped, and means connected with the cylinder for the release of the same after the machine has been stopped, substantially as described.

3. In a refrigerating machine, the combination with the means controlling the steam valve of the engine, of a cylinder and piston operated by the overpressure of the condenser coils whereby the valve is closed by the operation of the cylinder and piston, and means connected with the supply of the cylinder for the discharge of the same after the engine has been stopped, substantially as described.

4. In a refrigerating machine, the combination with means controlling the steam supply of the engine, of a cylinder and piston operated by the overpressure of the condenser coils, a valve in the supply pipe leading from the coils, and means connecting the piston with said valve whereby the supply from the coils is stopped by the closing of the valve, substantially as described.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

EMERY E. TRAPP.

Witnesses:

H. C. GARDINER,
J. S. NELSON.