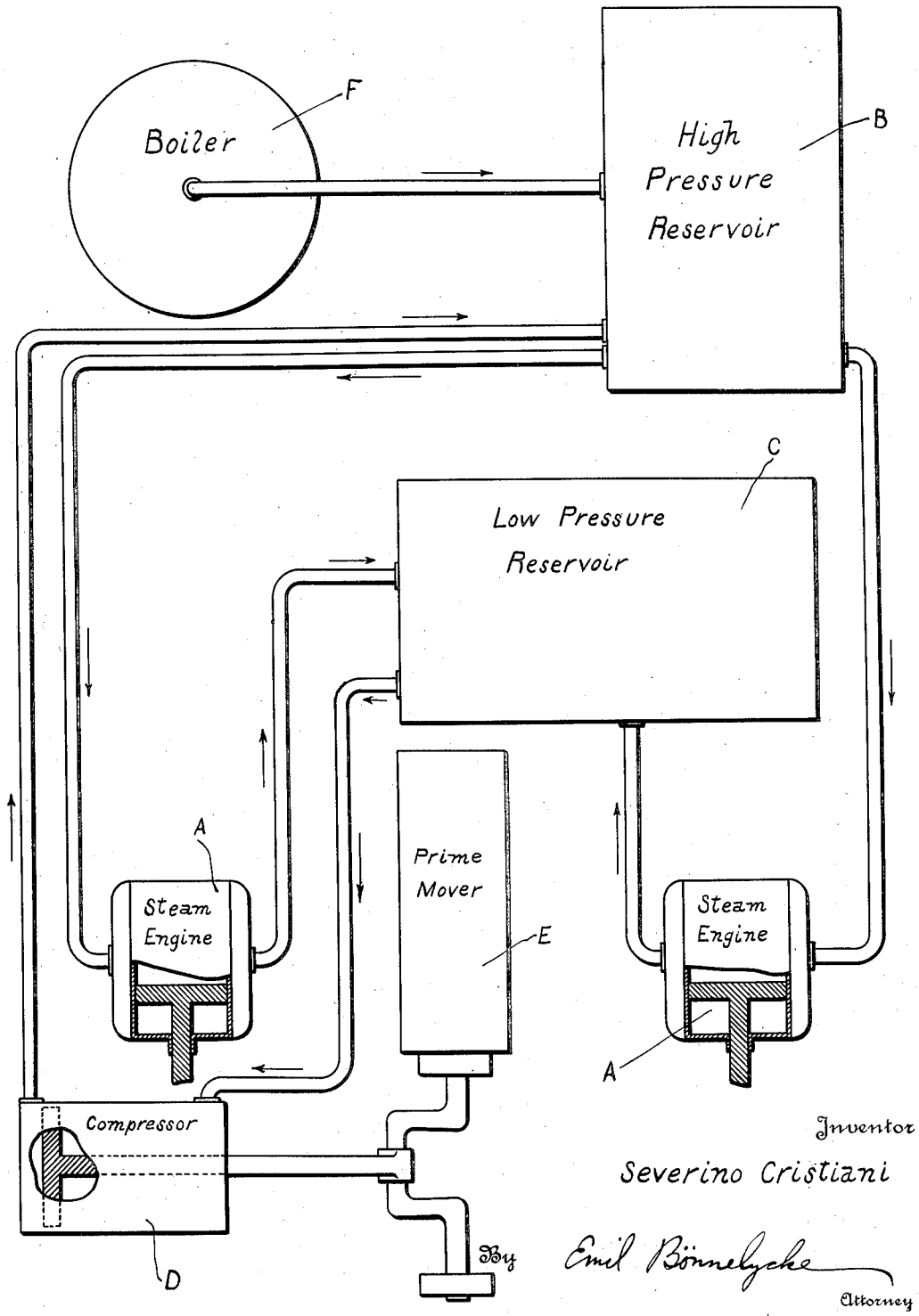
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SYSTEM FOR TRANSMITTING ENERGY BY MEANS OF STEAM WORKING IN A CLOSED CYCLE

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SYSTEM FOR TRANSMITTING ENERGY BY MEANS OF STEAM WORKING IN A CLOSED CYCLE.

Application filed September 20, 1921. Serial No. 501,993.

To all whom it may concern:

Be it known that I, SEVERINO CRISTIANI, subject of the King of Italy, residing at Milan, Italy, have invented certain new and useful Improvements in Systems for Transmitting Energy by Means of Steam Working in a Closed Cycle, of which the following is a specification.

The object of the present invention is to provide a system for the transmission of energy in which by means of steam the power of a non-reversible and constant speed motor, such as an internal combustion engine or an electric motor, can be utilized to operate a reversible and elastic steam engine in order to easily and economically control the operation of rolling mills, lifting apparatus, locomotives, etc.

The system forming the subject of the invention may be illustrated diagrammatically as in the accompanying drawing.

The working motors A (which are steam engine cylinders of the ordinary type) are driven by steam contained in the reservoir B. The steam escaping from the cylinders is discharged into the reservoir C. The low pressure steam discharged into the reservoir C is drawn into the compressor D which returns it to the high pressure reservoir B. The mechanical force which is necessary to perform the work of compression (which corresponds to the active work of the engines A, plus the losses of efficiency) is generated by a prime mover E which may be any suitable motor of economical efficiency, such as an electric motor or an internal combustion engine.

The quantity of steam required to complete the cycle may be generated to start with by the boiler F, which may continue to generate the small quantity of steam necessary to make good any losses of steam and heat which occur during the working of the system. The said boiler may be heated by any suitable combustible material since the said boiler only demands a very small amount of heat.

Actually the steam reacquires during its recompression almost the amount of heat which it lost in expanding in the cylinders and in traversing the connecting pipes. It is possible to reduce or even to prevent any loss of heat due to radiation through the pipes by using suitable insulation or by heating the pipes in any suitable manner and this makes it possible not only to maintain the steam in a condition of saturation, without too high a percentage of moisture, but also to superheat it.

The system described above permits all of the advantages of the steam engine to be efficiently utilized while the operating cost is reduced.

In the special case of the application of the invention to railways it may be pointed out that it is possible to effect the simple transformation of locomotives by installing the group comprising the motor, compressor and the reservoir in the place of the tubular or other boiler. A boiler can be installed in any suitable space in the locomotive and since such boiler is only necessary to fill the closed cycle installation preparatory to starting and to replace the steam lost by leakage, a small capacity boiler will be sufficient.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:

1. A power plant comprising a closed-cycle installation adapted to have steam circulated therein, said installation including an engine driven by the steam, and a compressor; a prime mover independent of said closed-cycle installation and adapted to operate said compressor in order to replace the energy in the steam of the closed-cycle installation which was expended in driving the engine; and a boiler for said installation in order to supply steam thereto when necessary.

2. A power plant comprising a closed-cycle installation adapted to have steam circulated therein, said installation including an engine driven by the steam, and a compressor; an internal combustion engine independent of said closed-cycle installation and adapted to operate said compressor in order to replace the energy in the steam of the closed-cycle installation which was expended in driving the first-named engine; and a boiler for said installation in order to supply steam thereto when necessary.

3. A power plant comprising a closed-cycle installation adapted to have steam circulated therein, said installation including an engine driven by the steam, a high pressure reservoir, a low pressure reservoir, and a compressor, said reservoirs being in com-

munication in the installation in such a way that the path of the steam is from the steam engine to the low pressure reservoir, to the compressor, to the high pressure reservoir, and then to the steam engine; a prime mover independent of said closed-cycle installation and adapted to operate said compressor in order to replace the energy in the steam of the closed-cycle installation which was expended in driving the engine; and a boiler for said installation in order to supply steam thereto when necessary.

4. A power plant comprising a closed-cycle installation adapted to have steam circulated therein, said installation including an engine driven by the steam, a high pressure reservoir, a low pressure reservoir, and a compressor, said reservoirs being in communication in the installation in such a way that the path of the steam is from the steam engine to the low pressure reservoir, to the compressor, to the high pressure reservoir, and then to the steam engine; an internal combustion engine independent of said closed-cycle installation and adapted to operate said compressor in order to replace the energy in the steam of the closed-cycle installation which was expended in driving the first-named engine; and a boiler for said installation in order to supply steam thereto when necessary.

In testimony whereof I affix my signature.

SEVERINO CRISTIANI.