

H. F. STRUEVER.
ELECTRIC SUPERHEATER.
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1,317,401.

Fig. 1.

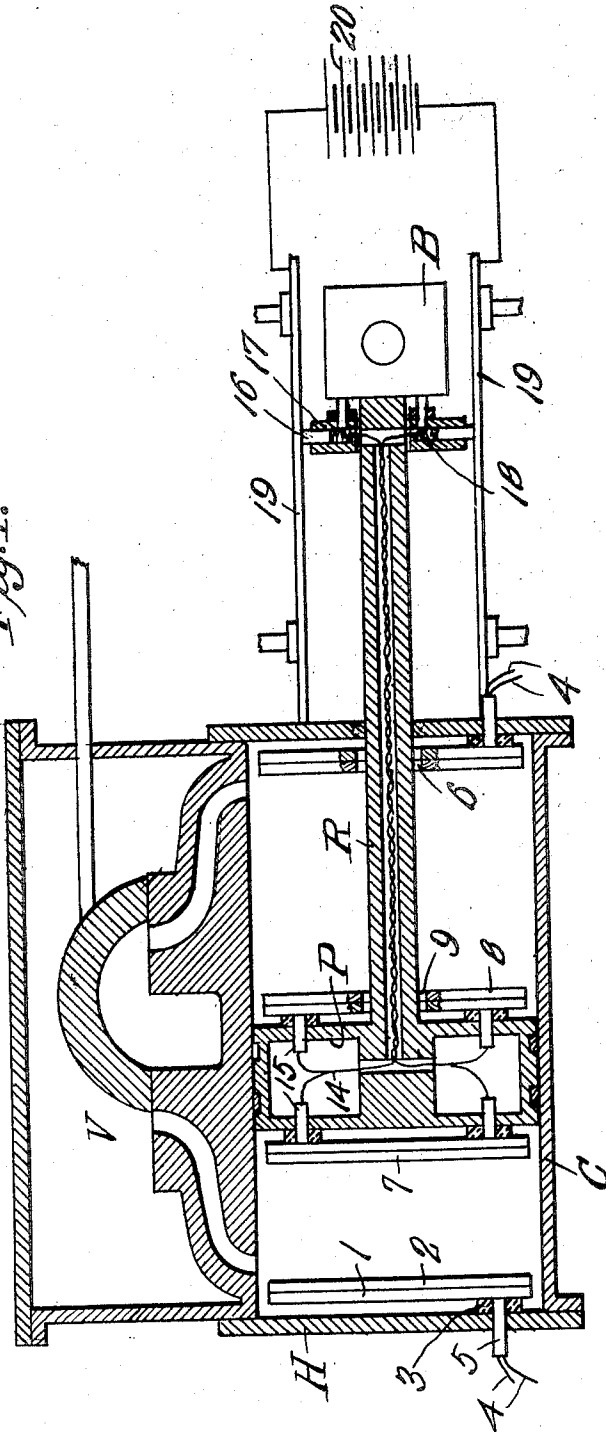
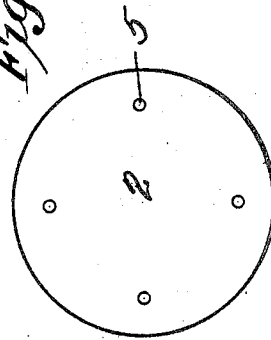


Fig. 2.



Witnesses

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ELECTRIC SUPERHEATER.

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To all whom it may concern:

Be it known that I, HENRY F. STRUEVER, a citizen of the United States, residing at Faulkton, in the county of Faulk and State of South Dakota, have invented certain new and useful Improvements in Electric Superheaters, of which the following is a specification.

This invention relates to heaters as applied to the treatment of steam, and more especially to superheaters for live steam; and the object of the same is to utilize an electric hot plate as a superheater for the steam entering a cylinder.

The idea broadly may be carried out in a number of ways, but preferably I apply hot plates to both faces of the piston, or to both ends of the cylinder, or both. Details are set forth below, and reference is made to the drawings wherein:—

Figure 1 is a sectional view through the cylinder and piston, both equipped with hot plates heated electrically, this view showing the wiring.

Fig. 2 is an elevation of one of the plates.

In Fig. 1 of the drawings I have shown a piston P reciprocating within a cylinder C, upon which is mounted the valve chest and valve V. The piston rod is indicated at R, and the letter B designates a bearing on the rod with which the pitman is connected as usual. The cross head is not shown. No novelty is claimed for any of these parts, and they may, in fact, be the parts of an engine of ordinary type, excepting that the piston rod R will have to be hollow as described below. When my invention is applied to an engine already in use, the heads H of the piston may be taken off and the hot plates described below mounted thereon, after which the heads may be replaced on the ends of the cylinder body with rings under them so as to slightly lengthen the cylinder. This is made necessary by the insertion of the hot plates which of course take up a little space. If these plates are applied to the ordinary piston P, that also would reduce the steam space at both ends of the cylinder, and the heads H would have to be adapted thereto. If the hot plates are used at both points, as shown in Fig. 1, possibly the heads would have to be set yet farther out from the body of the cylinder, and it may be that

another piston would have to be employed. However, all these details may be left to the manufacturer or to the engineer who applies the invention to an engine already in use.

Coming now to the details of my present invention, the numerals 1 and 2 are used to designate the two members of a hot plate, the same being well known in the arts as containing an electric resistance coil so that these plates become extremely hot when the current is turned on. The plates are fastened face to face with wires between them. Insulation is indicated at 3 and the feed wires are shown at 4 as passing through other insulation in the shape of pipes 5 which may be led through the insulation 3 and out through the head H of the cylinder and may serve as fastening means for the hot plates. There may be four such fastening devices as indicated in Fig. 2. At the right end of the cylinder shown at Fig. 1, a similar hot plate is mounted, differing only from that at the left end in that it has a central hole 6 for the passage of the piston rod R. Fig. 1 also shows a hot plate 7 at the left side of the piston, and a hot plate 8 at the right side of the same, this plate having a central hole 9 so that it may pass over the piston rod. The view shows four such plates mounted within a single cylinder. This may sometimes be resorted to, but ordinarily two hot plates within a cylinder are sufficient, disposed either against the heads or the opposite faces of the piston.

When the plates are carried by the piston, the feed wires 14 lead through the insulation fastening means 15 into the interior of the piston head itself, the same usually being hollow as shown, and are thence carried through the hollow piston rod R and connected respectively with brushes 16 carried in guides 17 on the rod and borne outward by springs 18 into electric contact with rails 19 which are connected with the poles of a source of electricity indicated at 20. Thus as the piston and its rod reciprocate the brushes 16 slide upon the rails 19 and the current is gathered up by them and delivered along the wires 14 to the hot plates 7 and 8 on the piston head.

In the application of my invention to an engine as shown in Fig. 1, live steam is entering from the valve V at the left. It

strikes the left end hot plate within the cylinder, and also the plate 7 on the piston P if one is there used, and is intensely heated. Thereby it is suddenly expanded, and its expansion acts to move the piston P to the right. Of course anything which increases the expansive force of the steam renders it less necessary to feed live steam to the cylinder, and thus a saving is effected. Moreover, the steam is more powerful on its expansion than on its impact, and thus the engine is increased in its effectiveness. Meanwhile the exhaust steam is driven out at the other end of the cylinder and may be led to a hot water heater or other point where its heat can be employed, rather than permitting it to go to waste. I speak of its heat because the exhaust steam is subject also to the hot plates at the other end of the cylinder, and therefore the steam exhausted by an engine built according to my invention is much hotter than otherwise would be the case. When the piston has completed its stroke to the right, the valve V changes its position, and on the return movement of the piston, the action is the same and the live steam is heated as well as the exhaust steam, as before. The use of insulating blocks 3 behind the pairs of hot plates and around the insulating fastening devices 5 permits the steam to flow completely around the plates so that it is thoroughly and quickly heated thereby. All wires must of course be properly insulated, and the lubricator employed in this engine must be such as to stand the highest fire test.

The foregoing description and the drawings have reference to what may be considered the preferred, or approved form of my invention. It is to be understood that I may make such changes in construction and arrangement and combination of parts, materials, dimensions, et cetera, as may prove expedient and fall within the scope of the appended claims.

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

1. An electric superheater for steam engines consisting of hot plates mounted on both faces of the engine piston, insulated means for supporting them therefrom, contacts connected to said plates, rails on which the contacts slide, and means for connecting said rails with a source of electricity.

2. An electric superheater for steam engines consisting of hot plates mounted on both faces of the engine piston, insulated means for supporting them therefrom, insulated wires leading from said plates, brushes on the rod to which said wires are connected, and tracks on which said brushes slide, the tracks being in communication with a source of electricity.

3. In a steam engine, the combination with the cylinder, a hollow piston, and a hollow piston rod; of a hot plate carried by and insulated from said piston, wires leading from said plate into the interior of the piston and thence throughout the length of the rod, brushes carried by said rod outside the cylinder, rails on which said brushes slide, and means for supplying an electric current to said rails.

4. An electric superheater for steam engines consisting of hot plates mounted on both faces of the engine piston, insulated means for supporting them therefrom, insulated wires leading from said plates throughout the length of the piston rod, and means for connecting said wires with a source of electricity.

5. An electric superheater for steam engines consisting of hot plates mounted on both faces of the engine piston, insulated means for supporting them therefrom, insulated wires leading from said plates throughout the length of the piston rod, brushes at the outer ends of said wires, and tracks on which said brushes slide, the tracks being in communication with a source of electricity.

6. In a steam engine, the combination with the cylinder, a hollow piston, and a hollow piston rod; of a pair of hot plates carried by and insulated from opposite faces of said piston, wires leading from said plates through the rod, guides carried by the rod, brushes slidably mounted in said guides and connected respectively with the feed wires, springs bearing said brushes normally outward, and rails upon which said brushes slide, the rails being connected with a source of electric energy.

7. In a steam engine, the combination with the cylinder, a hollow piston, and a hollow piston rod; of a pair of hot plates carried by and insulated from opposite faces of said piston, wires leading from said plates into the interior of the piston and thence throughout the length of the rod, and means for supplying an electric current to said wires.

8. In a steam engine, the combination with the cylinder, a hollow piston, and a hollow piston rod; of a pair of hot plates carried by and insulated from opposite faces of said piston, wires leading from said plates into the interior of the piston and thence throughout the length of the rod, brushes carried by said rod, rails on which said brushes slide, and means for supplying an electric current to said rails.

9. In a steam engine, the combination with the cylinder, the piston, and a hollow piston rod; of hot plates carried by and insulated from the heads of said cylinder, one of them having a central opening for the

passage of the rod, other hot plates carried
by and insulated from both faces of the
piston, one of them also having an opening
through which the rod passes, wires leading
5 from the plate on the piston throughout the
length of the rod and connected with a
source of electric energy, and means for
supplying electric energy to the other plates.

In testimony whereof I affix my signature
in presence of two witnesses.

HENRY F. STRUEVER.

Witnesses:

FRANK TURNER,
I. ALLEN CORNWELL.