No. 863,608. PATENTED AUG. 20, 1907.

J. McF. HORNER.

THERMOSTAT.

APPLICATION FILED MAR. 5, 1906.

Fig. 1.

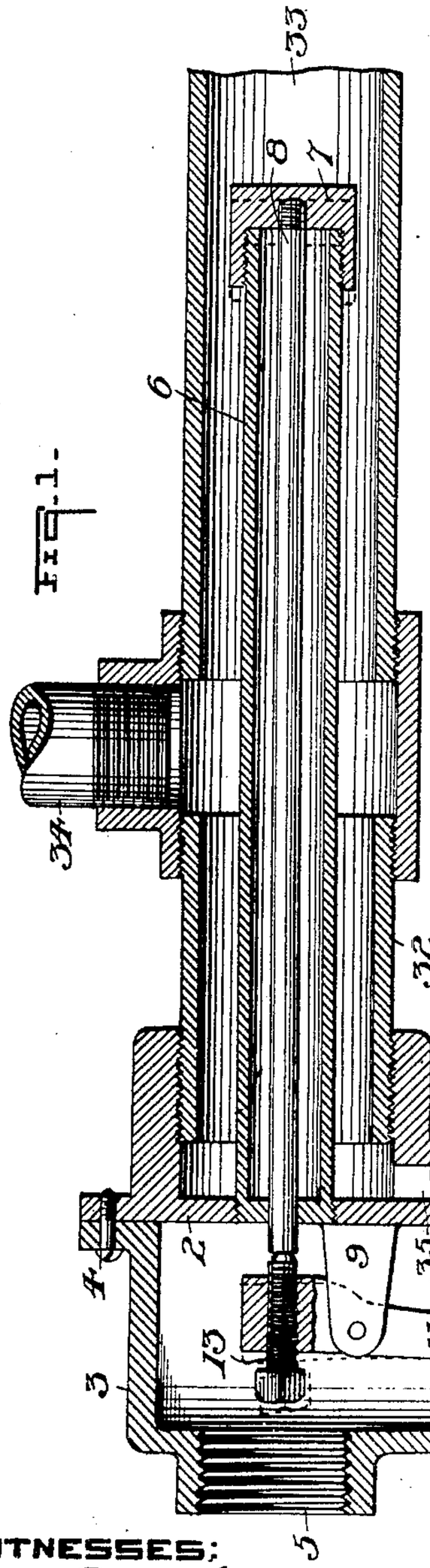


Fig. 2.

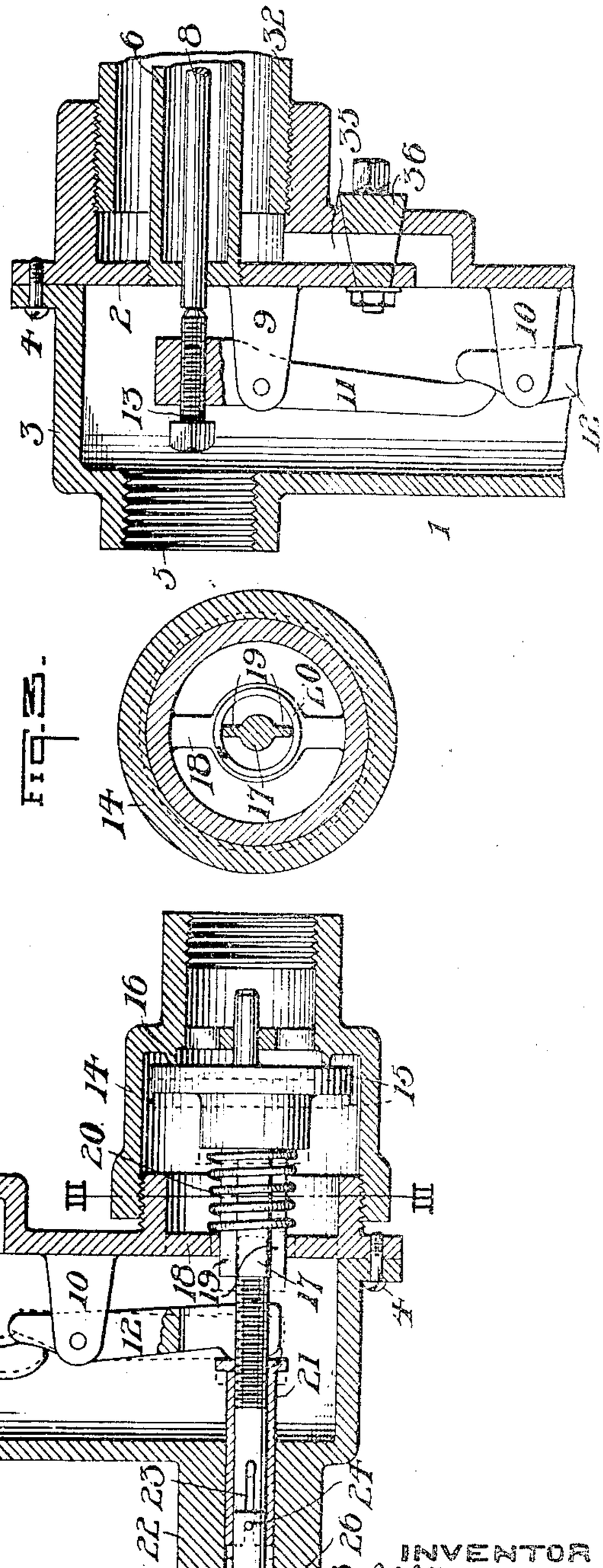
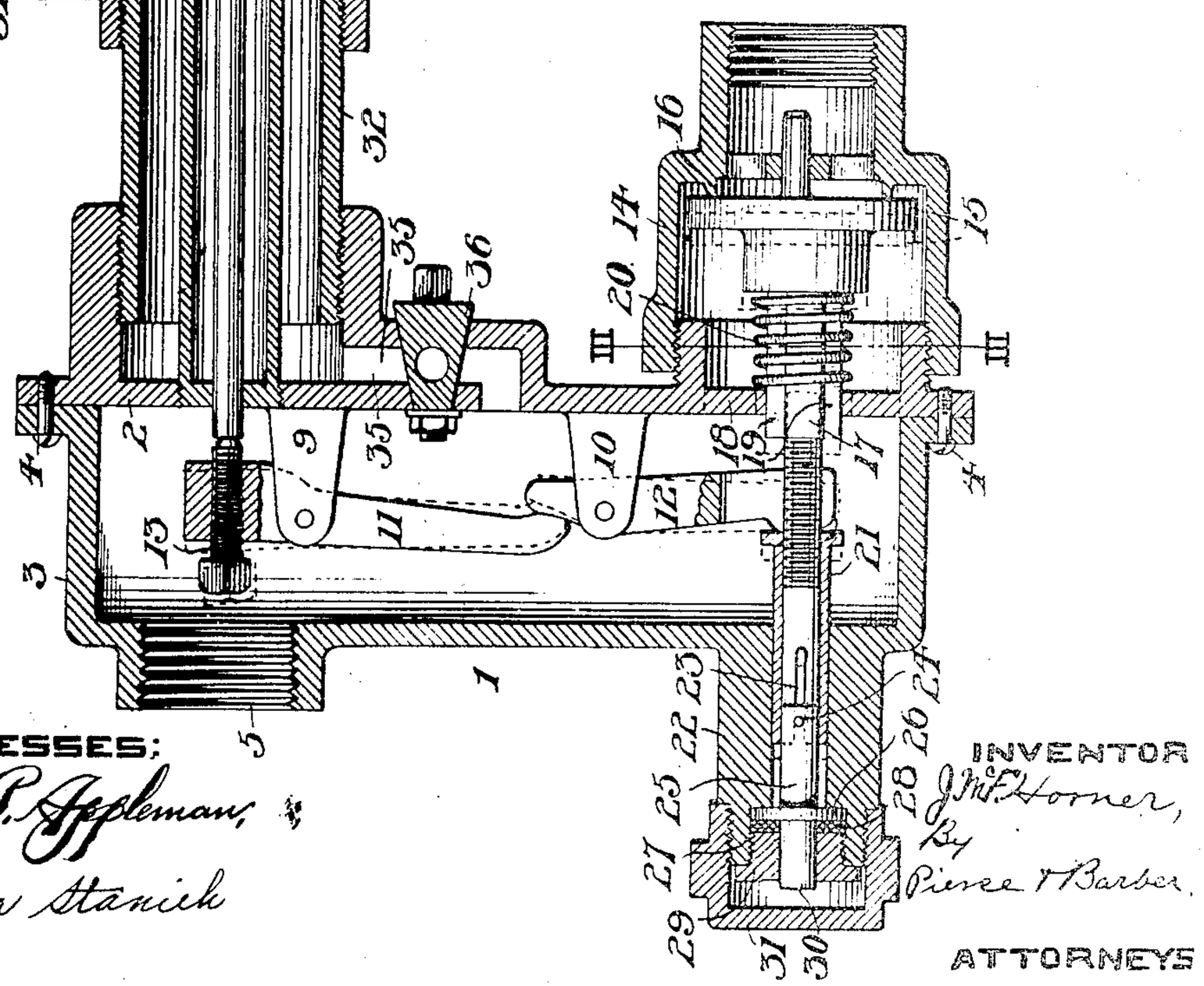


Fig. 3.



WITNESSES:

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THERMOSTAT.

No. 863,608. Specification of Letters Patent. Patented Aug. 20, 1907.

Application filed March 5, 1906. Serial No. 304,200.

To all whom it may concern:

Be it known that I, JOHN McF. HORNER, a citizen of the United States, residing at Glenfield, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Thermostats, of which the following is a specification.

My invention relates to thermostats and its object is to provide a thermostat of simple construction, compact arrangement, easy and complete adjustments, and small cost.

Another object thereof is to make a thermostat which may be constructed to serve as a gas regulator for water-heaters or as a steam trap for steam pipes or their equivalent, or which may be constructed to be convertible from one use to the other.

I do not restrict myself to the uses above or hereinafter stated or to the forms hereinafter described, as the principles of my invention may be variously embodied.

Other objects will appear hereinafter.

Referring to the drawings, Figure 1 is a central longitudinal section through a selected form of my invention, set to serve as a regulator of gas supply for heating water; Fig. 2, a similar view of a portion of Fig. 1, showing my invention set for use as a steam trap; and Fig. 3, a cross-section on line III—III of Fig. 1.

Referring to the drawings, 1 represents a box with the base 2 and body 3, secured together by the screws 4 or otherwise. The body 3 is provided with the gas outlet 5, preferably in line with the thermostatic tube 6 which is secured in the base 2. The tube 6 has its outer end closed, as by the cap 7, into the bottom of which is secured the brass rod 8, extending axially through the tube 6 and through the inner end of the same into the box 1, the rod 8 being packed or made otherwise to fit neatly in the inner end of the tube so as to permit its free or unobstructed reciprocation therein. The base 2 has inside the box 1 the two posts or lever supports 9 and 10, on which are pivoted the first-class levers 11 and 12 respectively, the short arm of the lever 11 being opposite the end of the rod 8 and its long arm coöperating with the short arm of the lever 12, as hereinafter described. The lever 11 has the adjusting screw 13 therein in line with the rod 8 and forming an adjustable connection between the said lever and rod. This screw being opposite the outlet 5 may be adjusted therethrough.

The base 2 of the box 1 has secured to its exterior the valve casing 14, in which the valve 15 adapted to the seat 16 is seated. The valve has its stem 17 extended into the box 1 through an opening in the cross-arm 18 across the inlet opening in the base 2. The valve stem is prevented from rotation by the wings 19 fitting corresponding slots in the arm 18. A spring 20 surrounds the stem 17 between the arm 18 and the valve 15 and tends to force the latter on or toward its seat 16. The valve-stem has its end within the box 1 threaded and provided with a collar 21 adjustable along the threads thereof. The long arm of the lever 12 is forked so as to straddle the valve-stem and engage with the end of the collar. The outer end of the collar is seated in the hollow extension 22 on the box-body 3 and is provided with longitudinal slots 23 (only one shown) in which are seated the ends of the cross-pin 24 in the rod 25. The rod 25 has thereon the fixed collar 26, seated at the inner end of the seat or cavity 27 in the outer end of the extension 22. The collar 26 is covered with the packing 28, which is compressed by the gland 29 to make the cavity 27 gas-tight. The outer end of the rod 25 is provided with the slot 30 or equivalent means for rotating it. A screw cap 31 is provided for the extension 22 and the outer end of the rod 25.

32 represents the pipe, reservoir, or other receptacle in which the tube 6 is seated. As shown 32 is a water conduit, such as is connected to a water reservoir and heater. The water enters, for example, at 33 and escapes through the pipe 34, after having passed along in contact with the tube 6. I may connect the interior of the pipe or reservoir 32 with the interior of the box as by the passage 35, placed as shown or elsewhere. I may place in said passage 35 the valve 36 which can open or close the passage. Where the thermostat is to be used solely for regulating the flow of gas, the passage 35 and valve 36 may be omitted; and where it is to be used solely for a steam trap, the valve 36 may be omitted.

In Fig. 1, the parts being as shown in full lines, when the water passing through the pipe 32 is sufficiently hot, the valve-rod 8 is retracted by the expansion of the tube 6, the spring holding the valve 15 against its seat 16 so that no gas passes, the gas being kept burning by the usual by-pass (not shown) in such a case, as in instantaneous heaters. If the water going through pipe 32 becomes too cool, it causes the tube 6 to contract. The shortened tube 6 pushes the rod 8 against the screw 13, causing the lever 11 to move the long arm of the lever 12 outwardly against the collar 21, which pulls the valve 15 from its seat allowing the gas to pass to the burner, through the box 1, the parts being as shown in dotted lines on Fig. 1. As the water becomes hotter in the pipe 32, the expansion of the tube 6 will gradually close the valve 15.

By removing the cap 31, I can raise or lower the collar 21 on the valve-stem 17, so that the valve may be open different distances. The screw 13 may also be turned to assist or make the required adjustment, but it is not so convenient as the rod 25, and will not be used ordinarily, except when necessary.

In case my invention is to be used with a burner which requires gas to pass the valve 15 all the time, the collar 21 or the screw 13, or both will be set so that the valve cannot close, no matter what degree of temperature the water has.

In Fig. 2, the valve 36 is shown open. In this case the pipe 32 is, for example, the end of a system of steam pipes and collects therein the water from the condensed steam. The opening 5 is not used or is not necessary and may be closed. What was the inlet for the gas becomes the outlet for the water which has collected behind the valve 15. The condensed water will cool the tube 6 and the valve 15 will be opened, allowing the water of condensation to escape. After the water escapes the steam or hot water in the pipe 32 will cause the valve to close, the principles of operation being the same as when the thermostat controls gas.

I claim—

1. The combination of a thermostatic tube, a valve, a lever mechanism operatively connected to said tube and said valve, a rotary sleeve independent of said tube, adjustable on the valve stem and controlling the movements of the valve by the lever mechanism, a chamber in which said lever mechanism is located and through which the fluid controlled by the valve flows, and a rotary non-traveling device connected to said sleeve and permitting the reciprocation thereof.

2. The combination of a thermostatic tube, a valve, a lever mechanism operatively connected to said tube and said valve, a rotary sleeve independent of said tube, adjustable on the valve stem and controlling the movements of the valve by the lever mechanism, a chamber in which said lever mechanism is located and through which the fluid controlled by the valve flows, a rotary non-traveling device connected to said sleeve and permitting the reciprocation thereof, and means for packing said rotary device so as to prevent the escape of fluid from said chamber.

3. The combination of a thermostatic tube, a valve, a lever mechanism operatively connected to said tube and said valve, a rotary sleeve independent of said tube, adjustable on the valve stem and controlling the movements of the valve by the lever mechanism, a chamber in which said lever mechanism is located and through which the fluid controlled by the valve flows, a rotary non-traveling device connected to said sleeve and permitting the reciprocation thereof, means for packing said rotary device so as to prevent the escape of fluid from said chamber, and a removable cap covering said rotary device.

4. The combination of a chamber having a gas inlet and outlet, a valve in said chamber, a second chamber having a liquid inlet and outlet, a thermostatic device in said second chamber, a lever connection between the valve and the thermostatic device, and means for connecting said chambers together and disconnecting them alternately, said means adapted to control alternately the flow of liquid from the second chamber through the first and the flow of gas through the first chamber only.

5. The combination of a thermostatic tube, a valve, and lever mechanism connecting the same, a casing inclosing said levers and forming a conduit for the fluid controlled by said valve, a rotary non-traveling device operable from the outside of said casing, and a nut adjustable on the valve stem and forming a connection between the valve stem and the lever-mechanism, the nut and said rotary device being connected so that the latter may rotate the former.

6. The combination of a chamber having a gas inlet and an outlet, a valve in said chamber, a second chamber having a liquid inlet and outlet, a thermostatic device in said second chamber, a lever connection between the valve and the thermostatic device, there being a communicating passage between said chambers, and a valve in said passage for closing the same when the thermostatic device is to control the flow of gas from the gas inlet past the valve and for opening the same when the thermostatic device is to control the flow of liquid from the second chamber past the valve.

Signed at Pittsburg, Pa., this 1st day of March 1906.

JOHN McF. HORNER.

Witnesses:

F. N. BARBER,

C. E. EGGERS.