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REGULATING APPARATUS FOR DRYING SHEETS OF PAPER, CLOTH, AND THE LIKE.

APPLICATION FILED OCT. 16, 1914.

1,167,029.

Patented Jan. 4, 1916.

2 SHEETS—SHEET 1.

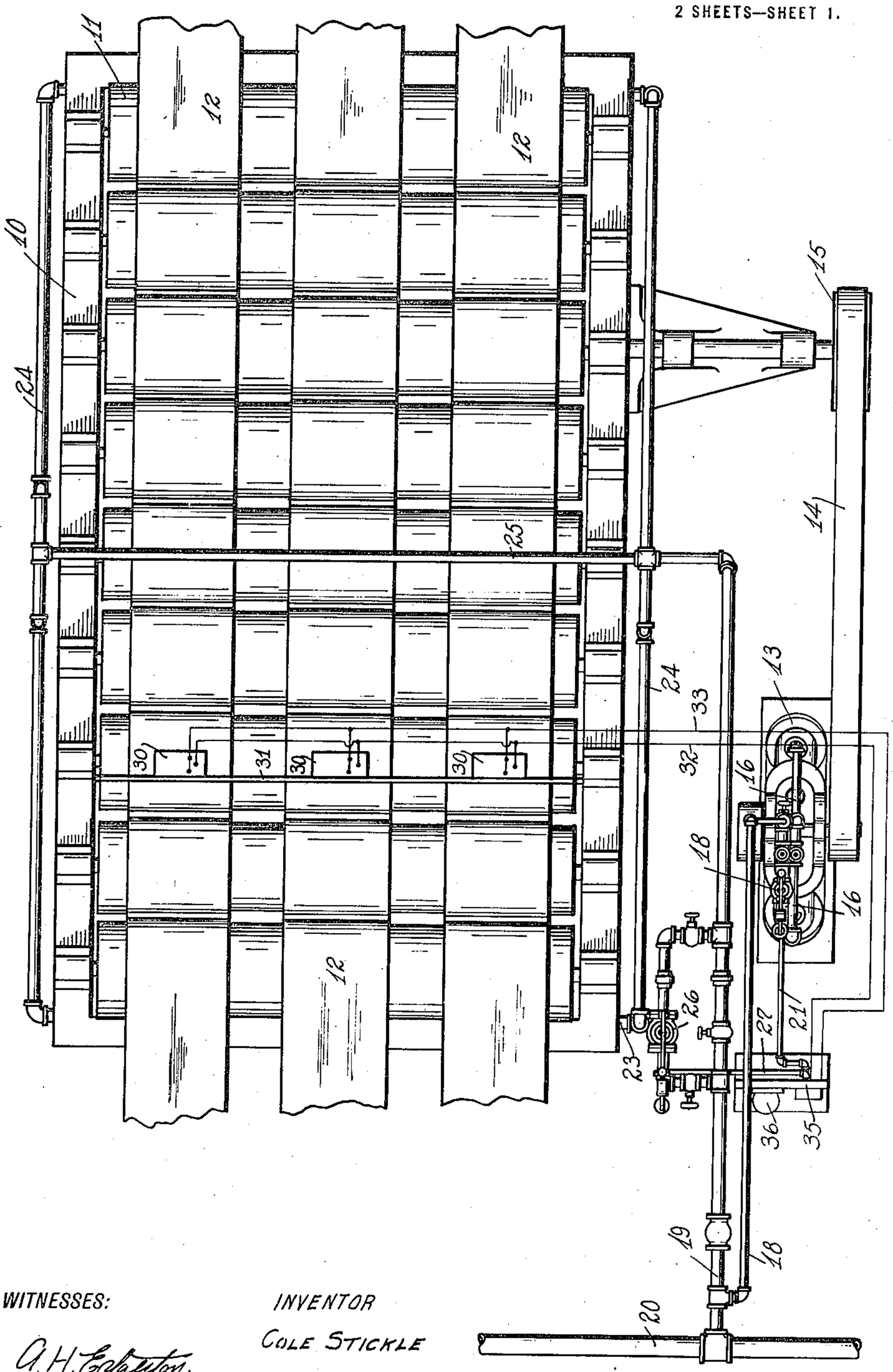

Fig. 1.

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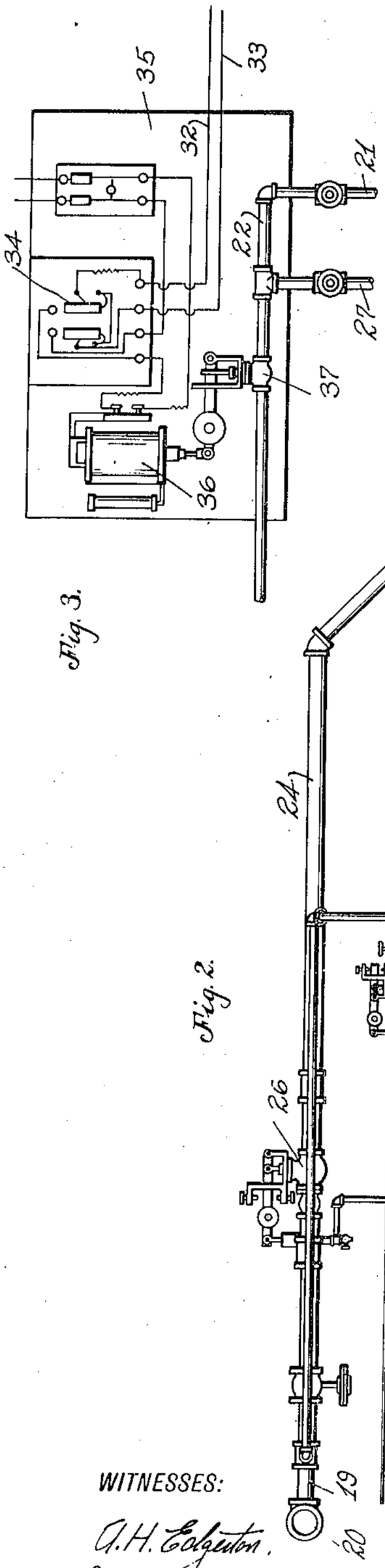

Fig. 3.

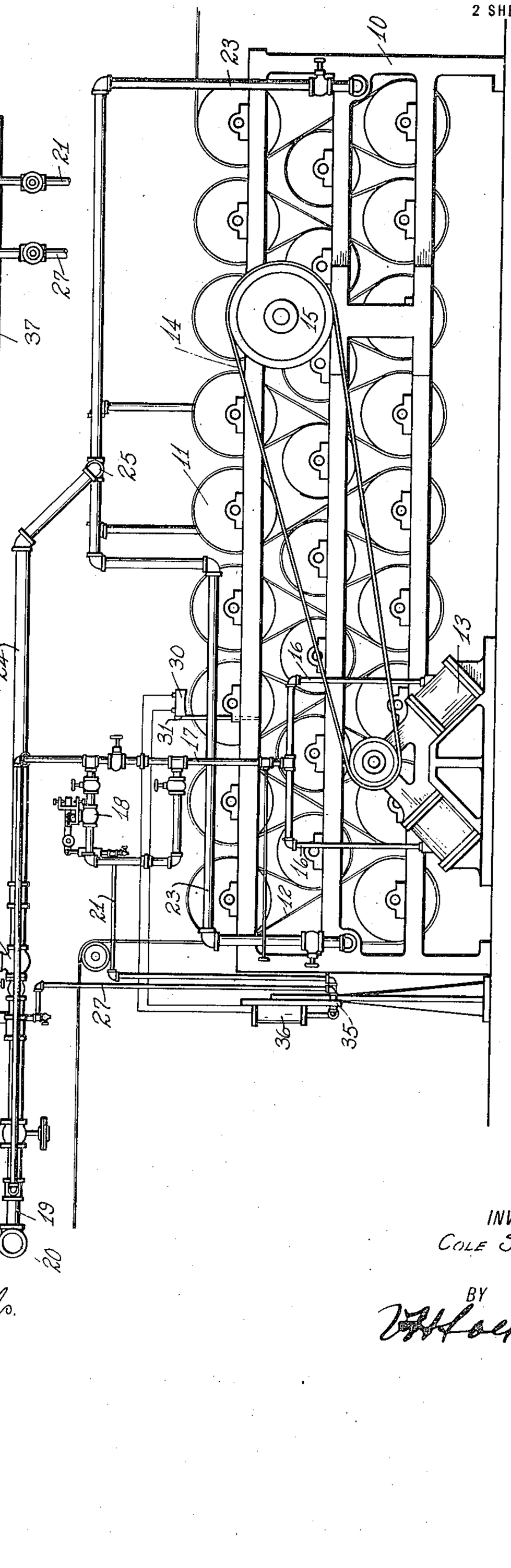

Fig. 2.

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REGULATING APPARATUS FOR DRYING SHEETS OF PAPER, CLOTH, AND THE LIKE.

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Application filed October 16, 1914. Serial No. 866,989.

To all whom it may concern:

Be it known that I, COLE STICKLE, a citizen of the United States, and a resident of Indianapolis, county of Marion, and State of Indiana, have invented a certain new and useful Regulating Apparatus for Drying Sheets of Paper, Cloth, and the like; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like letters refer to like parts.

The object of this invention is to improve the means for automatically controlling the steam pressure to the drying cylinders or the steam pressure for operating the engine for driving said cylinders, or both, in a machine arranged to treat a plurality of sheets of cloth, paper or the like, so that said control will be predetermined by the cool or moist areas in any of said sheets.

The tendency of the modern manufacturer of cloth, paper or the like is to increase the capacity of the machines and instead of passing one sheet through a machine, the tendency is to make the machine large enough to pass through it a number of sheets parallel with and independent of each other. While there is thus a plurality of sheets having surfaces in different conditions as to moisture, at the same time the steam supply for drying the sheets and for driving the drying cylinders is single. It is desirable that this single steam supply shall be regulated according to the moisture or temperature of the moist or most moist area of any sheet, as too little steam pressure in the drying cylinder or too rapid operation of the cylinders from too high steam pressure will cause the machine to do defective work by letting sheets pass through undried. On the other hand, there is no difficulty arising from making the sheet too dry, that is, having too much heat for drying or too slow a speed of the cylinders. The problem thus described has been solved by having thermostats, at least one adjacent each sheet of paper, cloth or the like, and the plurality of thermostats are wires in parallel and arranged to control the valve mechanism which will regulate the steam pressure for both heating and driving the cylinder. Thus said thermostats are located at points immediately over or adjacent the sheets of cloth, paper or the like, and preferably at points over or adjacent the drying cylinders or points where the moisture is likely to be thrown off and, therefore, which are the most essential points for control. Hence, the most moist or cool area in any one of the sheets of paper, cloth or the like, will actuate a thermostat and in reality regulate and predetermine both the drying temperature and the speed of the engine and cylinders. The drier or more heated areas of the sheets will produce no effect on the regulating apparatus. While there is the same steam pressure for supplying both the drying cylinder and the engine, suitable intermediate valves are provided for increasing the steam pressure to the drying cylinders and at the same time diminishing the steam pressure going to the engine and thus diminishing the speed of the cylinder. Two influences then cooperate in facilitating the drying, namely, the increase in drying temperature and decrease in the speed of the cylinder and sheet of paper, cloth or the like, so that the sheet remains longer on a drying cylinder and to that extent is more thoroughly dried.

The nature of the invention will be understood from the accompanying drawings and the following description and claims:

In the drawings, Figure 1 is a plan view of the machine. Fig. 2 is a side elevation. Fig. 3 is an elevation of the thermostatic control board.

There is a frame 10 carrying a number of drying cylinders 11 over which three sheets of cloth 12 are being passed for drying or otherwise treating the same. There is a steam engine 13 which through a belt 14 drives a pulley 15 which through means not illustrated drives the various drying cylinders 11. This means may be such as is well known in the art.

Steam is supplied to the engine 13 through a pair of pipes 16 leading from a single pipe 17 controlled by a reduction valve mechanism 18 arranged to reduce the steam pressure entering said pipe from any suitable steam supply. Pipe 18 leads from a pipe 19 and it from a header 20. The reduction valve 18 is controlled by water coming through a pipe 21 which leads from a high pressure water pipe 22, see Fig. 3.

The cylinders are heated by steam being introduced into them through pipes 23 leading from pipes 24 which are supplied through a transverse pipe 25 which extends from the pipe 19. The pipe 19 has a regulating valve 26 arranged so that it will regulate steam pressure coming to the pipe 19

from the steam header 20. This valve 26 is controlled by water under pressure in pipe 27 which leads from pipe 22, the same as pipe 21. The piping system may be such as desired, but the foregoing will explain the nature of the invention.

Three thermostats 30 are mounted immediately over one of the drying cylinders 11 and one of the thermostats immediately over each sheet of cloth, paper or the like, which passes over said cylinder, see Figs. 1 and 2. Said thermostats are carried by a bar 31 secured to the frame of the machine and all of said thermostats are connected with the lines 32 and 33 which run to an electrical mechanism 34 mounted on a control board 35 and arranged so as to operate a solenoid 36 and cause said solenoid to regulate a valve 37 in the high pressure water pipe 22.. The electrical mechanism 34 is well known in the art and need not be described in detail.

When any one of the thermostats 30 is influenced by a reduction in temperature of the sheet due to moisture in the sheet, it will operate the valve 37 and cause it to admit water through pipes 21 and 27 to the valves 18 and 26. The valve 18 will reduce the steam pressure going to the engine and thus reduce the speed of the engine and cylinders and cause the sheets to linger longer on the drying cylinders and thus become drier than they otherwise would have become if the cylinders had not been speeded up. At the same time the water going through pipe 27 to valve 26 will cause the valve to increase the supply of steam to the drying cylinders and, therefore, increase the temperature and cause them to give greater power in drying the sheets. When the sheets become dry, the engine is speeded up automatically and the drying pressure in the drying cylinders is automatically reduced. Thus the machine is automatic in its control of both the temperature of the drying cylinders and their speed and this automatic control is subject to the influence of the most moist area in all of the sheets.

When the series of sheets passing through the machine are of different degrees of moisture or temperature, the speed of the motor or device is reduced by the thermostat which is influenced by the coolest or most moist sheet passing through the machine and not by any of the warmer or less moist sheets passing through the machine simultaneously with said cooler or more moist sheet.

The invention claimed is:

1. The combination of a machine having steam supply apparatus for simultaneously drying a plurality of sheets of paper, cloth or the like, and means controlled by the temperature of each of said plurality of sheets for regulating the steam pressure in the drying apparatus.

2. The combination of a machine having a steam supply apparatus for simultaneously drying a plurality of sheets of paper, cloth or the like, a thermostat located adjacent each of said plurality of sheets, and means controlled by said thermostat for regulating the steam pressure in the drying apparatus.

3. The combination of a machine having steam supply apparatus for simultaneously drying a plurality of sheets of paper, cloth or the like, and means controlled by a plurality of thermostats located adjacent said sheets and in parallel, and means controlled by said thermostats for regulating the steam pressure in the drying apparatus.

4. The combination of a machine having steam supply apparatus for simultaneously drying a plurality of sheets of paper, cloth or the like, a thermostat located adjacent each of said plurality of sheets, and a single means controlled by all of said thermostats for regulating the steam pressure in the drying apparatus.

5. A machine for simultaneously drying a plurality of sheets of paper, cloth or the like including a frame, drying cylinders over which said plurality of sheets may pass, means for supplying steam to said drying cylinders, a thermostat secured to the frame over one of said drying cylinders and adjacent to each of said plurality of sheets as it passes over said cylinder, and means controlled by all of said thermostats for regulating the supply of steam to said cylinders.

6. The combination of a machine having rotatable drying cylinders for simultaneously drying a plurality of sheets of paper, cloth or the like, and means controlled by the temperature of each of said plurality of sheets for regulating the speed of said cylinders.

7. The combination of a machine having rotatable drying cylinders for simultaneously drying a plurality of sheets of paper, cloth or the like, a thermostat located adjacent each of said plurality of sheets, and means controlled by said thermostat for regulating the speed of said cylinders.

8. The combination of a machine having rotatable drying cylinders for simultaneously drying a plurality of sheets of paper, cloth or the like, a thermostat located adjacent each of said plurality of sheets, and means controlled by all of said thermostats for regulating the speed of said cylinders.

9. The combination of a machine having rotatable drying cylinders for simultaneously drying a plurality of sheets of paper, cloth or the like, a steam engine for driving said cylinders, and means controlled by the temperature of each of said plurality of sheets for regulating the steam supply to said engine.

10. The combination of a machine having rotatable drying cylinders for simultaneously drying a plurality of sheets of paper, cloth or the like, a steam engine for driving said cylinders, a thermostat located adjacent each of said plurality of sheets, and means controlled by said thermostat for controlling the supply of steam to said engine.

11. The combination of a machine having rotatable drying cylinders for simultaneously drying a plurality of sheets of paper, cloth or the like, a steam engine for driving said cylinders, a reduction valve for controlling the supply of steam to said engine, a thermostat located adjacent each of said plurality of sheets, and means controlled by said thermostat for controlling the operation of said valve.

12. The combination of a machine having rotatable drying cylinders for drying a sheet of paper, cloth or the like, means for supplying heat to said cylinders, means for driving said cylinders, and means controlled by the temperature of said sheet for regulating both said heating means and said driving means.

13. The combination of a machine having rotatable drying cylinders for drying a sheet of paper, cloth or the like, means for supplying heat to said cylinders, means for driving said cylinders, a thermostat located adjacent said sheet, and means controlled by said thermostat for regulating both said heating means and said driving means.

14. The combination of a machine having rotatable drying cylinders for simultaneously drying a plurality of sheets of paper, cloth or the like, means for supplying heat to said cylinders, means for driving said cylinders, and means controlled by the temperature of each of said sheets for regulating both said heating means and said driving means.

15. The combination of a machine having rotatable drying cylinders for simultaneously drying a plurality of sheets of paper, cloth or the like, means for supplying heat to said cylinders, means for driving said cylinders, a thermostat located adjacent each of said plurality of sheets, and means controlled by said thermostat for regulating both said heating means and said driving means.

16. The combination of a machine having rotatable drying cylinders for drying a sheet of paper, cloth or the like, means for supplying steam for heating said cylinders, a steam engine for driving said cylinders, a valve for regulating the steam pressure to said heating means, a valve for regulating the steam pressure to said engine, one of said valves being arranged to increase the steam pressure when the other valve decreases the steam pressure, a thermostat adjacent said sheet, and means controlled by said thermostat for controlling both of said valves.

17. The combination of a machine having rotatable drying cylinders for simultaneously drying a plurality of sheets of paper, cloth or the like, means for supplying steam for heating said cylinders, a steam engine for driving said cylinders, a valve for regulating the steam pressure to the engine, one of said valves being arranged to increase the steam pressure when the other valve decreases the steam pressure, a thermostat adjacent each of said plurality of sheets, and means controlled by said thermostat for controlling both of said valves.

18. The combination of a machine having rotatable drying cylinders for drying a sheet of paper, cloth or the like, means for supplying steam for heating said cylinders, a steam engine for driving said cylinders, a valve for regulating the steam pressure to said heating means, a valve for regulating the steam pressure to said engine, one of said valves being arranged to increase the steam pressure when the other valve decreases the steam pressure, means for supplying fluid under pressure to actuate both of said valves, a thermostat adjacent said sheet, and means controlled by said thermostat for controlling said fluid under pressure.

19. The combination of a machine having rotatable drying cylinders for simultaneously drying a plurality of sheets of paper, cloth or the like, means for supplying steam for heating said cylinders, a steam engine for driving said cylinders, a valve for regulating the steam pressure to said heating means, a valve for regulating the steam pressure to the engine, one of said valves being arranged to increase the steam pressure when the other valve decreases the steam pressure, means for supplying fluid under pressure for actuating said valves, a thermostat adjacent each of said plurality of sheets, and means controlled by said thermostat for regulating said fluid under pressure for actuating said valves.

In witness whereof, I have hereunto affixed my signature in the presence of the witnesses herein named.

COLE STICKLE.

Witnesses:
J. H. WELLS,
R. G. LOCKWOOD.