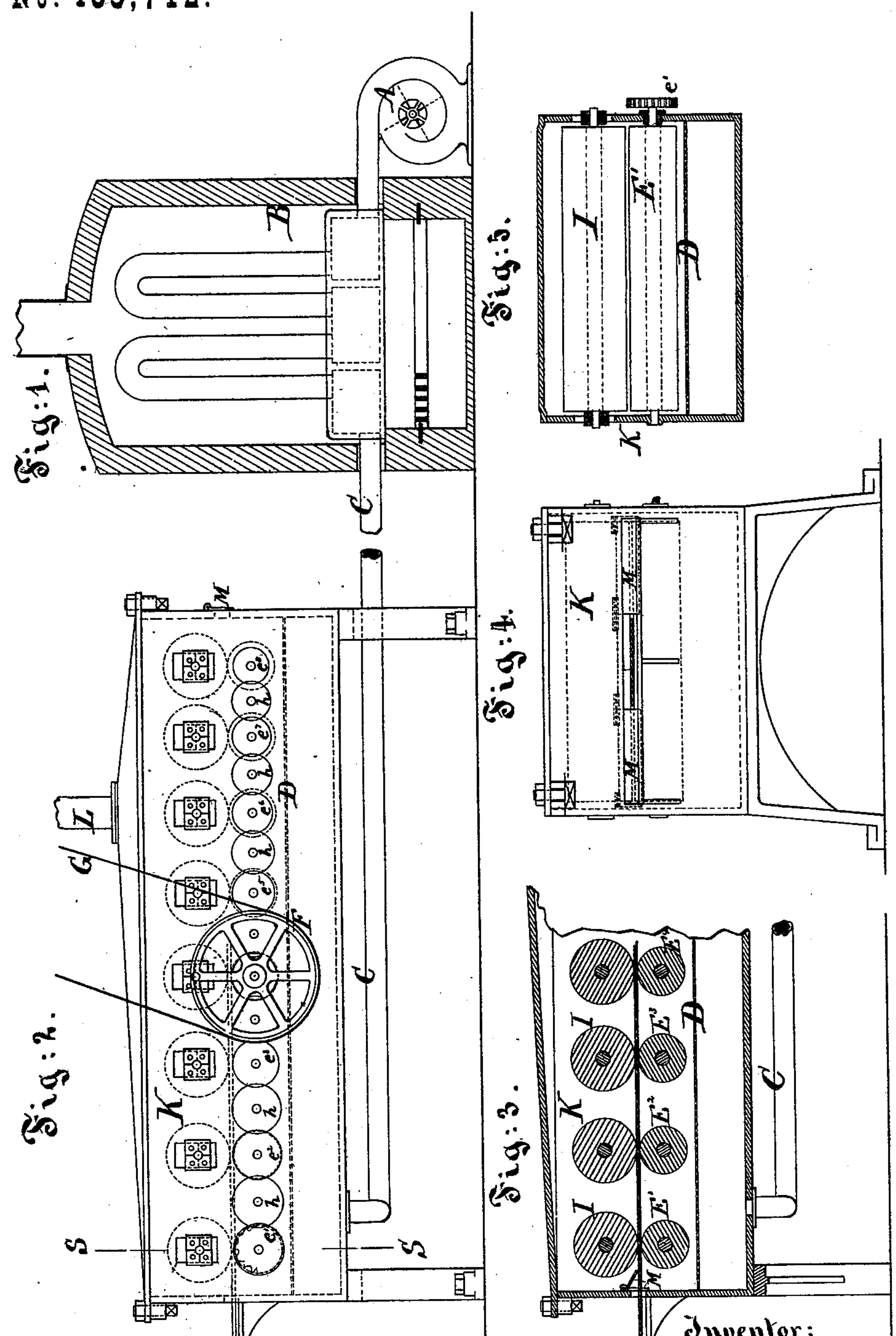
R. S. GILLESPIE.

STRAIGHTENING AND DRYING LUMBER.

No. 185,742. Patented Dec. 26, 1876.



Witnesses:

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RICHARD S. GILLESPIE, OF NEW YORK, N. Y.

IMPROVEMENT IN STRAIGHTENING AND DRYING LUMBER.

Specification forming part of Letters Patent No. **185,742**, dated December 26, 1876; application filed November 11, 1876.

To all whom it may concern:

Be it known that I, RICHARD S. GILLESPIE, of New York city, in the State of New York, have invented certain new and useful Improvements Relating to Straightening and Drying Lumber, of which the following is a specification:

Thin lumber is susceptible of being thoroughly dried by rapid treatment, but with great liability to curl. Great quantities of such lumber are required in the manufacture of cigar-boxes and analogous articles. I have devised an apparatus in which the wood is passed continuously through a series of metal rolls, which hold it rigidly straight while heated as highly as may be safely done, with provisions for conveying away the moisture which escapes.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a section through the blowing and air-heating means. Fig. 2 is a side elevation of the straightening machinery. Fig. 3 is a portion of the same in section. Fig. 4 is an end elevation of the same. Fig. 5 is a cross section on the line S S in Fig. 2.

Similar letters of reference indicate corresponding parts in all the figures.

A is a fan-blower, which forces the air in a liberal current through the several chambers in B, which is an air-heating stove or furnace capaple of raising the air to a temperature of—say, 400° Fahrenheit. The air thus uniformly and highly heated is conducted through a pipe, C, into a space below a perforated plate or horizontal partition, D, which causes the hot air to be distributed nearly uniformly among the rolls and upon the green lumber which is being treated.

E^1 E^2, &c., are a series of smooth iron rolls, preferably nickel-plated, cased in copper or otherwise very smoothly and durably coated with a non-oxidizable metal or material. Gear-wheels e^1 e^2, &c., are fixed on the overhanging ends of these rollers. Intermediate gear-wheels *h*, mounted on fixed studs, communicate the motion from one to another. One of the main rolls carries a pulley, F, which receives motion through a belt, G, from a steam-engine or other convenient power.

The gear-wheels e^1 e^2 e^3, &c., are not uniform in size, the last of the series being smaller than the first, and inducing a more rapid rotation of their rolls. All the rolls E^1 E^2, &c., run in rigidly-supported bearings arranged in a right line.

Heavy top-rolls I are mounted above, each bearing on one of the rolls E^1 E^2, &c. The trunnions or prolonged axes of these heavy rolls I are held in slots in the framing or housing K, with freedom to rise and sink, as will be obvious.

The whole set of rolls is inclosed within a box, K, the top of which is inclined, as shown, and communicates with a flue, L, which may lead away to the chimney, or may, if preferred in any instance, communicate around, and after passing the air in contact with some desiccating material may lead out again to the fan A.

A low but wide orifice is provided at each end of the case K at the proper level, one to receive the thin lumber to pass the rolls and the other to allow its discharge. Each is guarded by a hinged door, M, which closes by gravity, and is made sectional, three sections being represented, but the number may be increased at will. When narrow pieces of lumber are introduced they open only the central section or sections. When wider pieces are passed in they open the whole.

The air received by the fan A may be previously subjected to contact with desiccating materials and deprived of most of its moisture even when cold fresh air is received. This is more important when the whole or any portion of the air is passed around more than once.

The hot and dry air is distributed by the perforated plate D and caused to rise gently and quite uniformly. It keeps all the rollers at a high temperature, and also acts directly on the lumber in its passage between them.

Successive increase in the velocity of the pairs of rolls induces each piece of lumber to move away from its successor and leave a considerable space between, through which the hot air rises freely. It rises, also, freely past each side or edge of the lumber.

The size of the rolls and their distances apart should be so graduated to the probable lengths of the pieces of lumber to be treated that each piece shall be subjected to the action of more than one pair of rolls at the same time. The differences in the velocities of the rolls will compel one or both to slip. This slipping polishes the lower surface.

In cases where the expense will be warranted, a fan or other blowing-machine may be mounted as an exhaust, in connection with the flue or escape L. In such case the speed of the blowing-fan and of the exhausting-fan should be so graduated that the air will be neither forced out or drawn in through the openings which admit and discharge the lumber. The slots which guide the upper rollers need not be made to extend through the outer case or box K. They may be in an inside framing.

Provisions may be made for making increased pressure on the rollers, or for holding up one or all the top rolls to the height required by the thickness of the lumber. Steam may be introduced in the interiors of one or both sets of rolls; but I propose, in most instances, to maintain a temperature higher than that of ordinary steam. Superheated steam may be introduced in the rolls, and also may be mingled with the air passed through the apparatus. With proper precautions in regard to fire, a portion, or the whole, of the gaseous products of combustion from the stove B may be mingled with the air passing through the apparatus.

I esteem it of great importance that the air-heating furnace and its accessories shall be in another apartment or in another building, from that in which great quantities of the thin and thoroughly dried lumber are being handled.

The apparatus should be sufficiently long, and the traverse of the lumber through it should be sufficiently slow, to allow the material to be thoroughly dried. In some cases, however, the material may, after passing once through, and while it still remains heated, be carried around and passed through the machine a second time.

The liability of all thin lumber to curl or warp in drying is familiar to every observer. This is peculiarly felt with some kinds of lumber which might otherwise be made very useful. Some modes of manufacturing the thin shapes tend to leave it strongly curled. I prefer to take the lumber very fresh from the saw or from the cutting instrument. In cases where the wood is steamed at some stage of its manufacture, it should be passed into my apparatus in its fresh and steamy condition.

The wood issues from my exit-doors absolutely straight. The increased pressure, when desired, on the top rolls, may be applied by springs with wedge or screw adjustments, or, preferably, by weighted levers. Means may be provided for increasing the pressure on the whole at once.

I claim as my invention—

1. The method described of straightening and drying lumber, by passing it between a series of hot metal rollers in a bath of hot air or gas, as herein specified.

2. The method described of simultaneously straightening, drying, and polishing lumber, by passing it between a series of hot rollers in a bath of hot air or gas, with the rollers slipping on one of its surfaces, as specified.

3. The drying and straightening apparatus, composed of the blowing means A, air-heating means B, passage C, rollers E I, combined in a long series, and casing K, all arranged and serving, in combination, to traverse, hold, heat, and dry the lumber, as herein specified.

4. The door M, in combination with the casing K, rollers E I, air-distributer D, air-heater B, and blower A, as and for the purposes herein specified.

In testimony whereof I have hereunto set my hand this 10th day of November, 1876, in the presence of two subscribing witnesses.

RICH. S. GILLESPIE.

Witnesses:

THOMAS D. STETSON,

CHARLES C. STETSON.