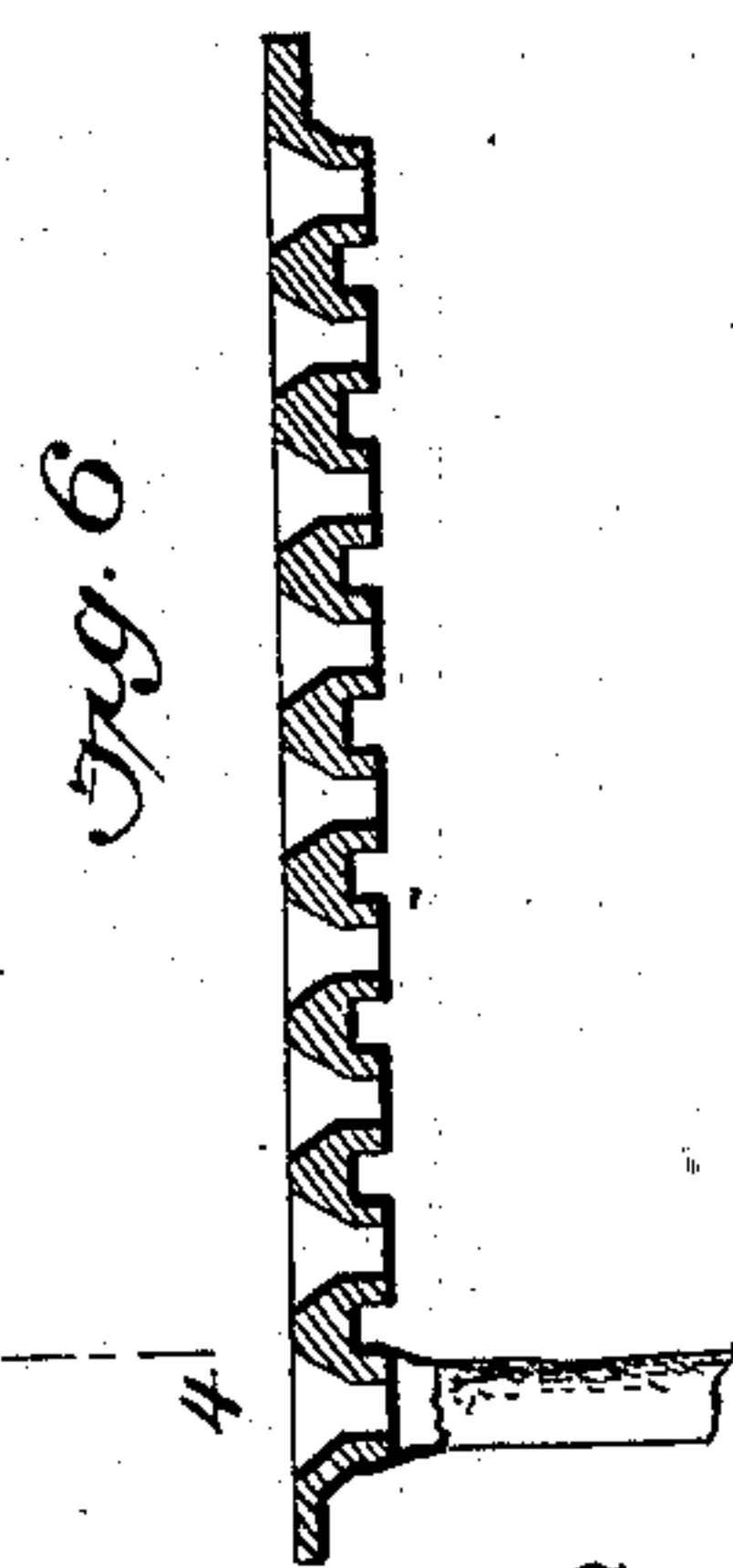
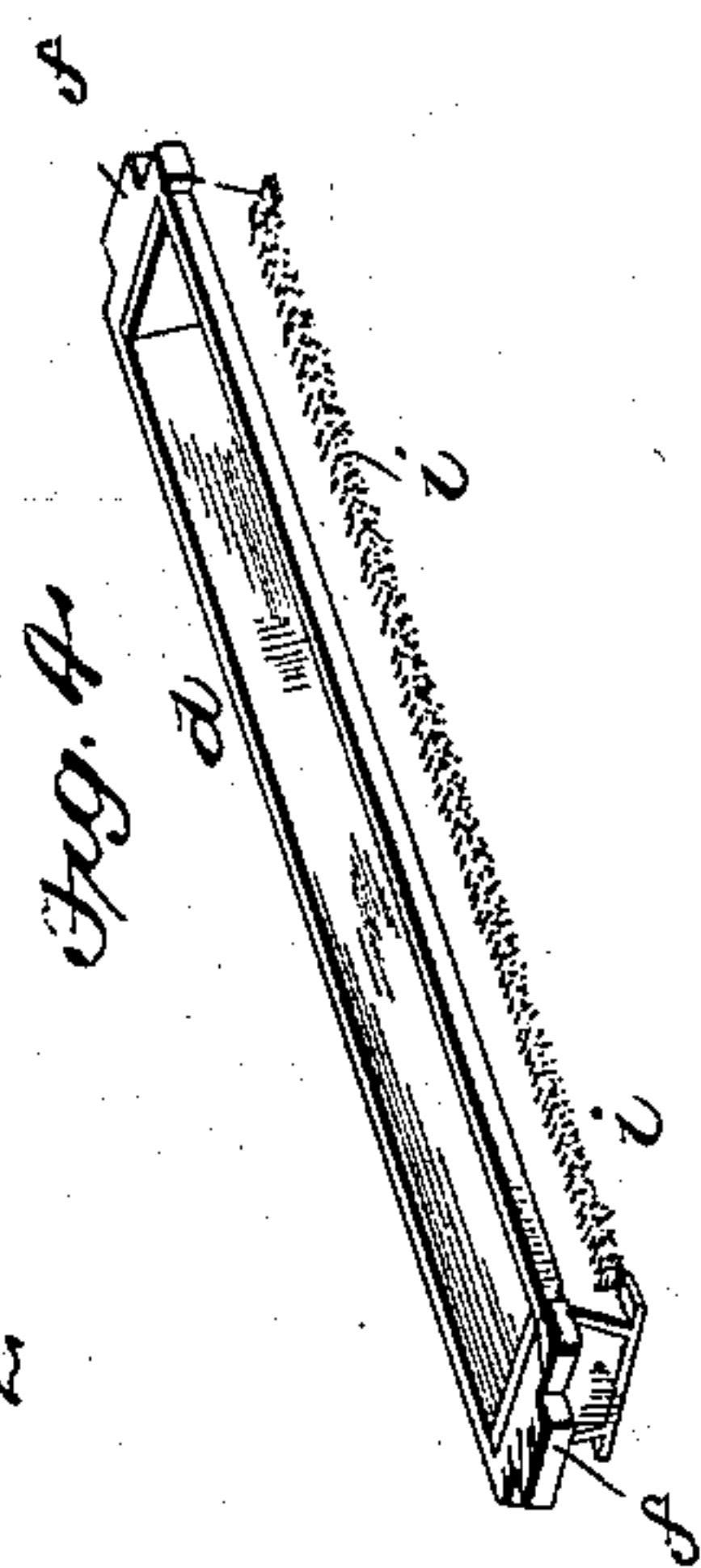
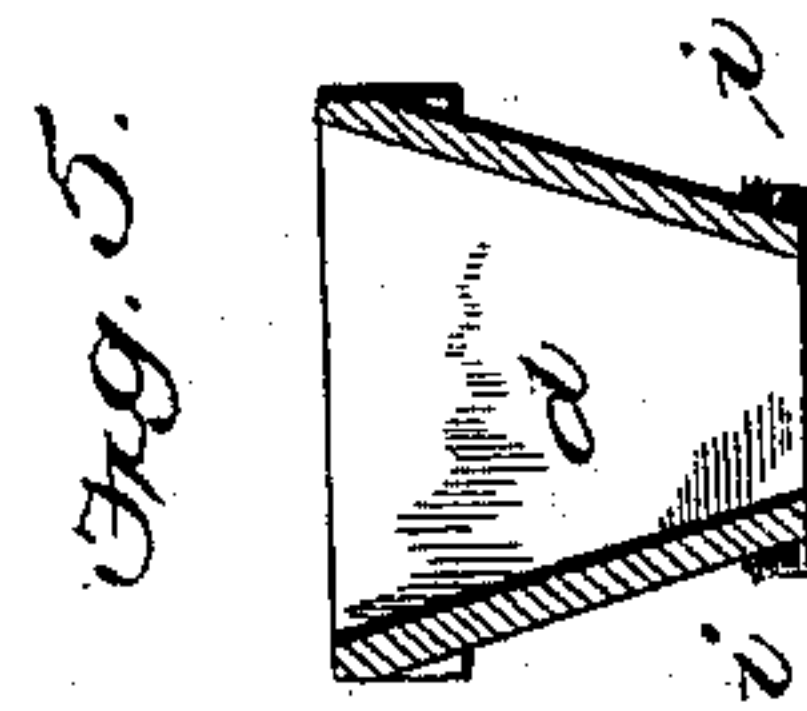
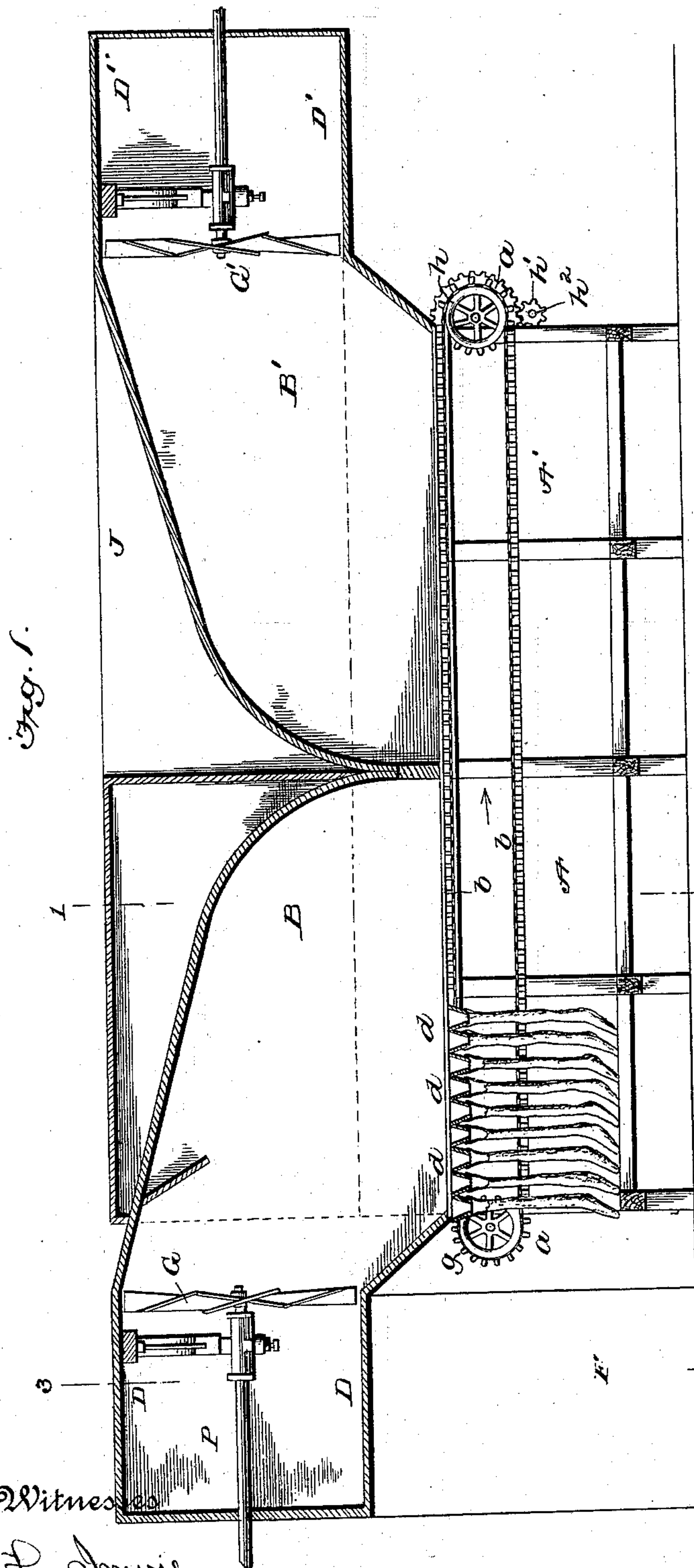


O. DUCKWORTH.
APPARATUS FOR OXIDIZING STOCKINGS.

No. 578,866.

Patented Mar. 16, 1897.



Witnesses
John J. Innis
R. H. Bishop.

Inventor
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Attorney

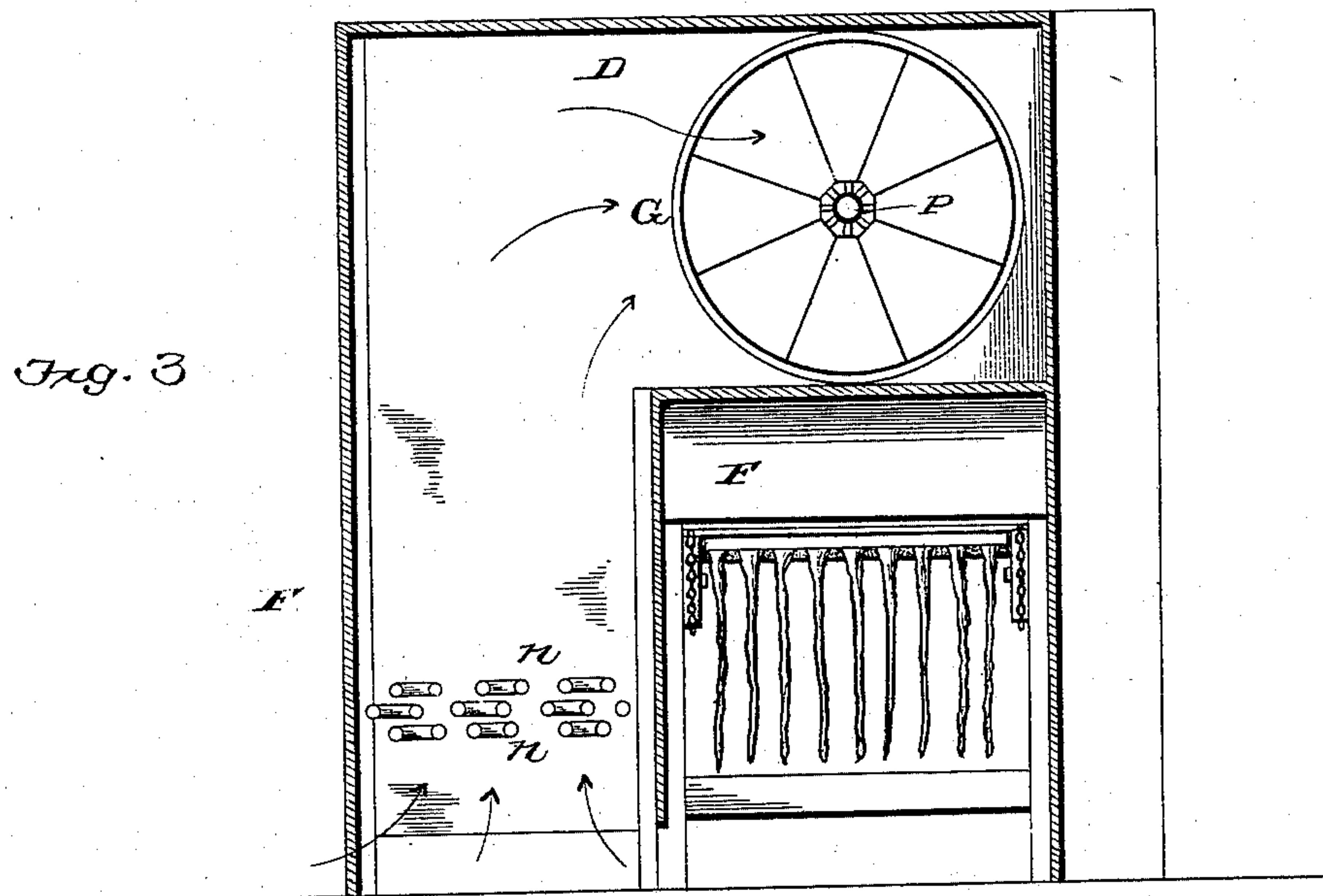
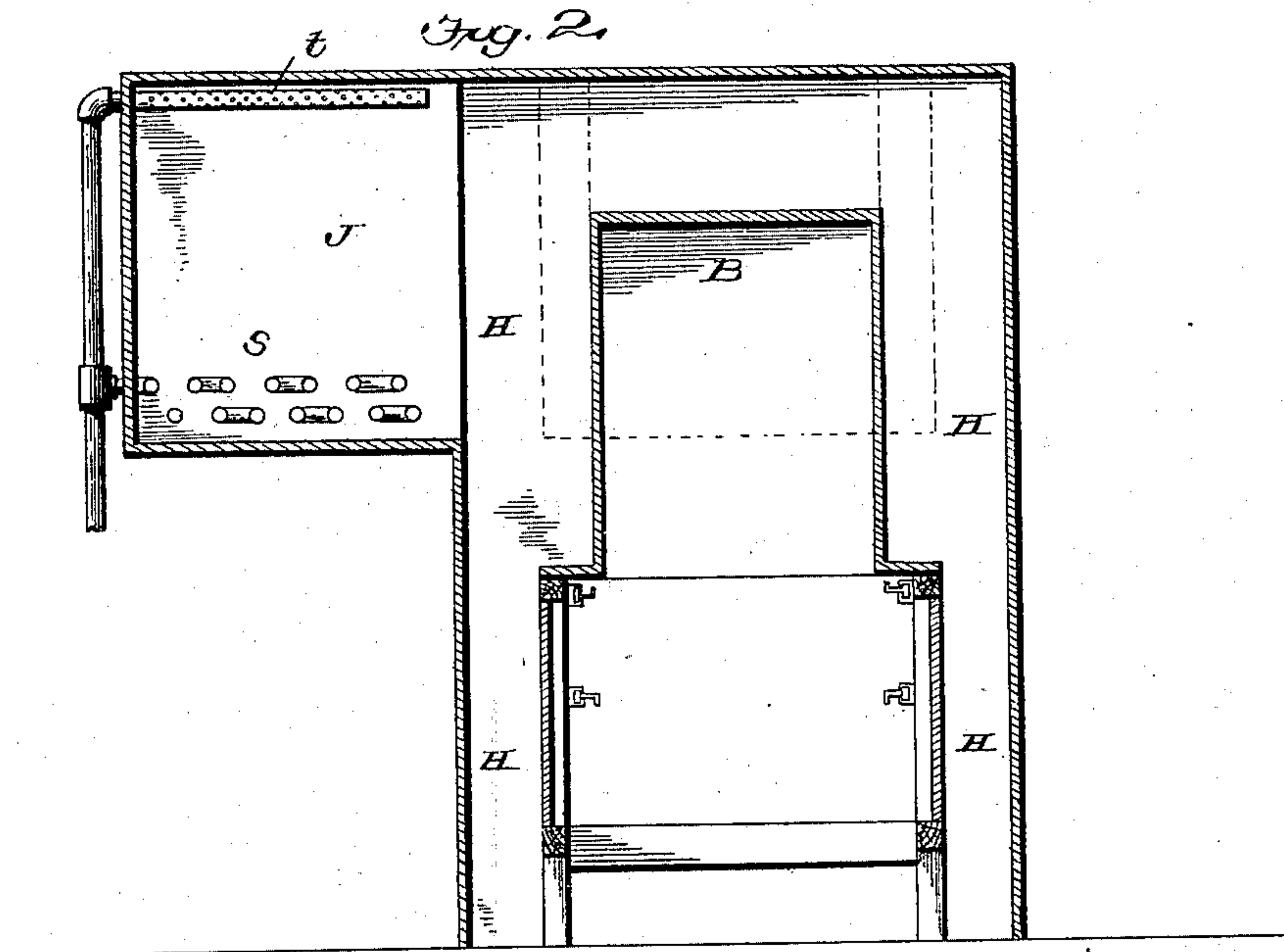
(No Model.)

2 Sheets—Sheet 2

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UNITED STATES PATENT OFFICE.

ORMEROD DUCKWORTH, OF NORRISTOWN, PENNSYLVANIA, ASSIGNOR
TO THE LAWRENCE MANUFACTURING COMPANY, OF LOWELL,
MASSACHUSETTS.

APPARATUS FOR OXIDIZING STOCKINGS.

SPECIFICATION forming part of Letters Patent No. 578,866, dated March 16, 1897.

Application filed February 16, 1893. Serial No. 462,620. (No model.)

To all whom it may concern:

Be it known that I, ORMEROD DUCKWORTH, of Norristown, county of Montgomery, and State of Pennsylvania, have invented a certain new and useful Improvement in Apparatus for Drying and Oxidizing Stockings; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification.

My invention has relation to stocking drying and oxidizing; and it consists in the apparatus hereinafter particularly described and claimed.

One object of my invention is to provide for rapidly and effectively drying or oxidizing stockings after the dyeing operation, a further object being to effect both the drying and oxidizing of the stockings without re-handling of the same.

In the accompanying drawings, Figure 1 is a longitudinal section of a machine for drying and oxidizing stockings in accordance with my invention. Fig. 2 is a transverse section on the line 1 2, Fig. 1. Fig. 3 is a transverse section on the line 3 4, Fig. 1. Fig. 4 is a perspective view of one of the stocking-carrying bars of the machine. Fig. 5 is an enlarged transverse section of said bar, and Fig. 6 is a longitudinal section of another form of such bar.

When stockings are dyed with the anilin colors now generally employed, it is a common practice to first dry the stockings and then oxidize them by subjecting them to heat in a moist atmosphere, and in Fig. 1 of the drawings I have shown a compound or duplex machine constructed for effecting both of the objects in accordance with my invention; but it should be understood that my invention is not limited to both drying and oxidizing, but covers either of these operations separately performed.

In Fig. 1 A A' represent a casing open at the ends; or in place of the casing there may be a simple framework having at its opposite ends bearings for the spindles or sprocket-wheels *a*, carrying opposite endless chains *b*, upon which are mounted the stocking-carry-

ing bars *d*, each of said bars *d* having at each end a projecting tenon *f*, Fig. 4, which fits between projecting lugs or pins *g* on the corresponding chain, so that the bars will not only be supported by the chains, but will be carried forward by the same, motion being imparted to the chains in any suitable manner, as, for instance, by spur-gearing *h h'*, whereby the shaft of the sprocket-wheel at one end of each chain is rotated from a suitable driving shaft or spindle *h²* at that end of the same.

Each of the carrying-bars *d* is of hollow or trough-like form, and each side of said carrying-bars is provided with projecting teeth or pins *i* for engaging with the upper portions or mouths of the stockings, which are stretched across the bar from side to side, so as to distend the mouths, a row of stockings being carried by each bar and extending from end to end of the same.

For the purpose of forming the projecting holding pins or teeth *i*, I prefer to use at each side of the bar *d* a strip of card-clothing, as shown in Fig. 4 and also in Fig. 5; but, if desired, the bar may be formed with a series of short tubes or nozzles *m*, as shown, for instance, in Fig. 6, the mouth of a stocking being applied to each nozzle and held thereon by like pins or teeth.

Above the portion A of the casing is a hood or casing B, inclosing a chamber which communicates with a lateral flue D, Fig. 3, the latter communicating with a vertical stack F, in the lower portion of which is a steam-coil *n*.

In the mouth of the hood B is a rotary fan G, carried by a shaft *p*, extending through the flue-casing D, and when this fan is rotated in the proper direction air is drawn in at the bottom of the stack F, as shown by the arrows in Fig. 3, and is heated by contact with the steam-pipes *n*, the air then passing through the lateral flue D and being forced by the fan into the hood B, from which it escapes downwardly into the portion A of the casing through which the stocking-carrying bars are traveling.

As the mouth of each stocking is distended the air enters the same, fills the stocking, and

escapes through the meshes or pores of the fabric, so that the rapid and thorough drying of said fabric is effected.

The bars *d* are, as will be seen on reference to Fig. 5, preferably wider in cross-section at the top than at the bottom, so that the upper portions of successive bars may be in close contact to prevent leakage of air between the bars, and thus cause the entire volume of air to pass through the bars and into the stockings.

The air, carrying with it the moisture taken up during its passage through the stockings in the portion A of the casing, is withdrawn from the bottom of said portion of the casing through opposite side flues H and is delivered thereby, either directly or over the top of the hood B, into a longitudinal flue J, which in turn delivers into a transverse flue D', from which the air is withdrawn by a fan G' and is forced through a hood B' down into the portion A' of the casing, so as to pass through the stockings which may be traversing said portion A' of the casing after having passed through the portion A of the same.

The air which is withdrawn from the portion A of the casing is further heated in the flue J by means of steam-pipes *s* and is further moistened by means of steam from a perforated pipe *t*, so that when it is delivered from the hood B' it is in proper condition for exercising the desired oxidizing effect upon the stockings.

Owing to the fact that the air is forced through the meshes or pores of the fabric of which the stockings are made, said stockings are dried more rapidly and thoroughly than when stretched upon boards in the usual way, and the air may be at a comparatively low temperature, so that the rotting or weakening of the fibers, due to high temperature, is prevented. In fact, the drying of stockings in my improved machine can, if desired, be effected by means of cold air, although the process is facilitated if the air is heated.

Instead of movable carriers for the bars *d* said carriers may be simply in the nature of supports along which the series of bars is pushed as fresh bars are added at the receiving end of the machine.

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

1. The within-described carrier for a stocking drying or oxidizing machine, said carrier consisting of an open-bottomed trough-like bar provided with means for retaining the stockings with their upper ends distended so as to receive air which passes through the bar, substantially as specified.

2. The within-described carrying-bar for a stocking drying or oxidizing machine, said carrier consisting of an open-bottomed trough-like bar having toothed strips on opposite

sides of the same, substantially as specified.

3. The within-described carrying-bar for a stocking drying or oxidizing machine, said carrier consisting of an open-bottomed trough-like bar, wider in cross-section at the top than at the bottom, and having near the bottom means for retaining the stockings with their upper ends distended, substantially as specified.

4. A stocking drying or oxidizing machine in which open-bottomed bars, provided with means for retaining the stockings with their upper ends distended, are combined with a carrier for said bars, a hood or casing above said carrier, and means for causing a flow of air through said hood and into and through the bars and the stockings thereon, substantially as specified.

5. The combination in a stocking drying or oxidizing machine, of a series of bars provided with means for suspending the stockings with their upper ends distended, a carrier for said bars, a casing having a hood above the carrier, a lateral flue, a vertical stack communicating therewith, and a fan between the lateral flue and the hood, substantially as specified.

6. The combination in a combined stocking drying and oxidizing machine, of a series of stocking-holding bars, a carrier therefor, a duplex casing, and air flues and circulating devices whereby the air which is brought into contact with the stockings in drying the same is again brought into contact with the stockings at a further point in their travel, substantially as specified.

7. The combination in a combined stocking drying or oxidizing machine, of a series of stocking-holders, a carrier therefor, a duplex casing, air flues and circulating devices whereby the air which is brought into contact with the stockings in drying the same is collected and again brought into contact with the stockings, and means for heating the air in its passage from one part of the machine to the other, substantially as specified.

8. The combination in a combined stocking drying and oxidizing machine, of a series of stocking-holders, a carrier therefor, a duplex casing, air flues and circulating devices whereby the air which comes into contact with the stockings in drying the same is collected and again brought into contact with the stockings, and means for moistening the air in its passage from one part of the machine to the other, substantially as specified.

In witness whereof I have hereunto set my hand this 14th day of February, A. D. 1893.

ORMEROD DUCKWORTH.

Witnesses:

F. EARLE VON LEER,
HORACE PETTIT.