(No Model.)

J. E. HINDS.

Machine for Drying Moist or Varnished Sheets.

No. 239,164. Patented March 22, 1881.

FIG. 1.

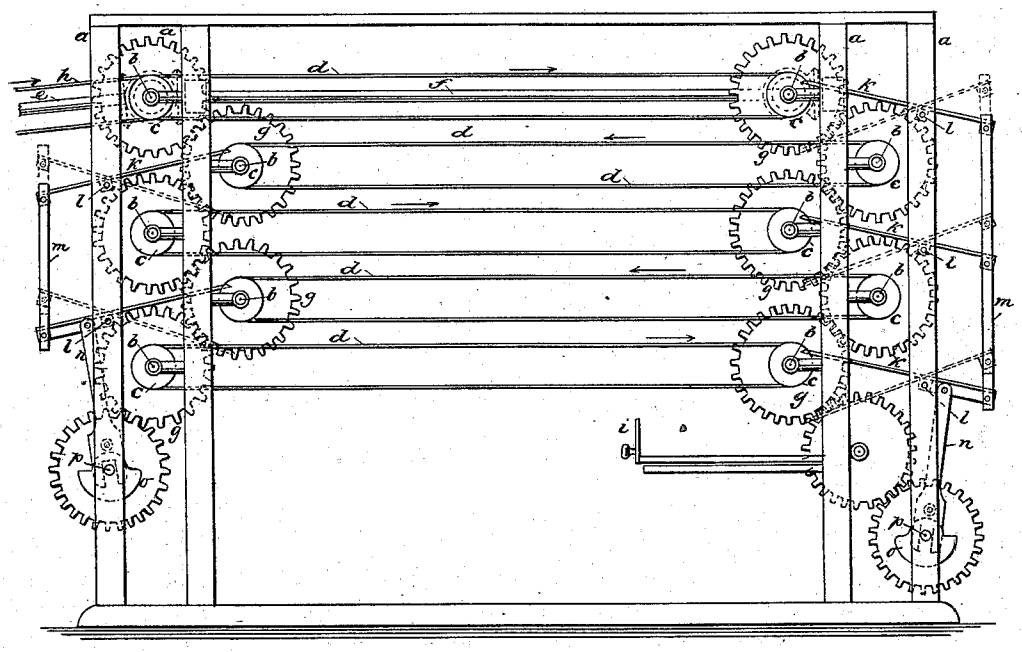
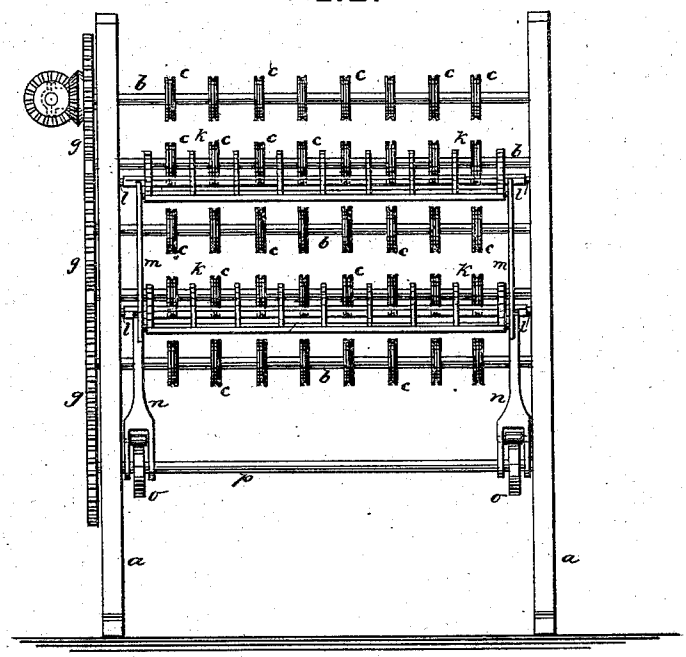


FIG. 2.



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UNITED STATES PATENT OFFICE.

JOSEPH E. HINDS, OF BROOKLYN, NEW YORK.

MACHINE FOR DRYING MOIST OR VARNISHED SHEETS.

SPECIFICATION forming part of Letters Patent No. 239,164, dated March 22, 1881.

Application filed January 4, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. HINDS, of Brooklyn, Kings county, New York, have invented an Improved Machine for Drying Moist or Varnished Sheets, of which the following is a specification.

My invention aims to provide a machine which will receive labels or other sheets or prints as they are delivered from a varnishing or enameling machine, and keep the same in slow motion through the air for a sufficient length of time to dry the varnished surfaces, without smearing the same or making contact between the varnished sheets till the same are dry.

To this end the main features of my machine consist of a series of endless moving belts or cords moving in opposite directions, and adapted to deliver the sheets from one to the other in zigzag system, with transferring-flies, or their equivalent, arranged at the ends or turns of the belts, to receive the moving sheet from one belt and deposit it upon the next till the sheets are finally delivered in a dried condition, as hereinafter fully set forth.

Figure 1 of the annexed drawings is a side elevation of my improved machine, and Fig. 2 an end elevation thereof.

The machine consists of a light open frame, *a a*, in which a number of horizontal shafts, *b b*, are journaled, one above the other, at either end thereof. These shafts are provided with a number of light pulleys or rollers, *c c*, set at short intervals thereon, and around which pass endless belts or bands *d d*, which extend from the rollers at one end to the corresponding rollers at the opposite end, so as to thus form a horizontal series of endless bands arranged one over the other in parallel rows.

The varnishing-machine is supposed to be placed directly at the left of Fig. 1, and from it extends a driving-shaft, *e*, which gears with a main shaft, *f*, on the drying-machine, which in turn gears with the upper set of band-shafts, *b b*, and these latter are mutually geared by the wheels *g g*. The arrangement is, hence, such that the alternate bands move uniformly in opposite directions, and all are driven positively from the varnishing-machine, and in definite relation therewith. An endless band, *h*, also extends from the varnishing-machine, to convey the varnished sheets therefrom to the upper band of the drying-machine, which carries it onward to the turn, where it is deposited on the next band moving in the opposite direction, and so on to the end of the series, where the sheet is finally delivered on the table *i* in a dry condition. The bands, as will be observed, are arranged in zigzag stepped position—that is, each succeeding band projects a little beyond the delivering turn of the preceding band, and at these turns are arranged transferring-flies *k*, which receive the sheet as it is delivered from one band and deposit it on the next, as fully illustrated in Fig. 1.

The flies consist of a light frame of parallel teeth, which project between the band-pulleys *c c*, and these flies are all pivoted about midway at *l*, connected by the connecting-rods *m*, and driven by a driving-bar, *n*, from a cam, *o*, on a rotary shaft, *p*, which is also geared positively with the rest of the machine, so that an oscillating movement is imparted by the said cam to the several flies, whereby they first incline outward to receive the sheet from the turn of the advancing and upper band, and thence incline inward and deposit the sheet on the returning and lower band, the several parts being so connected and moved relatively to the delivery of the sheets from the varnishing-machine that the flies move just at the proper times to receive the sheets from one band and transfer them to the next, until the sheets are finally delivered by the last fly in a pile on the table *i*. Hence, by this system, each sheet, as it is delivered from the varnishing-machine, is caused to pass slowly through the air in a zigzag descending course without making any contacts, which would smear its varnished surface, but bringing this surface constantly through fresh strata of air, which allows the free evaporation of the volatile matter of the varnish and its free dissipation in the air, and thus effects the rapid drying of the varnished surface, so that by the time the sheets arrive at the last fly they are sufficiently dry to admit of being piled one upon the other, and may be handled without objection.

The system hitherto used for drying varnished labels is to place them, one by one, on shallow trays, which are then placed one over the other in racks or shelves. The vapors rising

from the varnish are thus confined by the closely-overlying trays, and have little chance for dissipation, which greatly retards the drying, which usually requires twenty-four hours; whereas my machine is adapted to effect the drying within half an hour, this being the time which one sheet ordinarily requires to pass from one end of the machine to the other, besides performing all the operations automatically and dispensing with the hand-labor heretofore required.

It will be observed that my drying-machine is, in effect, an open net-work, on which the sheets are constantly moving, and through which air-currents and vapors from the varnish have free passage or circulation, thus insuring the best conditions for good drying. To increase the drying effect I prefer to place a heater—say a steam-coil—below the rows of bands, and to arrange the machine in or under suitable ventilating passages or shafts, so that a dry hot-air current will constantly flow slowly through the machine, and thus constantly change the air and carry off the vapors without having any tendency to flutter or displace the sheets on the bands.

The movements of the several parts of the machine, as machinists will readily understand, must of course be properly timed with relation to each other, and in definite relation with the delivery of the sheets from the varnishing-machine, so that the several flies will move at just the proper moments to receive the sheet as it arrives at the turn of one band, and thence deposit it upon the next band.

It may also be understood that any suitable number of rows of bands of any suitable length may be used. In practice I prefer to use twelve rows of bands, and about sixty feet long from end to end of the machine; but in the drawings I have shown but four bands, contracted in length for convenience of illustration.

I do not of course limit myself to any special form of transferring-fly or means for transferring the sheets from one band to the other, provided this means acts in substantially the same manner as that described—viz., to receive the sheet bodily on its unvarnished side from one band, and thence transfer the same to or deposit it on the next band without making any contacts with its varnished surface. Thus, in lieu of the oscillating flies shown, a level fly having a vertical movement from one band to the other may be used; or, instead of this, moving bands with a reversible motion may be used to transfer the sheets from one band to the other. I prefer the form of flies illustrated, however, as most simple and effective.

The traveling bands may be also arranged in a level series, side by side, if desired, with appropriate transferring devices from one to the other; but the vertical overlying series is much preferable.

My machine is not, of course, confined to the drying of varnished labels, but may be used for drying moist sheets of any other kind, or for any equivalent purpose.

The bands *d d* may be made of cords, tapes, wires, or other suitable material.

What I claim is—

1. A machine for drying moist sheets, consisting of a series of traveling bands moving in opposite directions, in combination with transferring devices, substantially such as described, arranged at or near the turns of the bands, to transfer the sheets from one band to the other without making contacts with the varnished side, substantially as herein shown and described.

2. A machine for drying moist sheets, consisting of a series of traveling bands arranged in horizontal overlying rows, and moving in opposite directions, in combination with vibrating flies arranged at the turns of two rows of bands, to receive the sheet from one and transfer it to the other band, substantially as herein shown and described.

JOSEPH E. HINDS.

Witnesses:
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