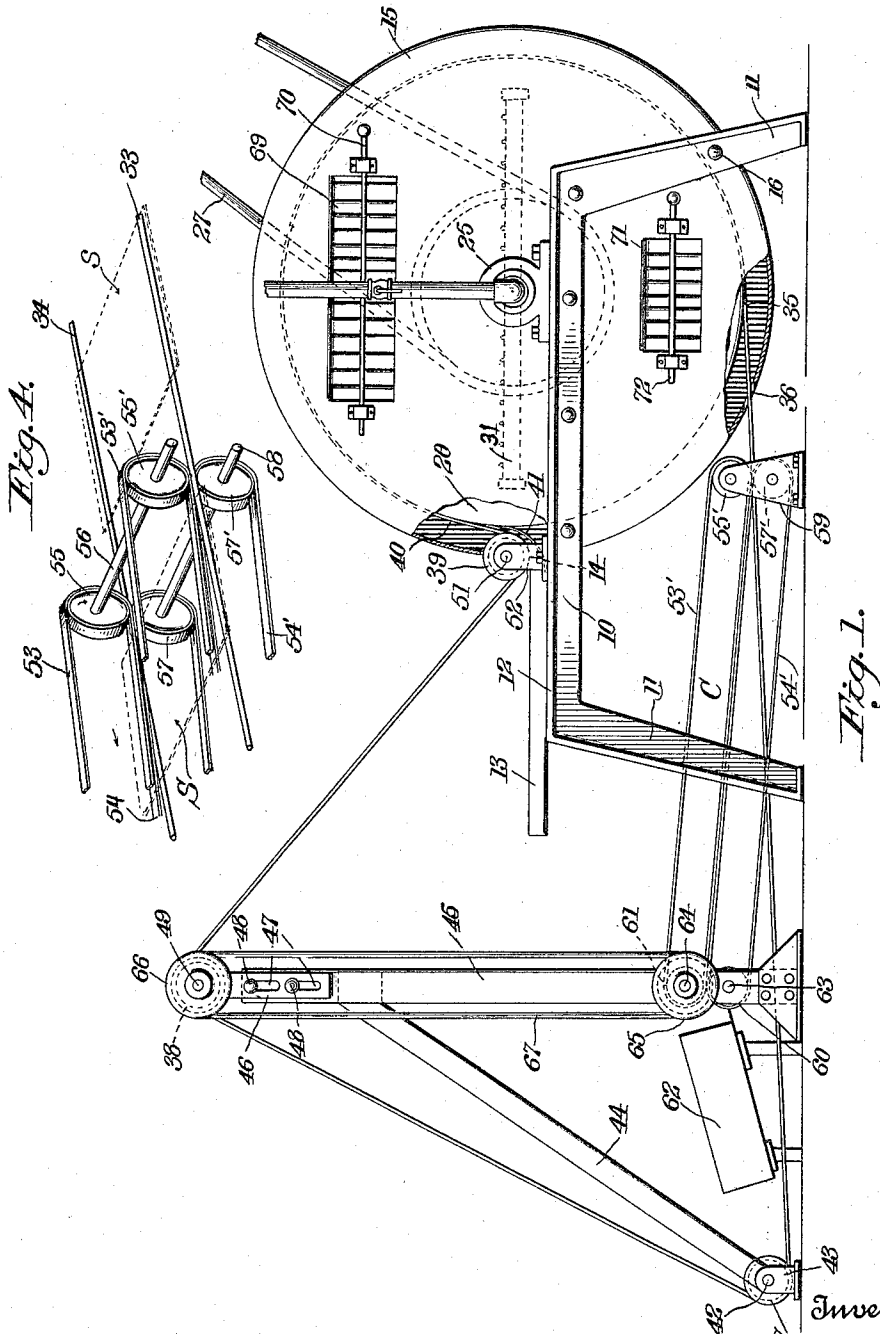


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MACHINE FOR EMBOSSED PRINTED MATTER.
APPLICATION FILED MAR. 7, 1914.

1,149,308.

Patented Aug. 10, 1915
2 SHEETS—SHEET 1.



Witnesses
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Fig. 3.

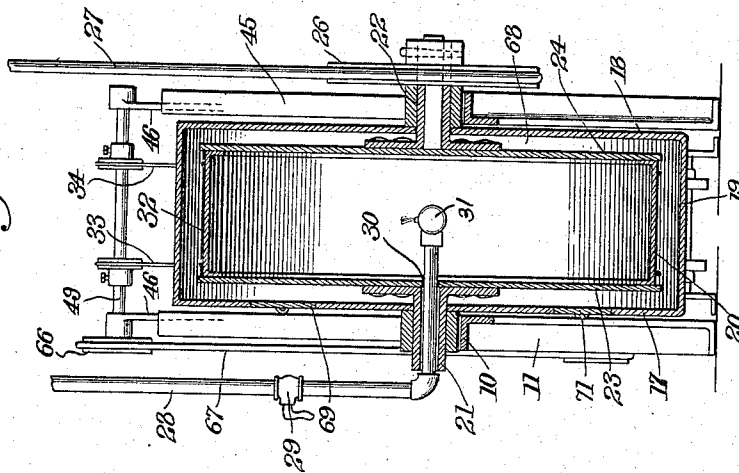
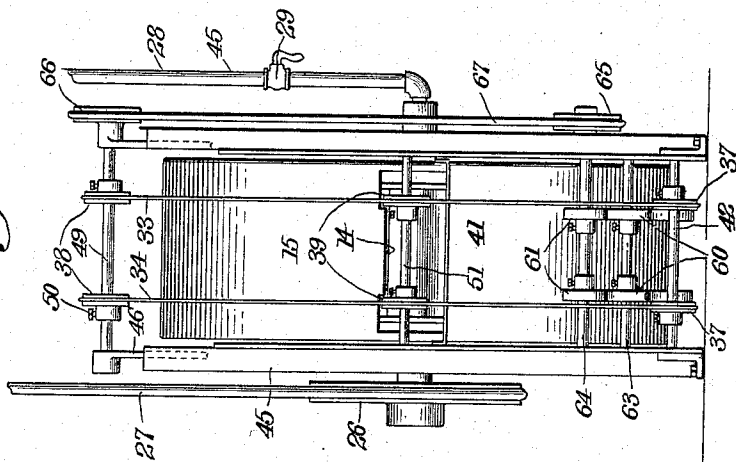


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN WILLIAM TURNER, OF WILKES-BARRE, PENNSYLVANIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-THIRD TO ARTHUR O. DUNLAP AND ONE-THIRD TO JOHN D. JONES, BOTH OF WILKES-BARRE, PENNSYLVANIA.

MACHINE FOR EMBOSSING PRINTED MATTER.

1,149,308.

Specification of Letters Patent.

Patented Aug. 10, 1915.

Application filed March 7, 1914. Serial No. 823,250.

To all whom it may concern:

Be it known that I, JOHN WILLIAM TURNER, a citizen of the United States, and resident of Wilkes-Barre, county of Luzerne, and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Embossing Printed Matter, of which the following is a specification.

In producing embossed surfaces the design or printed matter is printed, stamped or otherwise applied to a sheet or other article, an ink or other substance which will remain for a time in an adhesive or tacky condition being used. After the printing step and while the ink or other substance used is still in its adhesive condition, the material for producing the embossed effect is applied to the design usually by dusting it thereon in powdered form, the powder adhering to the portions of the sheet carrying the design. The article is then passed through a suitable heating device which causes the powder to melt and unite with the printed design. When the powder melts it causes the printed matter to swell and thereby raises the design and causes it to stand above the even surface of the paper giving an embossed effect similar to that obtained with the use of dies. When the printed surface cools and dries it has a glossy appearance.

My invention relates to machines for heating, cooling and drying printed matter and more particularly to a machine for heating and cooling prepared sheets to produce the embossed effect as described above.

My invention has for its object to provide a machine having a capacity for handling a large number of pieces of printed matter and so designed as to prevent the marring or scorching of the paper or printed matter to be embossed.

Another object is to provide a machine in which the speed and heat required to do perfect work may be accurately controlled.

A further object is to provide a means for cooling or drying the embossed matter so that when it is delivered and stacked in a received the separate pieces will not adhere together.

The above and other objects and the novel features of my invention will be apparent

from the following description, taken in connection with the drawing, in which,

Figure 1 is a side elevation of the apparatus, parts being broken away; Fig. 2 is an end elevation of the apparatus embodying my invention; Fig. 3 is a vertical sectional view of the oven or heating device embodying my invention; and Fig. 4 is a perspective view of the means whereby the embossed articles are delivered to the cooling and drying device.

Referring to the drawing two horizontal frame members 10 supported on suitable legs 11, 11, are provided with a table 12. At one end of the table 12 there is a feed trough provided with a side guiding strip 13 whereby the separate sheets, cards or other articles to be operated upon may be guided into the opening 14 of a stationary inclosing casing or housing 15 which fits between the side frame members 10 and is secured thereto by the rivets 16. The inclosing housing 15 is cylindrical and provided with side walls 17 and 18 and the peripheral wall 19.

On the interior of the housing there is a cylindrical shell or drum 20 which constitutes the carrier for the articles to be embossed. Hollow trunnions 21 and 22 are secured to the side walls 23 and 24 of the drum 20 and rotatably support the drum in bearings 25 secured at the ends of the horizontal frame members 10. A grooved pulley 26 is keyed to the end of the trunnion 22 and power is derived from a belt 27 running over the pulley 26 to drive the drum or carrier 20. A gas pipe 28 provided with a suitable valve 29 leads through the hollow trunnion 21 and through an opening 30 in the side wall 23 registering with the hollow trunnion 21 to a gas burner 31 extending horizontally across the interior of the drum 20 and serving to heat the same.

As shown in the drawings the drum 20 is spaced a suitable distance from the housing 15 and the side walls 23 and 24 extend a slight distance beyond the end wall 32 so as to provide flanges at the edges of said wall 32.

A pair of endless wires or bands 33 and 34 of incombustible material pass around the peripheral wall 32 of the heated drum and

serve to engage or grip the separate sheets of paper or articles to be embossed close to the marginal edges thereof. The wires or bands 33 and 34 secure the paper or printed matter tightly to the smooth outer surface of the drum, excluding all air from between the paper and surface of the drum and preventing any shifting or movement of the paper on the drum. This will tend to prevent the marring of the article and by excluding all air from between the surface of the paper and the drum a greater degree of heat can be utilized without scorching the paper allowing greater speed and much better work in embossing, that is, larger quantities and keener cut letters in a given time.

The endless wires or bands 33 and 34 leave the surface of the heating drum at the point 35 and pass out of the casing 15 through an opening 36 near the bottom thereof. From thence the wires pass around the pulleys 37, 37, 38, 38, 39, 39, through the opening 14 and into contact with the heating drum 20 at a point 40 a slight distance above the feed opening 14. A curved feed plate 41 has one end resting on the table 12 and the other end curved upwardly into contact with or into close proximity to the drum 20 so as to guide the articles or sheets of paper upwardly to the point 40 where the bands or tapes 33, 34, properly grip them.

The pulleys 37, 37, are mounted so as to be longitudinally adjustable along a shaft 42 supported in the bearings 43, 43, which also carry the lower end of the members 44 which brace the uprights 45. The uprights 45 carry the plates 46, 46, at their upper ends, the said plates being provided with slots 47, 47, to receive the pins 48, 48, whereby the plates 46, 46, are vertically adjustable. The plates 46, 46, rotatably support the shaft 49 at their upper ends and the guide pulleys 38, 38, are secured to the said shaft by suitable set screws 50 or otherwise so that they may be horizontally adjustable along the said shaft to accommodate the bands 33 and 34 to any width of material or sheets carried over the drum 20. The adjustable plates 46, are provided for the purpose of taking up the slack in the tapes so that the same will always closely hug the surface of the heating drum, and tightly grip the sheets thereon. The guide pulleys 39, 39, are secured to rotate with a shaft 51 supported in bearings 52, 52, located at opposite sides of the feed opening 14 and extending part way into the same, as shown in Fig. 1. The power transmitted to the heating drum 20 by the belt 27 causes the rotation of the drum and serves to frictionally drive the tapes 33 and 34 which are held in close contact therewith.

When in operation the wires 33 and 34 as they emerge from the casing through the

opening 36 carry the sheets S on their upper surface, as is indicated in Fig. 4, and deliver them directly to a cooling and drying device which finally delivers and stacks them in a receiver. As shown in Figs. 1 and 4, the tapes or wires 33 and 34 pass downwardly at an angle on opposite sides of two pairs of endless tapes 53, 53', 54, 54'. The tapes 53 and 53' pass around the pulleys 55 and 55' respectively which are carried by the shaft 56 while the tapes 54 and 54' pass around the pulleys 57 and 57' carried by the shaft 58, both shafts being supported in a suitable bearing 59 close to the opening 36 in the housing 15. The pulleys 55, 55' and 57, 57' rotate in opposite directions so that the contiguous flights of the tapes running thereon will move in the same direction and when the wires or tapes 33, 34, carry a sheet S to a point opposite to where the pulleys are located the sheet will be seized between the contiguous flights of the tapes 53, 54, 53', 54' and be carried therewith to the point where the latter pass around the pulleys 60 and 61 mounted in the upright 45 where the sheets will be delivered to a receiver and stacker 62. While being carried along the tapes 53, 54, 53', 54' the sheets will be cooled and dried out so that when they reach the receiver 62 they will not adhere to one another when stacked, the cooling conveyer being of sufficient length to allow the embossing to harden.

The pulleys 60 and 61 are mounted on shafts 63 and 64 in the vertical frame members 45 and a pulley 65 mounted on the end of the shaft 64 receives its driving power from the pulley 66 mounted on the end of the shaft 49 through the belt 67, the lower endless tapes of the cooling device C being driven by frictional engagement with the flights of the upper endless tapes.

In order to maintain the temperature within the space 68 at a required degree I have provided a series of ventilating doors 69 pivoted on the rod 70 at the top of the housing 15 and another series of ventilating doors 71 pivoted on the rod 72 at the bottom of the housing and controlling openings in the side wall 17 of said housing. By means of these doors the heat within the housing may be perfectly regulated and the best results obtained.

The operation of the machine will be clear from the foregoing description. The sheets having been printed and dusted with a suitable embossing powder are placed on the table 12 and from there are fed by hand or otherwise and guided by the strip 13 through the opening 14 upwardly along the plate 41 to the point 40 where the marginal edges thereof are gripped by the wires 33 and 34 to hold the sheet, printed face out, in close contact with the peripheral wall 32 of the

heating drum 20. The drum 20 is of such size and carries the sheet a sufficient period to heat the same to the required temperature to perform the embossing of the printing thereon and without scorching the paper. The sheet is delivered through the opening 36 in the casing to the cooling device C which carries it the necessary time to harden the embossing and then delivers it to the receiver 62. It will be seen that the device is designed so as to have the maximum capacity since the process is continuous and the sheets may be delivered from the table 12 continuously and as rapidly as is permissible with the rotation of the drum 20.

It will be understood that the detached sheets which have been prepared on one side for embossing are engaged on their outer sides near the marginal edge and outside the design thereon so that the wet or prepared portion will not be marred or smeared. The inner or prepared sides of the sheets are held flat against and in contact with the surface of the carrier or drum and the outer, prepared, surface of the sheet is exposed, consequently the heated air in the housing will have free access to the printed design on the sheet. By reason of such an arrangement, the embossing of the prepared surfaces will be much more rapid than where the sheets are so carried as to prevent circulation of heated air across the prepared surfaces thereof, and consequently the capacity of such a machine is greater than of a similar machine in which the sheets are covered on both sides. Besides this, more perfect work will be turned out by a machine of the type made according to this invention.

It will be clear that many variations in the construction of the machine are possible and therefore I do not wish to be limited to the exact details as shown and described.

Having described my invention what I claim as new and desire to secure by Letters-Patent is,

1. In a machine for embossing printed matter, the combination of a casing having inlet and delivery openings, a rotatable drum within the casing, heating means within the drum, means for rotating the drum, an endless band extending around the drum from the inlet opening to the delivery opening, suitable guides exterior to the casing over which said band passes, and means for directing sheets of paper through the inlet opening in the casing and into engagement with the band and drum whereby said sheets are carried around the drum in contact therewith and suitably heated to raise the embossing material and discharged through the delivery opening in the casing.

2. In an embossing machine, the combination of a rotatable drum having a smooth outer surface constituting a support for detached printed sheets prepared for emboss-

ing, a stationary housing for said drum having an inlet opening and a delivery opening, endless bands entering the housing through the inlet opening and leaving through the delivery opening, said bands passing around said drum and capable of engaging said sheets on their outer sides near the margins thereof, whereby the unprinted sides of said sheets are held flat against said smooth surface of the drum and the printed sides are held facing away from the drum and exposed to the air in said housing, and means for heating the drum and the interior of said housing to emboss the printed matter on the sheets carried by said drum.

3. In an embossing machine, the combination of a rotatable drum capable of supporting detached sheets to be embossed, a stationary housing for said drum and having an inlet opening and a delivery opening, endless bands entering the housing through the inlet opening and leaving said housing through the delivery opening, said bands passing around said drum and capable of engaging said sheets on the outside thereof near their margins to hold them on the drum with their printed sides facing outwardly into the housing, means for heating the drum and the interior of said housing to emboss the printed matter on said sheets, and means for regulating the temperature within the housing, said regulating means comprising an opening in the wall of the housing and a device for controlling the effective size of said opening.

4. In a machine for embossing printed matter, the combination of a carrier for detached sheets printed and prepared to be embossed, means for gripping the sheets at their marginal edges to avoid marring the printed and prepared parts thereof and to hold the sheet in contact with the carrier, means for heating the carrier so as to heat the sheets to emboss the printed and prepared parts thereof, mechanism adapted to receive the sheets as they leave the carrier and arranged to hold them while they cool, and means for driving said carrier, gripping means and mechanism.

5. In an embossing machine, the combination of a rotatable drum capable of supporting detached sheets to be embossed, a stationary housing for said drum and having an inlet opening and a delivery opening, means capable of engaging the sheets fed through said inlet opening and holding them in contact with said drum, said means being capable of discharging said sheets through said delivery opening, means located adjacent said delivery opening and adapted to receive the sheets discharged therefrom and hold them while they cool, and means for heating the drum and the interior of said housing to emboss the printed matter on the sheets carried by said drum.

6. In a machine for embossing printed matter, the combination of a casing having inlet and delivery openings, a rotatable drum within the casing, heating means within the drum, means for rotating the drum, endless bands extending around the drum from the inlet opening to the delivery opening, suitable guides exterior to the casing over which said bands pass, means for directing sheets of paper through the inlet opening in the casing and between the bands and drum whereby said sheets are carried around the drum in contact therewith, suitably heated to raise the embossing material and discharged through the delivery opening in the casing, a receiver for the embossed sheets, and a device, located between the delivery opening in said housing and said receiver, for removing the sheets from said endless bands, holding them while they cool and discharging them into said receiver.

7. In a machine for embossing printed matter, the combination of a casing having inlet and delivery openings, a rotatable drum within the casing, heating means within the

drum, endless bands extending around the drum from the inlet opening to the delivery opening, suitable guides exterior to the casing over which said bands pass, means for directing sheets of paper through the inlet opening in the casing and between the bands and drum whereby said sheets are carried around the drum in contact therewith and suitably heated to raise the embossing material, openings in the walls of the casing, means for regulating the effective sizes of said openings to control the temperature within the casing, a receiver for the embossed sheets, and endless devices between the receiver and said delivery opening capable of removing from said endless bands the sheets discharging from said delivery opening in the casing, cooling the sheets and discharging them into said receiver.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN WILLIAM TURNER.

Witnesses:

JAMES SHEEHAN,

WILLIAM M. DEITRICH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."