May 15, 1928. 1,669,552

H. J. BRUNK

REAR DISCHARGE ATTACHMENT FOR BLUE PRINT DRIERS

Filed Nov. 8, 1926 2 Sheets-Sheet 1

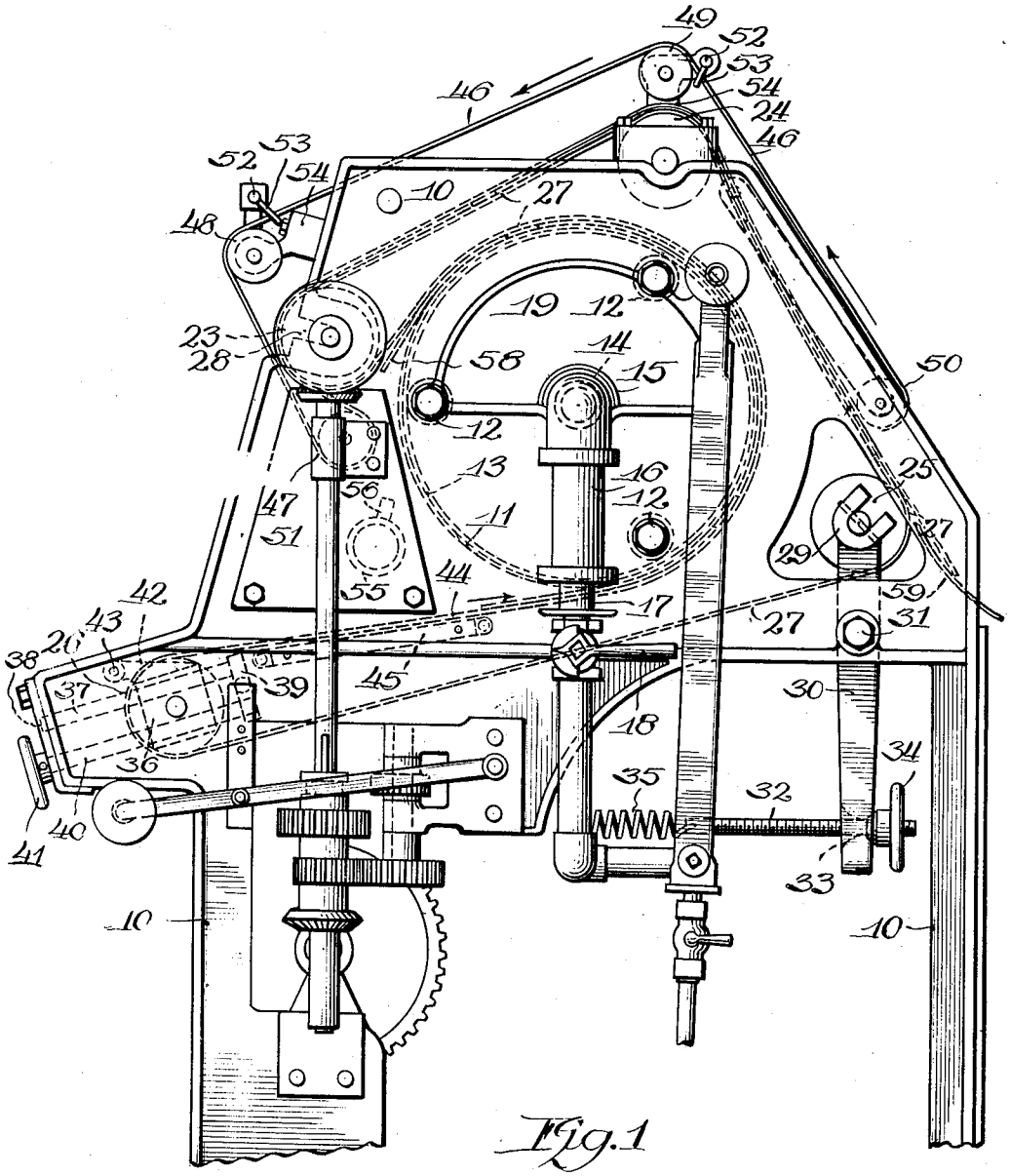


Fig. 1

Witness:
Chas. R. Kourse.

Inventor:
Harold J. Brunk
by Geo. Bagley & Co. Attys.

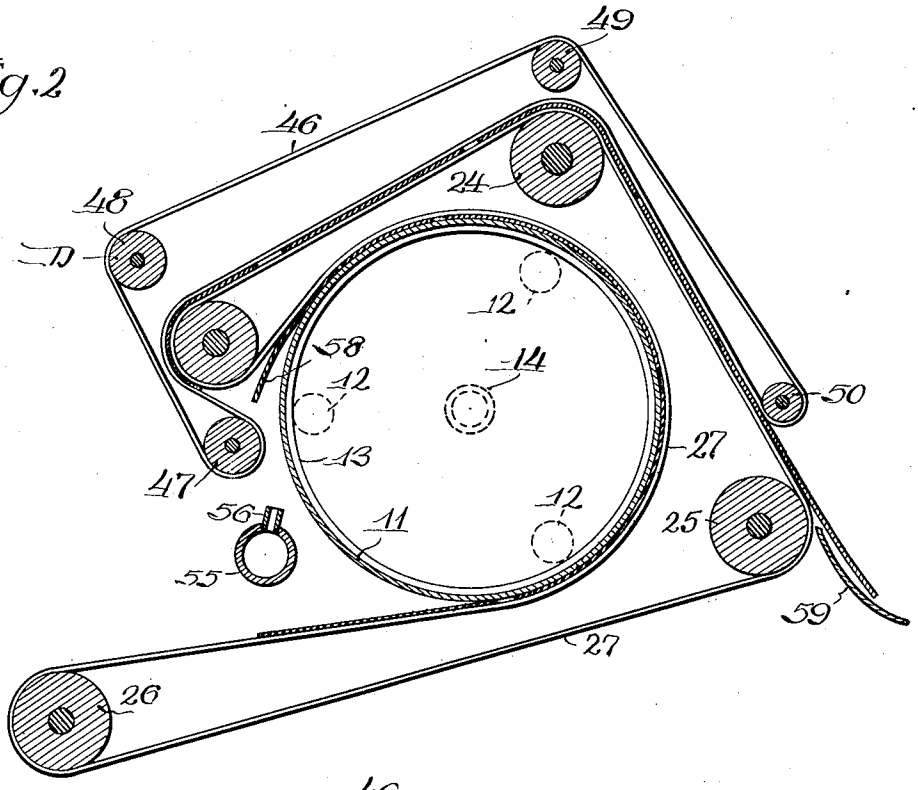
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Fig. 2



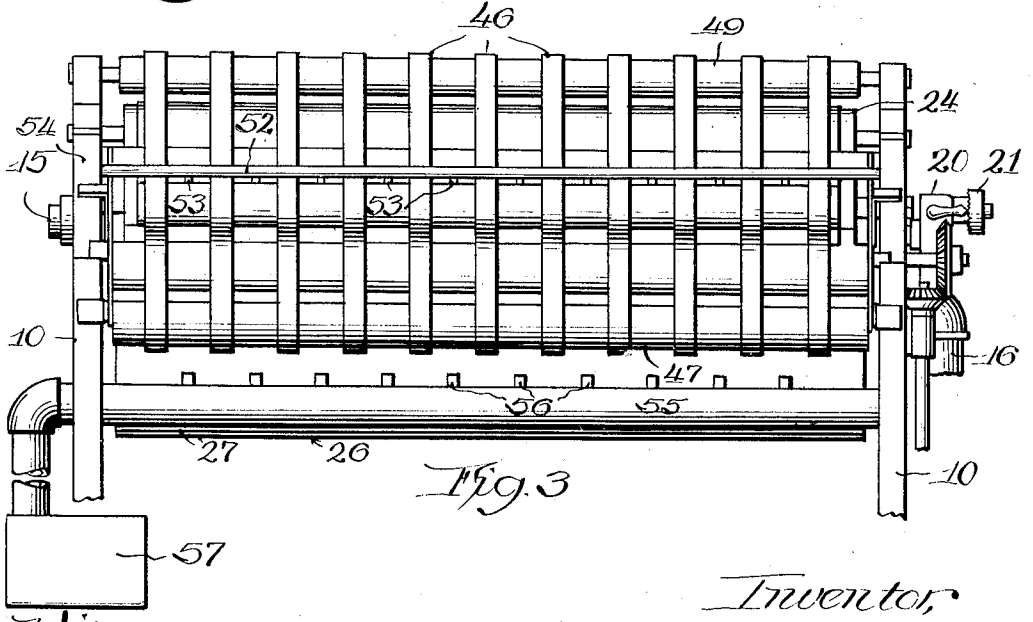


Fig. 3

Witness:
Chas. L. Kourshs.

Inventor,
Harold J. Brunk,
George Bagby Jones & Riley.

Patented May 15, 1928. 1,669,552

UNITED STATES PATENT OFFICE.

HAROLD J. BRUNK, OF CHICAGO, ILLINOIS, ASSIGNOR TO C. F. PEASE COMPANY, A CORPORATION OF ILLINOIS.

REAR-DISCHARGE ATTACHMENT FOR BLUE-PRINT DRIERS.

Application filed November 8, 1926. Serial No. 146,870.

This invention relates to improvements in drying machines, and more particularly to the belt and drum type of machine used in drying blueprints and other photographic prints after they have been washed.

In Patent No. 1,564,775, issued December 8, 1925, to myself and Charles A. Green, as joint inventors, there is shown and described a machine in which the wet blueprints are carried around the heating drum by a belt, and after being dried during this contact with the drum are discharged into a tray at the front of the machine. In some cases it is desirable to make the prints on a continuous machine with a drier immediately behind the same, in which case the operator would have to stand at the side of the machine in order to collect the prints, which would be inconvenient. Other situations also arise which make it desirable to discharge the prints at the rear of the heating drum, instead of in the front of the same.

The object of the present invention is to provide means for discharging the prints at the rear of the heating drum even though said prints enter at the front and have to be carried nearly around the drum in order to allow enough time for the drying.

Another object is to provide a rear discharging device of this character in the form of an attachment for a drying machine of the type shown in said patent.

In the drawings, I have illustrated one embodiment of the invention.

Figure 1 is a side elevation of part of the drying machine and the attachment.

Fig. 2 is a similar view with certain parts omitted.

Fig. 3 is a front elevation of the apparatus.

Referring to the drawings, the machine comprises a frame 10 having side members and suitable transverse connecting members.

The heating or drying drum is shown at 11 mounted horizontally between the side frame members and supported in such position by means of rollers 12 carried by each of the side frames and extending inwardly from the latter into the opposite open ends of the drum. Three of these rollers, spaced equi-distant, are shown carried by each side frame and these engage metal bands 13 of steel or the like carried interiorly of the drum immediately adjacent its opposite open ends. It is preferable to construct the drying drum 11, except for the bands 13 thereof, entirely of copper in the form of a seamless tube.

A gas burner 14 in the form of a perforated pipe extends through the drum 11 and is mounted at its opposite ends in the side frames. This burner pipe is capped at one end, as at 15, and at its other end said pipe connects with the supply pipe 16, the latter having therein a suitable mixing valve 17 and cut-off valve 18. The side frames overlie the open ends of the drum except for the openings 19 through which access may be had to the interior of the drum and to the burner.

A heat regulator 20 is provided having calibrated dial 21 whereby the temperature of the drying drum may be regulated as explained more fully in said prior patent.

Surrounding the drum 11 and suitably spaced therefrom are a plurality of horizontally disposed rollers, 23, 24, 25 and 26, over which and the drum passes the conveying and driving belt 27. The roller 23 is mounted with the opposite ends of its shaft journaled in suitable bearing grooves 28 provided in the front edges of the side frame members. Roller 24 is removably journaled across the top edges of the side frames. Roller 25 is journaled in the upper forked ends 29 of levers 30 pivoted at 31 on the inner sides of the frame members. The levers 30 may be adjusted on their pivots 31 to regulate or control the tension of the belt 27, these adjustments being effected through screw threaded rods 32, which engage loosely through openings 33 in the lower ends of the levers 30, nuts 34 and coiled springs 35, the latter being anchored at one end to the frame members and at their outer ends being connected to the ends of the rods 32. Thus by turning nuts 34 in one direction or the other, the roller 25 may be moved to either increase or decrease the tension of the belt. The forward roller 26 is journaled at its opposite ends in blocks 36 slidably carried on rods 37 anchored at their forward ends in the side frames, as at 38, and at their rear ends to members 39, which are fixed to the side frames at the rear of said blocks. Screw threaded rods 40 engage through these blocks 36 and extend substantially parallel to the rods 37, said rods 40 being journaled at their rear ends in mem-

bers 39 and at their forward ends are provided with hand wheels 41 whereby the blocks 36 and hence roller 26 may be adjusted back and forth upon the rods 37, this arrangement also providing for adjusting and regulating the tension of the belt. With this arrangement it will also be observed that either end of the roller 26 may be adjusted independently of the other end thereof in order to keep the belt centrally disposed with relation to the drum and rollers and to prevent lateral creeping thereof. The blocks 36 each carry a forwardly projecting arm or bracket 42 to which are secured the opposite ends of a fixed transverse rod 43, the belt 27 in its travel over or around roller 26 passing between the latter and this rod 43.

Reference numeral 44 designates the feed run of the belt and, as previously described, is inclined upwardly at a tangent to the heating or drying drum. Immediately beneath the feed run of the belt and extending between the side frame members and attached thereto, there is positioned a fixed table 45, conveniently termed a "feeding table," said table providing a rigid and firm support for that portion of the belt upon which the prints are fed to the machine. This enables the operator to spread the prints evenly and smoothly on the belt without danger of wrinkling or otherwise injuring the same.

A suitable motor is provided for rotating the roller 23, through mechanism which need not be described in detail, and the other rollers 24, 25, 26, which are idlers, are rotated by the belt 27. The prints are thus carried around the drum, preferably more than half way, and, in any case, far enough to permit the necessary drying, said prints being fed in at the bottom and returning over the top of the drum to the front thereof. They are then released and carried to the rear by the following mechanism, which may have the form of an attachment to the main machine.

A plurality of narrow belts or straps 46 are arranged to pass over a series of substantially horizontal rollers 47, 48, 49, 50, as shown. The roller 47 is mounted in a pair of side members 51 arranged to be conveniently secured to the side frame of the main machine. Rods 52 are arranged near the rollers 48 and 49, and are provided with a series of fingers 53 which project between the narrow belts and serve to guide the same and maintain the spacing. Rollers 48 and 49 are supported on suitable brackets 54 bolted or otherwise secured to the main frame of the machine. As will be seen, the belts 46 are in contact with the main belt 27 during part of the return movement of that span which is traveling from front to rear.

A pipe 55 is suitably supported by the side frame members 51 and has a plurality of nozzles 56 projecting therefrom and inclined upwardly but not quite vertically in the relative positions of parts shown in Fig. 1, so that the air will be directed almost tangentially against the front of the heating roller, although preferably inwardly a few degrees, the nozzles being inclined rearwardly about ten degrees from the vertical. Air may be supplied by a suitable blower 57.

A dried print 58 is shown being released from between the main belt and heating drum. The print tends to follow the drum during part of its rotation, but it is not only moved away from said drum by the jets of air issuing from the nozzles 56, as soon as the belt leaves the drum on a tangent, but is swung forwardly enough to engage the narrow belts 46 as they and the main belt converge, in passing around the roller 23. The air, after stripping the print from the drum escapes to the front of the machine between the narrow belts and thus supports the edge of the print until it is caught between the upper and lower belts. The location of said nozzles with reference to the drum and belts referred to, is of considerable importance, there being many positions in which the issuing prints will not remove themselves from the drum and advance smoothly between the converging belts, but will fold over or wrinkle or otherwise cause trouble. With the nozzles in the position shown, however, the prints are detached from the drum and blown from the same far enough to engage the narrow belts properly and to be drawn by said narrow belts over the main belt and carried between the two around the rollers 23 and 24 to the roller 50, at which point the narrow belts begin their return movement and the print is discharged into any suitable receptacle or guide, such as 59, at the rear of the drum. With this arrangement, it will be seen that prints fed in at the front of the drum may be carried more than half way around the same, but, nevertheless, discharged eventually at the rear of said drum where they may conveniently be removed by an operator stationed there for the purpose. Furthermore, the machine operates equally as well with a number of small prints arranged side by side on the belt, and regardless of whether said prints are carefully placed on said belt with their edges parallel to the sides of said belt, or whether said prints are turned to various diagonal positions, in a hap-hazard manner.

Although the prints are described as moving from "front to rear" "up and down", etc., it is to be understood that while the path of travel shown is the preferred one, I use these terms in a relative sense for convenience, and contemplate other relative arrangements, for example, a movement of the

prints down toward the drum and upwardly away from the same, and other angles of feed and discharge.

I claim:

1. In a drying machine, a drum, means for heating the same, a plurality of rollers, a belt passing over said rollers and around said drum, means for driving said rollers, said belt in passing from one of said rollers to said drum, traveling in an upwardly inclined direction tangentialy thereto and more than half way around said drum to another roller and back to said first roller to release the fabric being dried, a second belt out of contact with said dum and traveling toward and overlying said first belt, and means for directing air toward the point where said first belt leaves said drum in order to direct the print issuing therefrom between said two belts.

2. In a device of the class described, a belt carrying prints half way around a heating drum, a second belt overlying said first belt on part of its return path, and means for directing air tangentialy toward said drum to remove prints therefrom and direct them between said two belts.

3. An attachment for a drier of the belt drum type wherein a main belt travels rearwardly to the heating drum and upwardly around the same to the front thereof, and thence back to the starting position, comprising a plurality of small belts overlying the return section of said main belt, and means for directing air upwardly against said drum adjacent the point where the main belt leaves the same.

4. An attachment for driers having a drum and a main belt with supporting rollers, two of said rollers being arranged in front of said drum, a plurality of additional rollers, and a series of narrow belts passing over the same and in engagement with said main belt during part of its return travel, a pipe, a source of compressed air therefor, a series of nozzles directed upwardly and slightly to the rear of the front of said drum whereby said air moves the prints being dried, away from said drum, and directs them between said main belt and said narrow belts enabling them to be carried to the rear of said drum and be discharged.

5. A device of the class described comprising a drying drum, an endless belt, supporting rollers therefor arranged to permit said belt to travel rearwardly toward the bottom of said drum and upwardly around the same, leaving said drum in a downwardly and forwardly direction, thence upwardly and rearwardly and downwardly and forwardly to the starting position, and means for causing a photographic print to adhere to and be carried rearwardly by said belt after it leaves said drum, whereby said print may be carried around said drum to dry it and thereafter be delivered at the rear of said drum on the opposite side from that on which the drying operation is completed.

6. A machine of the class described comprising a rotatable drying drum, a set of rollers spaced from the drum, an endless belt on said rollers having one run thereof in contact with said drum for carrying sheets to be dried around the drum in contact with the same, a second set of rollers having an endless belt thereon one run of which contacts with the reverse run of said first belt for carrying the dried sheets as they issue from said first belt and drum to discharging position at the rear of the drum.

7. The combination with a rotatable drying drum of an endless belt having one run thereof passing around the same for carrying sheets of material to be dried between the drum and belt, and a second travelling endless belt having a run thereof contacting with the reverse run of said first belt, said second belt having a portion of said run extended adjacent the drum for receiving the issuing sheets and carrying the same between the contacting runs of said belts from which they are discharged at a position on the opposite side of the drum.

In testimony whereof, I have subscribed my name.

HAROLD J. BRUNK.