(No Model.) 2 Sheets—Sheet 1.

A. C. GETTEN.

DRYING MACHINE.

No. 305,914. Patented Sept. 30, 1884.

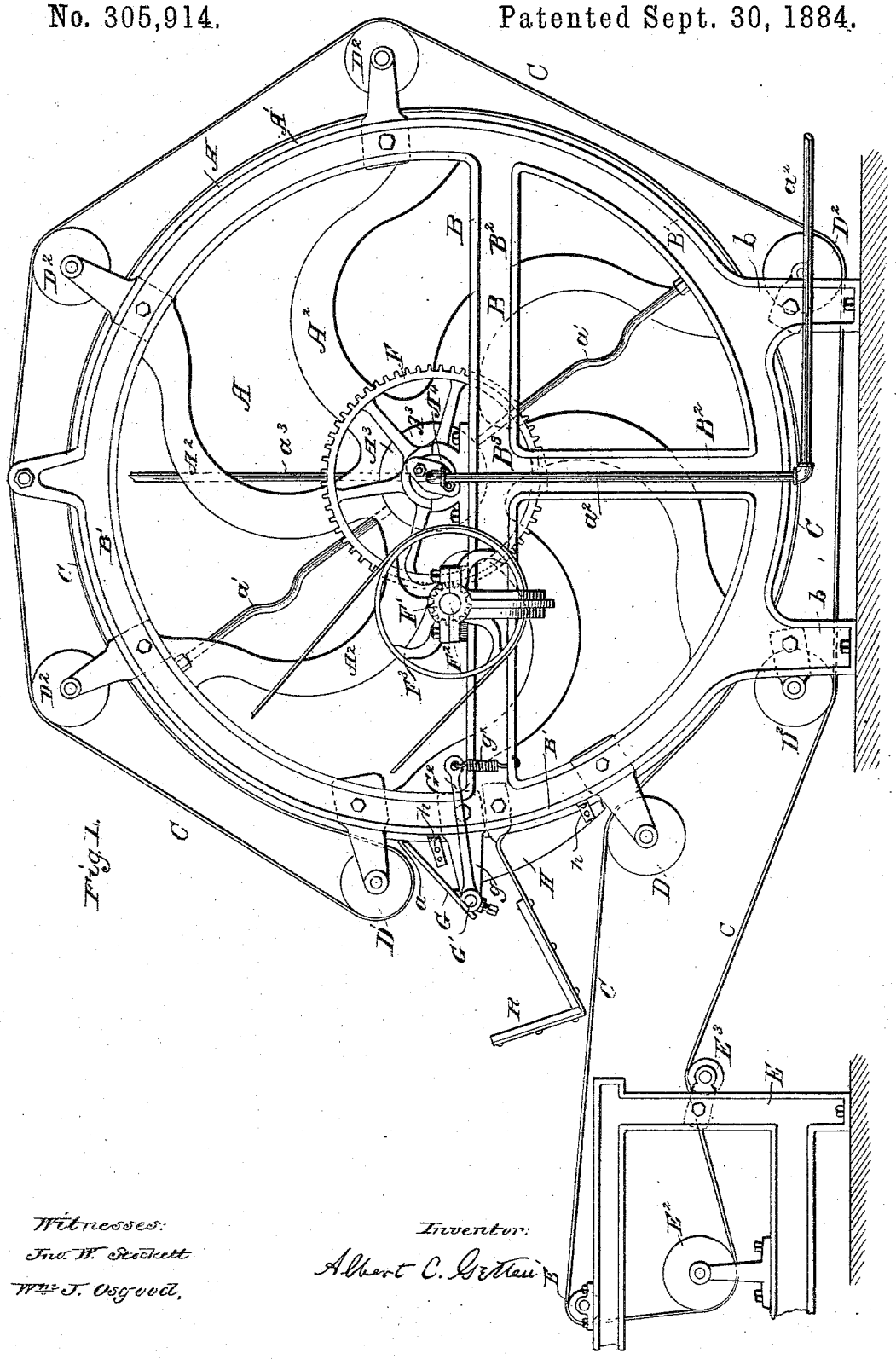

Fig. 1.

Witnesses:
Fred. W. Beckett
Wm. T. Osgood.

Inventor:
Albert C. Getten

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig 6

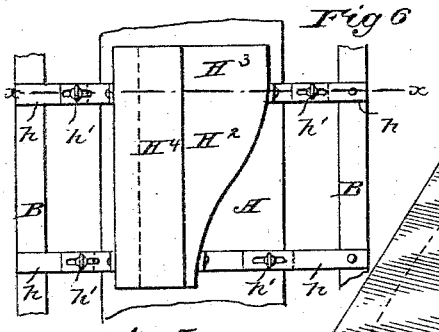


Fig 2

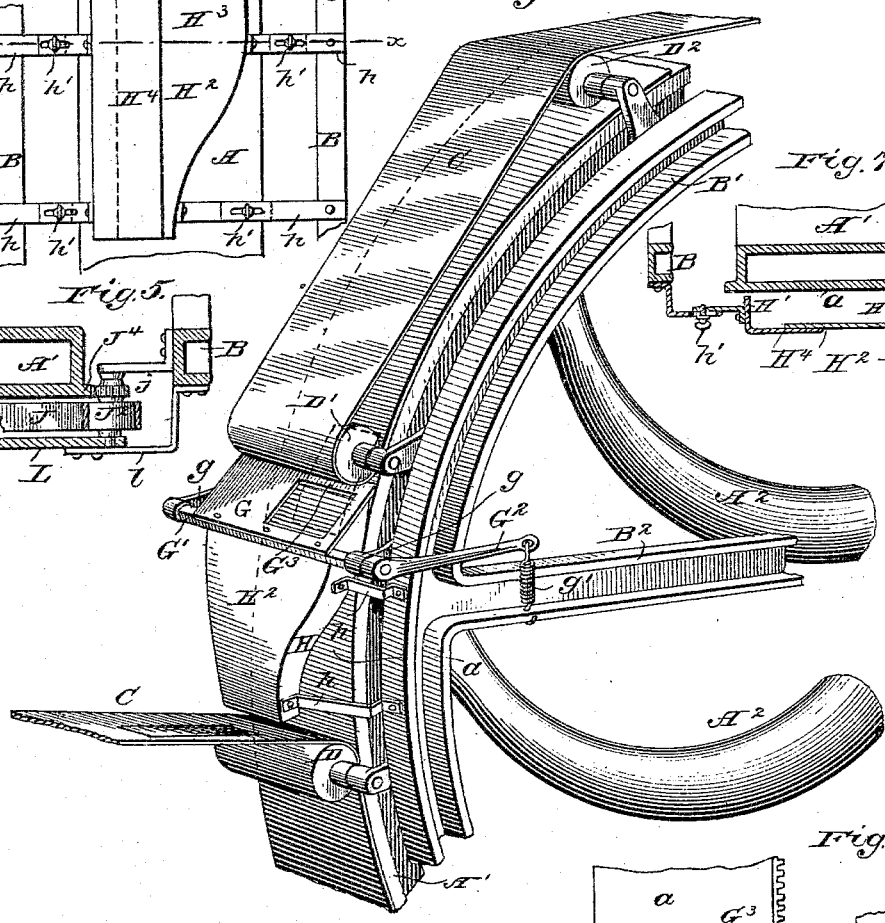


Fig. 7.

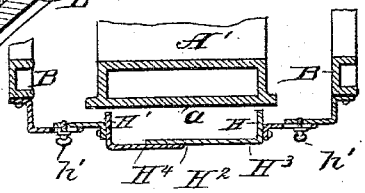


Fig. 5.

Fig. 4.

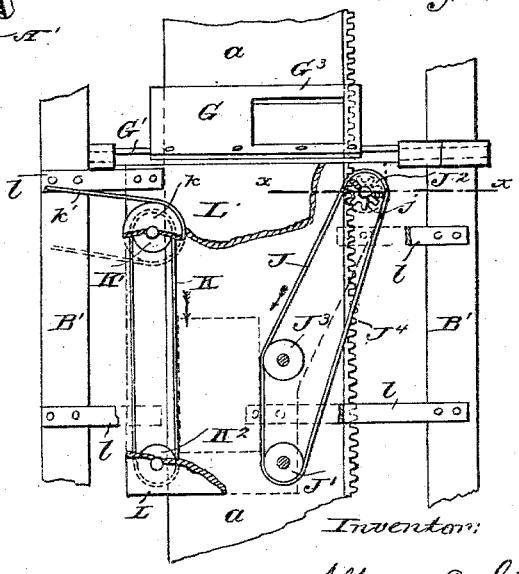
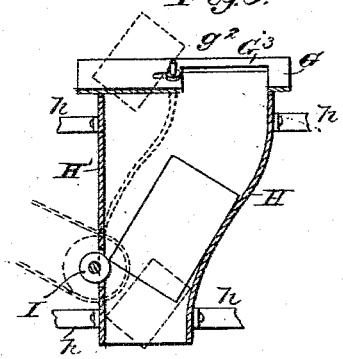


Fig. 3.



Witnesses:
Fred. W. Seckett.
Wm. J. Osgood

Inventor:
Albert C. Getten

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

ALBERT C. GETTEN, OF CHICAGO, ILLINOIS.

DRYING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 305,914, dated September 30, 1884.

Application filed February 21, 1884. (No model.)

To all whom it may concern:

Be it known that I, ALBERT C. GETTEN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Drying-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to driers for paper-bag machines, or devices used in connection with such machines for drying the bags after they have been folded and pasted, so that they will be in condition for immediate use, and when stacked or piled they will not be liable to stick together.

It relates more particularly to that class of drying apparatus which consists of a revolving drum or drying-cylinder, the surface of which is suitably heated by steam or otherwise, and around which is placed an endless belt for retaining the bags in contact with the heated surface of the drum while they are being dried.

In devices of the character above mentioned, and as heretofore usually constructed, the cylindrical face of the drum and the belt passing around it have been made of slightly greater width than the widest bag that is to be operated upon, and the bags have been made to pass once around the drum, the belt being arranged in contact with the drum for a greater part of its periphery, so that the bags are discharged from between the surface of the drum and the belt at a point slightly distant from the point at which they enter between them.

It has been found in the use of a drum or drying cylinder of practicable size in such drying apparatus that the bags are not always sufficiently dried in passing once around between the drum and belt, and in order to provide means in such apparatus whereby the bags may be held in contact with the heated surface of the drum a sufficient time to thoroughly dry them without decreasing the rapidity with which the bags pass through the drier or adding materially to the cost of the apparatus, a drier is herein shown operating generally in the manner above stated, but embodying certain improvements in construction, the essential features of which are as follows: The cylindrical face of the drum and the belt operating in connection therewith are made of considerably greater width than that necessary for the passage of a single bag, and the devices by which the bags are fed to the band are arranged to deliver the bags upon the portion of the belt adjacent to the side thereof, so that said bags, in being carried around the drum, will rest upon one side only of the cylindric face thereof, and means are provided at the point at which the bags are discharged from between the belt and the drum, after passing around the latter, constructed to move the bags laterally upon the face of the drum and to deliver them again between the belt and drum at a point at one side of the point at which they were first carried to the drum, so that they will pass again around said drum. The bags may obviously be moved laterally one or more times, according to the width of the face of the drum, so that two or more lines or rows of bags arranged side by side may be thereby held continually in contact with the face of the drum, the bags being discharged, after their last passage around the drum, in the usual manner. By making the width of the face of the drum two or more times that necessary for the passage of a single bag, and providing a corresponding number of devices for moving the bag laterally after each passage around the drum, as above described, the bags may obviously be subjected to the action of the heated surface of the drum for any length of time desired without materially increasing the number of parts or the size of the machine, and without decreasing the speed thereof, and an equal drying effect may thus be obtained with a drum of much less diameter than has heretofore usually been used. In the form of drier herein illustrated the face of the drum is made twice as wide as necessary for the passage of a single row of bags, and a single device for moving the bags laterally is used, so that each bag will pass around the drum twice, and thereby remain in contact with the heated surface thereof twice as long as formerly. As herein shown, also, the belt which passes around the revolving drum is arranged to pass over suitable rollers connected with the paper-bag-making machine, so as to receive the finished bags from said machine and con-

vey them automatically to the drier, as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a side elevation of the drying apparatus and part of the frame of a paper-bag machine, showing devices embodying one form of my invention. Fig. 2 is a detail perspective view of a part of the drum of the drier, illustrating the form of device embodying my invention shown in Fig. 1. Fig. 3 is a detail section taken upon line *x x* of Fig. 1. Fig. 4 is a detail view illustrating another form of device embodying my invention, which will be hereinafter more particularly described. Figs. 5, 6, and 7 are detail views, which will be hereinafter described.

A is the rotating drum or cylinder of the drier, and B the supporting-frame thereof.

The drum A consists, as herein shown, of a hollow annular rim, A′, supported in the usual manner by arms A^2 from a central hub, A^3, secured to a central shaft, A^4, having bearings in the frame B. The drum A′ is provided with a smooth cylindric surface, *a*, which, as herein shown, is about twice as wide as heretofore usually constructed, in order to afford space for two rows of bags to be placed side by side in contact with its surface, as hereinafter more particularly described.

The frame B, as herein shown, is formed of two side plates or castings located at either side of the drum and consisting of annular rings B′ and cross-pieces B^2, affording bearings B^3 for the shaft A^4, the rings B′ being of about the same diameter as the rim A′ of the drum, and supported by short projections or legs *b* from the floor.

C is an endless band or belt which is placed around the drum in contact therewith for the greater portion of its circumference, and is made of the same width as the surface *a* of the drum, said belt being preferably placed over supporting-rollers D D′ at the points at which it passes to and away from the surface of the drum.

E is a portion of the frame of a paper-bag machine which may be of any construction, and which, as herein shown, is provided with rollers E′, E^2, and E^3, over which the band C passes.

The rollers D and D′ are located at the side of the drum adjacent to the bag-machine, the roller D′ being placed a short distance above the roller D, and the latter roller is arranged in connection with the roller E′ in such a manner as to support the portion of the band between the machine and the drum in a nearly horizontal position and in proper location with reference to the bag-making mechanism to receive the folded and pasted bags from the bag-machine and to convey them therefrom to the drier.

The belt C, as herein shown, is extended from the upper pulley, E′, of the bag-machine to the roller D, around the drum B to the roller D′, and then in a reverse direction over suitable supporting-rollers, D^2, arranged around the drum, to the rollers E^3 and E^2, and back to the roller E′.

The hollow rim A′ of the drum may be heated in any desired or preferred manner, the device herein shown for this purpose consisting of steam-pipes *a*′, joining said rim with a central passage in the shaft A^4, to which suitable steam supply and exhaust pipes, as a^2 and a^3, are connected.

The means shown for rotating the drum A consists of a spur-wheel, F, upon the shaft A^4, which meshes with a pinion, F′, upon a counter-shaft, F^2, mounted in suitable bearings upon the machine-frame, said counter-shaft being provided with a driving-pulley, F^3, to which power is transmitted by means of a suitable belt.

In driers generally similar to that herein shown, as heretofore usually constructed, an inclined deflecting-plate has been placed beneath the roller D′, with its upper edge resting in contact with the surface of the drum, the object of said plate being to throw the bags outwardly from the surface when they pass from beneath the band and to deliver them to a table or suitable receptacle placed beneath said plate. In the machine herein illustrated, in which the face *a* of the drum A and the band C resting in contact therewith are made twice as wide as necessary for the passage of one bag, the said belt is arranged in connection with the discharge devices of the bag-making machine in such a manner that the bags are received upon it at one side thereof, and a deflecting-plate, G, similar to that before used for delivering the bags from the drier, but extending only one-half the width of the belt, is located at the side of the belt and the drum opposite to the side thereof at which the bags are delivered from the machine.

Beneath the roller D, at the side of the face *a* of the drum opposite the guide-plate G, is arranged a device for moving or deflecting the bags laterally as they pass from beneath the belt, such device being arranged to deliver the bags again to the belt C near its point of contact with the face of the drum and at the opposite side of the face of the drum from that at which the bags are delivered to it.

One form of device for moving the bags laterally, as above mentioned, is illustrated in Figs. 1, 2, and 3, such device consisting, essentially, of a stationary guide-plate, H, (shown more clearly in Figs. 2 and 3,) which is supported from the frame of the machine and inclined from the outer edge of the cylindric face of the drum inwardly to a point near the middle thereof, so as to deflect the bag laterally for the purpose above mentioned. In connection with the said plate H, a second guide-plate, H′, may be used, the said plate preferably being arranged opposite the guide-plate H, so that the bags will be held and guided at both sides in their downward passage.

The guide-plates H and H′ are preferably

connected by a plate, H^2, formed integral with or attached to the said plates and arranged, generally, parallel with the surface *a* of the drum, so as to form with said plates H and H′ a spout or passage in which the bags are held in their downward and lateral passage over the face of the drum. The said plates may be supported in any desired manner, the means shown for the purpose consisting of braces *h*, secured to the said plates, and the rings B′ of the machine-frame.

The plate G, as herein shown and preferably constructed, is attached to the transverse bar or shaft G′, which is supported at its ends in lugs *g* upon the rings B′ of the machine.

The object of pivotally supporting the plate G is to permit the rear edge of said plate to be held yieldingly in contact with the drum, a lever, G^2, being, as herein shown, attached to the shaft G′ and connected at its free end with the machine-frame or other stationary object by a spring, *g*′, so as to retain the edge of the plate forcibly against the surface *a* of said drum. The bags passing from the plate G may fall upon a surface arranged to receive them, a receptacle, R, being herein shown as supported beneath said plate to receive the bags.

It is found in practice that the bags are liable to stick to the surface of the drum, so that it is necessary to bevel or sharpen the edge of the plate G in contact with the drum, so that it will enter beneath the bags and separate them from the surface thereof at the point at which they pass from beneath the belt. For the reason above stated also a narrow inclined plate, G^3, is placed with its rear edge in contact with the surface *a* of the drum beneath the roller D and over the guide H, said plate G^3 operating in a manner similar to the plate G to throw the bags outwardly from contact with the surface of the drum, so as to permit them to fall freely between the guides H and H′. The plate G^3 is preferably attached to and operated by the shaft G′, the plates G and G^3, as herein shown, being formed by cutting an aperture for the passage of the bags at one end of a single plate extending the full width of the face *a* of the drum and attached at its lower edge to the shaft G′, as clearly shown in Fig. 2.

The guide-plate H′ may obviously be made parallel with the plate H, as indicated in dotted lines in Fig. 3, so as to form a curved spout with parallel sides to guide the opposite edges of the bags; but where the space between the rollers D and D′ is relatively short, as herein shown, and the guide-plate H therefore considerably curved, the plate H′ is preferably flat and arranged in a vertical plane, so as to leave space beneath the plate G for the lateral movement of the upper end of the bag as it moves over the curved portion of the guide H, as clearly illustrated in full lines in Fig. 3.

In the passage of a bag between the guide-plates H and H′ the corner of the lower end of the bag, as it passes over the inclined portion of the guide H, is liable to strike upon the guide H′, so as to lessen or arrest the motion of the bag, this being liable to occur when the bag is in the position shown in outline in Fig. 3. To overcome the liability of stoppage of the bags in the spout from this cause, a roller, I, as illustrated in Fig. 3, may be located with a portion of its surface extending inside of the guide H′ and in such position that the lower corner of the bag will strike it in its descent between the guides. The said roller I may be driven positively by means of a suitable pulley upon its supporting-spindle, as illustrated in dotted lines in Fig. 3; but in practice it is found that by mounting the said roller I in bearings constructed to permit its free rotation, the constant and rapid passage of the bags through the spout will keep the said roller in continuous rotation, so that corner of each bag upon striking the roller will be immediately thrown downward, and the bags will pass uninterruptedly from the spout.

In Fig. 4 another form of device for moving the bags laterally upon the face of the drum is illustrated. In this case an inclined guide corresponding with the guide H is formed by means of an endless belt, J, placed over pulleys J′ and J^2, arranged in position to support said belt near the surface *a* of the drum, means being provided for rotating said pulleys, so as to move the portion of the belt J upon which the edge of the bag will strike in passing from beneath the roller D′ in a downward direction. The moving belt J may be used in combination with an opposite stationary guide similar to the guide H′, before described; or, as shown in said Fig. 4, a similar moving belt, K, supported on rollers or pulleys K′ and K^2, may be arranged to guide the bags at their opposite edges. The moving guide-belt K may in the same manner be used in connection with an opposite stationary guide-plate similar to the guide H. In the form of device shown in Fig. 4 a third roller, J^3, is preferably placed vertically above the lower roller, J′, so as to hold the lower part of the belt J parallel with the vertical portion of the belt K, the purpose of this construction being to prevent the bag from being twisted as it passes from between the guide-belts J and K, the bags being held by this means between the belts at the time of passing therefrom with its sides parallel with the margins of the surface *a* of the drum, as indicated in dotted lines in Fig. 4.

The several rollers J′, J^2, and J^3, supporting the belt J, and the rollers K and K′, supporting the band K, are, as herein shown, mounted on short bearing-spindles fixed in a plate, L, arranged beneath the guide-plate G and practically parallel with the sides *a* of the drum. The said plate L, besides affording a support for the several rollers mentioned, also acts as an outer guide-plate to prevent accidental escape of any of the bags passing between the guide-belts J and K. The said plate L, in the form of the device herein shown,

is rigidly attached to the frame of the machine by braces *l* corresponding with the braces *h*, before described in connection with the guide-plates H and H′. The guide-belts J and K may be driven in any desired or preferred manner, the device shown for this purpose at the left hand of Fig. 4 consisting of a pulley, *k*, upon the shaft of the roller K′, which is driven by a belt, *k′*, from a suitable counter-shaft.

Another and a preferred means of driving the belt J is illustrated at the right hand in Figs. 4 and 5, the latter being a detail section taken upon line *x x* of Fig. 4, and showing a portion of the rim of the drum. In the device referred to the margin of the rim A′ of the drum is provided with a rack, J^4, and the shaft of the roller J^2 is arranged to pass outside of the rim, and is provided with a pinion, *j*, constructed to intermesh with the rack, whereby the said belt is driven constantly in the proper direction for its operation.

The belt K may obviously be driven in a similar manner to that last described.

The guide-plates H and H′, as illustrated in Figs. 1, 2, and 3, are fixed or immovable, and in the passage of bags of a less width than will fit closely between the lower portions of said guides such bags are liable to pass from between the guides in an oblique position, as indicated in dotted lines in Fig. 3. This will not affect the operation of the machine, for the reason that the bags will not be turned so as to extend to a greater width than that of the widest bags adapted to pass through the machine, the only objection to the bags passing around the drum in the position mentioned being that in such case they are delivered to the receptacle R in the same position, and are thereby liable to arrange themselves irregularly in falling therein. To remedy this difficulty, an adjustable pin, g^2, may be placed in the plate in position to be encountered by the upper corners of the bags, as indicated in dotted lines in Fig. 3, whereby the bags will be slightly turned in their passage over the plate, so as to fall squarely into the receptacle.

Instead of making the guide-plates H and H′ immovable, as last described, said plates may be adjustably connected with the side pieces of the frame, as is, for instance, indicated in Figs. 6 and 7, in which the braces *h* are made in two overlapping parts provided with slots and held together by clamping-screws *h′*. When this construction is used, the plate H^2 is preferably made in two parts, H^3 and H^4, secured, respectively, to the plates H and H′, and arranged to slide one upon the other, the part H^3, as herein shown, being placed inside the part H^4, so that the bags in their lateral movement will not be liable to strike the edge of the overlapping plate.

By making the guides adjustable in the manner described, the space between the lower portions of the guides may be changed, so that bags of any size may be delivered from the guides with their sides vertical.

The improvements herein described may obviously be applied to any drier operating upon the general principles hereinbefore mentioned, whether such drier is used in connection with a bag-making machine, as herein shown, or otherwise; and this patent is therefore intended to cover such improvements as applied to driers adapted for operation upon articles of any character or size, and used either separately or in connection with other machinery.

I claim as my invention—

1. The combination, with the revolving drum of a drying apparatus and a belt placed around a portion of the circumference of the drum and constructed to move therewith, of means constructed to move the articles being dried laterally upon the face of the drum after the passage of such articles between the drum and belt, substantially as and for the purpose set forth.

2. The combination, with the revolving drum of a drying apparatus, a belt placed around a portion of the circumference of the drum, supporting-pulleys for the belt, and means for rotating the drum, of means constructed to move the articles being dried laterally upon the face of the drum between each passage of such articles around the drum, substantially as and for the purpose set forth.

3. The combination, with the revolving drum of a drying apparatus and a belt placed around a portion of the circumference of the drum and constructed to move therewith, of a guide constructed to deflect the articles being dried laterally upon the face of drum after each passage of such articles between the belt and the drum, substantially as and for the purpose set forth.

4. The combination, with the revolving drum of a drying apparatus and a belt placed around a portion of its circumference, of a spout constructed to receive the articles being dried from between the belt and drum after passing around the drum and to deliver said articles between the belt and drum at a point upon the face of the drum laterally distant from that at which they were received, substantially as and for the purpose set forth.

5. The combination, with the revolving drum of a drying apparatus and a belt placed around the drum for a portion of its circumference and constructed to move therewith, of pulleys D and D′, constructed to support said belt at the points at which it approaches and leaves the drum, and means located between said pulleys constructed to move the articles being dried laterally upon the face of the drum, substantially as and for the purpose set forth.

6. The combination, with the revolving drum of a drying apparatus and a belt placed around the drum for a portion of its circumference, of opposite stationary guides, as H and H′, constructed to deflect the articles being dried laterally upon the face of the drum, substantially as and for the purpose set forth.

7. The combination, with the revolving drum of a drying apparatus, a belt placed

around the drum for a portion of its circumference and constructed to move therewith, and pulleys D and D′, located one above the other for supporting the belt, of guides H and H′, constructed to deflect the articles being dried laterally upon the face of the drum, substantially as and for the purpose set forth.

8. The combination, with the frame of a drying-machine, a revolving drum supported therein, and a belt placed around a portion of the circumference of the drum and constructed to move therewith, of a guide, H, located adjacent to the face of the drum between the points at which the belt approaches and leaves the latter, and means, as *h*, for supporting the said guide-plate from the machine-frame, substantially as and for the purpose set forth.

9. The combination, with the frame of a drying-machine, a revolving drum supported therein, and a belt placed around a portion of the circumference of the drum and constructed to move therewith, of a guide, H, located adjacent to the face of the drum between the points at which the belt approaches and leaves the latter, and means for supporting the said guide from the machine-frame constructed to permit the lateral adjustment of said guide, substantially as and for the purpose set forth.

10. The combination, with the revolving drum of a drying apparatus and a belt placed around the drum for a portion of its circumference and constructed to move with the drum, of opposite stationary guides, H and H′, and means for adjusting the distance between said guides, substantially as and for the purpose set forth.

11. The combination, with the revolving drum of a drying apparatus and a belt placed around the drum for a portion of its circumference and constructed to move with the drum, of opposite stationary guides, H and H′, means for adjusting the distance between the said guides, and overlapping plates H^3 and H^4, attached to the guides H and H′, respectively, substantially as and for the purpose set forth.

12. The combination, with the revolving drum of a drying apparatus and a belt placed around the drum for a portion of its circumference, of means constructed to move the articles being dried laterally upon the face of the drum, and a stationary deflecting-plate, G, extending partially across the face of the drum for discharging the articles therefrom after they are dried, substantially as described.

13. The combination, with the revolving drum of a drying apparatus and a belt placed around the drum for a portion of its circumference, of a guide, H, constructed to deflect the articles being dried laterally with reference to the face of the drum, and an inclined plate, G^3, placed in contact with the face of the drum above the said guide, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

ALBERT C. GETTEN.

Witnesses:
C. CLARENCE POOLE,
OLIVER E. PAGIN.