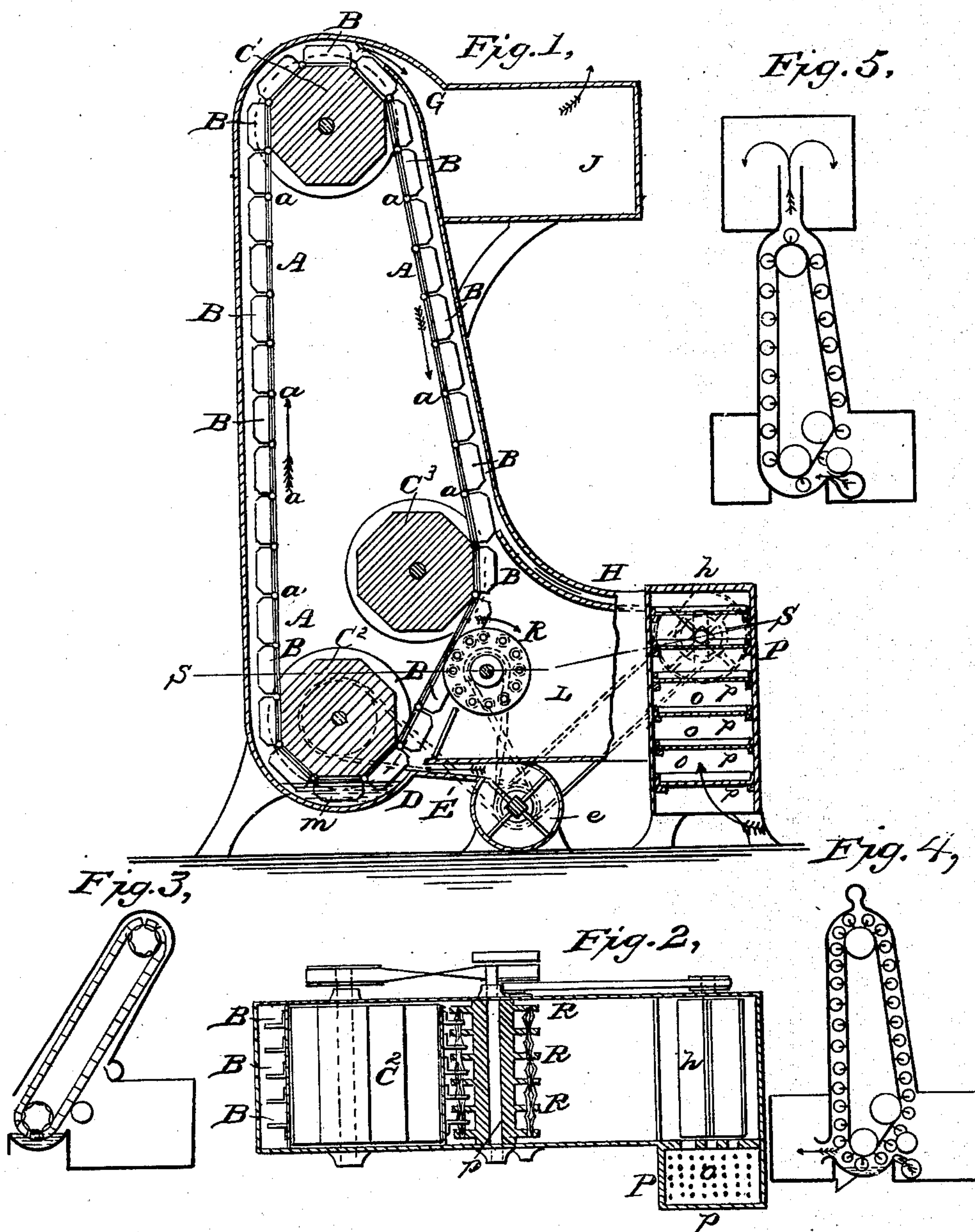


C. WAHL.  
Drying Glue.

No. 80,249.

Patented July 21, 1868.



WITNESSES:  
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# United States Patent Office.

CHRISTIAN WAHL, OF CHICAGO, ILLINOIS.

*Letters Patent No. 80,249, dated July 21, 1868.*

## IMPROVEMENT IN MACHINES FOR DRYING GLUE.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, CHRISTIAN WAHL, of Chicago, in the State of Illinois, have invented certain new and useful Improvements in Machines for Drying Glue; and I do hereby declare that the following is a full and exact description thereof.

My invention produces the finished glue in thin flakes, of the best quality, by a continuous operation, which may be effected very rapidly, and with little labor. Some portions of my apparatus have been before patented, but the features have not, so far as I am aware, been before combined, and several features of importance I believe to be entirely new.

I will first describe what I consider the best means of carrying out my invention, and will afterwards designate the points which I believe to be new therein.

Figure 1 is a side elevation of the entire apparatus, with the side removed to give a good view of the interior.

Figure 2 is a cross-section on the line S S in fig. 1.

Figure 3 represents some of the details on a small scale.

Figure 4 represents another arrangement of the parts, which is, on some accounts, preferable.

Similar letters of reference indicate corresponding parts in all the figures.

A is an endless chain, composed of links, joined together at the points *a*, as represented. B are plates of metal, glass, porcelain, enamelled iron, or other suitable material, on which the glue is dried in a thin coat, which cracks and comes off with facility as the operation of drying becomes completed.

C<sup>1</sup> C<sup>2</sup> are polygonal prisms or drums, mounted on shafts *c c*, one above the other, and at such distances apart as the work will require, or as the dimensions of the building will allow. C<sup>3</sup> is an additional prism, mounted out of the central line, and which performs an important function in the mechanism, as will appear further on. The breadth of each of the flat faces of each prism is equal to the length of one of the links of the chain A, and the several links of the chain apply successively on the flat faces as the prisms revolve. D is a trough or vessel, which contains the glue in a liquid condition. It may be kept at the proper temperature by steam-pipes or other approved means. I use steam, or the like, when required to heat, and pass through currents of cold air when required to reduce the temperature. I propose, in some cases, to blow air through pipes immersed in the glue, and to let it rise in small bubbles through the glue, to aid in evaporating it.

The plates B, after being immersed in the glue *m*, so as to coat the surfaces with fluid, are carried up by the movement of the chain A, and are, for a long time, exposed to currents of air, which evaporate the moisture. I consider it important to cool the glue as soon as possible after it is lifted out of the vessel D. One of the most convenient modes of effecting this is to expose it to a blast of cold air.

E is a broad flue or spout, from which a cold blast is discharged by the action of the fan *e*. The plates B are carried up in a series on one side of the apparatus, and descend upon the other, being supported upon the chain A, which is carried over the prisms C<sup>1</sup> C<sup>2</sup> C<sup>3</sup>, which prisms are slowly turned, either continuously or at intervals, by means of a steam-engine, or other suitable power not represented. During the whole of the descending motion, the plates B are exposed to air chemically dried. This air is supplied through the flue H by means of a fan, *h*, it being previously robbed of its moisture, and reduced to a very thirsty condition, by means of chemicals.

The chemicals employed may be chloride of calcium, crystallized sulphuric acid, quicklime, or any other which will serve in the manner represented. The chemicals are distributed, as indicated by O, on the gratings *p*, in a sufficiently capacious chamber, P. The air is drawn up through these several gratings, and exposed very thoroughly to the action of the chemicals, which absorb its moisture, and it is then impelled by the fan, or other efficient means, into the apparatus, and serves there efficiently in drying the glue. It will be understood that the chemicals may be afterwards restored, entirely or partially, to their original condition by heat or other



approved means, so that the same material may, after having been rid of its moisture, be employed, over and over, a number of times.

I can, if preferred, use the air thus chemically dried in a perfectly cold condition, that is to say, at the ordinary temperature of the atmosphere, but I propose, especially in cold weather, to warm the air in addition to its chemical preparation. This warming may be effected by a suitable air-heating furnace.

The ascent of the chain A may be exactly vertical, as represented, and the descent may be vertical until it reaches the prism C<sup>3</sup>. From there the chain A runs inclined, as represented, until it passes under the lower prism, C<sup>2</sup>. In traversing the incline between the prism C<sup>2</sup> and the prism C<sup>3</sup>, any particles of glue adhering to the plates B are removed by the means now to be described. R R, &c., are disks, of iron or other suitable material, carried on the rapidly-revolving shaft r, and formed into brushes on each face by fixing bristles or analogous material in the faces of the disk, as indicated. These disks alternate in position with the plates B, on which the glue is dried; that is to say, each plate B, in passing the revolving brush, is received between two of the disks R R, and is brushed on each side by the bristles thereon. Under ordinary circumstances, all, or nearly all, of the flaky glue will fall from the plates before their arrival at the brush, but the brush is a very efficient means of removing any particles which may occasionally adhere, and, by being again immersed in the glue, would tend to form bunches of glue. My brush would perform the same effect, in part, if it were not rotating. So, also, the rotating clearer would perform the same effect if it were not a brush, and were simply covered with rubbing-surfaces of flannel, or even of wood, but I prefer to make it a revolving brush, as described.

It will be understood that the cold air blown in by the fan e may, with advantage, be chemically dried also, if preferred, but I do not deem it generally economical to do so. The air, having performed its first function of chilling the glue on the plates, circulates along the ascending side of the apparatus, and escapes near the top. The chemically-dried air circulates on the other, the descending side of the apparatus, and mingles with the other air near the top, and both together flow out, through the passage G, into a capacious chamber, J, which is covered, at the top and upper sides, with wire gauze. It will be understood that the air is ordinarily blown in a gentle current, but it is always liable, with every precaution, to carry out considerable quantities of the light flaky glue. The chamber J is provided for gathering these flakes by allowing the air to come to rest in the chamber, under which condition the flakes of solid material will, of course, fall more or less rapidly to the bottom, while the air escapes, in a very gentle current, through the widely-extended gauze at the top.

I propose to employ deflectors, of vulcanized rubber or other suitable material, on the outside of the air-passages, to compel a proper circulation of the air. I can also carry analogous deflectors on the chain A, if necessary.

The special function of the prism C<sup>3</sup> is to hold the descending part of the chain, and, consequently, the descending plates, in such position that the glue falling by gravity therefrom cannot fall into the tank D, but will be received in the receptacle L, from which it may be removed constantly or at intervals. The glue received in L may be mingled with that received in the gauze chamber J, or they may be kept apart, according as it is found desirable in practice.

Fig. 3 shows, in miniature, an inclined mode of construction, which will allow the glue to fall outside of the tank D, but it is not as good as that shown in the earlier figures, and is unworthy of a long description. Fig. 4 shows a mode of construction, with the air-current entering at the top, and with the gauze chamber J and the glue-chamber L in one. This is also not worthy of detail.

Figure 5 shows, in a similar small scale, a plan by which, while carrying out the main features of the apparatus, as above described, the gauze chamber is located at the highest point in the apparatus. This may, in some situations, be preferable.

The advantages due to most of the novel features of my invention will be sufficiently obvious from the drawings and description. It may be expedient, however, to direct special attention to the advantages of one part of my apparatus. The links of the chain A, by being rigid, and of considerable length, and jointed together, as represented, and working over polygonal pulleys or prisms, as described, allow me to make the plates B of such length that their ends may abut, or very nearly abut, together. This gives a much greater surface, in a given length of chain, for the evaporation of the water from the glue; in other words, it gives more working-surface. The arrangement described in the patent issued to J. A. Lighthall and R. Lighthall, April 28, 1868, describes a belt carrying plates, on which the glue is received by immersion in a tank, and from which it falls by gravity when sufficiently dried by currents of air; but the Lighthall flexible belt, working over cylindrical pulleys, would not allow the plates to occupy the whole surface, and to be held firmly and true in position all the way around, as my construction and arrangement will. Aside from its other advantages, it is almost essential to the success of my revolving clearer R, or, indeed, to the success of brushing or clearing in any manner, that the plates B be supported very firmly. My links, hinges, and polygons, in combination with each other, and with the other parts, make a completely successful machine.

Apparatus for pouring or squirting the liquid glue upon the surfaces B may be substituted for the tank D, if preferred.

Having now fully described my invention, what I claim as new therein, and desire to secure by Letters Patent, is as follows:

1. I claim removing the thin glue adhering to the surfaces B, by means of a brush, R, against which the surfaces are presented after drying, and before being again immersed in the glue, for the purposes herein set forth.

2. I claim revolving the brush or clearing-device R, so as to actively rub the surfaces of the drying-plates, however slowly they may be moving, substantially as herein set forth.



3. I claim the connecting-pulley C<sup>3</sup>, arranged to cause the carrying-chain to turn partially around it in its descent, substantially as and for the purposes herein described.

4. I claim the employment of rigid links A, polygonal pulleys C<sup>1</sup> C<sup>2</sup> C<sup>3</sup>, tank or caldron D, and means for impelling drying-currents of air in connection therewith, as and for the purposes herein set forth.

5. I claim the gauze chamber J j, arranged, as represented, relatively to the air-currents and to the travelling-plates B, carrying the glue to be dried, substantially as herein set forth.

6. I claim, in connection with mechanism for drying glue, as specified, chemically drying the air previously to its introduction to the apparatus, substantially as and for the purposes herein set forth.

In testimony whereof, I have hereunto set my name in presence of two subscribing witnesses.

CHRISTIAN WAHL.

Witnesses:

C. C. LIVINGSTON,

W. C. DEY.