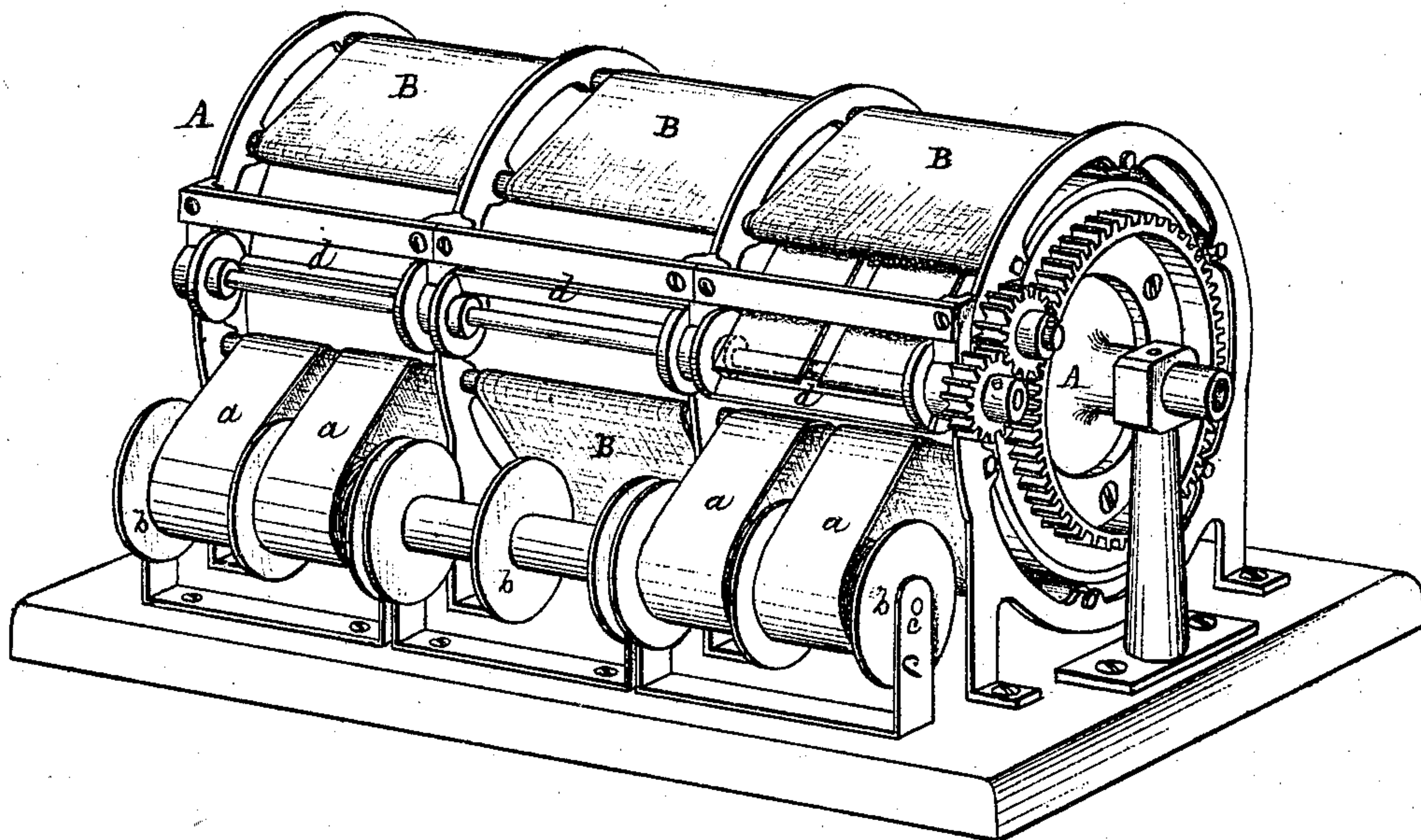


*L. Dodge,*  
*Paper Dyer.*

*No. 104,282.*

*Patented June 14, 1870.*



*Levi Dodge by*  
*A. Pollock*  
*Att'y*

**WITNESSES.**

*W. Bailey*  
*Wm. H. McCabe*  
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# United States Patent Office.

LEVI DODGE, OF WATERFORD, NEW YORK.

Letters Patent No. 104,282, dated June 14, 1870.

## IMPROVEMENT IN THE MANUFACTURE OF PAPER.

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

### To whom it may concern :

Be it known that I, LEVI DODGE, of Waterford, in the county of Saratoga and State of New York, have invented certain new and useful Improvements in the Manufacture of Paper, of which the following is a specification.

This invention relates to the drying of paper, and particularly of thick paper, which is slow to dry.

The drying apparatus which at present is usually employed is generally connected, and forms one machine with the "making" apparatus, and consists of a considerable number of heated cylinders geared together, over and under which the paper sheet, as it is fed on an apron from the "making" apparatus, travels until it is dried.

The principal objections to this mode of drying are, that it requires too much room or space, as the apparatus is necessarily large, and it is also expensive, both on account of the cost of the apparatus, and of the power and incidental expenditures required to run the same, and to keep it in working order; for instance, a "No. 50" sheet of paper weighing one pound takes fifteen minutes to dry, and, as the "making" machine from which the sheet is fed runs at the rate of sixty feet per minute, the drying apparatus, which is connected with it, must run at the same rate of speed, so that the paper will travel nine hundred feet before it is dried. It is manifest, therefore, that the apparatus is necessarily large in order to admit of this travel of the paper, and must occupy much space.

In the above example, there would be, in the drying apparatus, from one hundred and seventy-five to two hundred heated rolls geared together, and, necessarily the expense of the apparatus would be great. Moreover, a loss by radiation of heat from so many cylinders would unavoidably occur, the consumption of lubricating-oil and cost of steam-fittings would be considerable, and, owing to the friction, more power would be required to run the machine than if but a single drying-cylinder were employed.

The employment, however, of a single cylinder, when the drying apparatus is connected with the making machine, is impracticable, as the drier must be run at the same rate of speed as the "making" machine, and consequently the paper will travel around, and leave the drying-cylinder before it is dry; and therefore, in all cases where the making and drying apparatus form one machine, a great number of drying-cylinders, or a great extent of drying-surface, is required, in order to properly dry the paper.

My invention is intended to obviate these difficulties; and to this end, instead of allowing the paper

to pass directly from the making machine to the drier, I wind it upon reels as it comes out of the making machine, and then convey the reels to a drying apparatus, containing one or more cylinders, the speed of which is so proportioned to their size and the thickness of the paper that, by being once carried around the cylinder or cylinders, the paper will be dry, and ready for removal.

My invention consists, therefore—

First, in subjecting the paper, after it leaves the making machine, and before it reaches the drier, to an intermediate reeling.

Second, in the combination, with the drier, of a series of reels, from which the paper to be operated on is fed to the drying-cylinder or cylinders.

The manner in which my invention is or may be carried into effect will be fully understood by reference to the accompanying drawing, which represents a perspective view of so much of a drying apparatus as is needed in order to illustrate my invention.

The paper to be dried is represented at *a*, and the reels upon which the same is wound are shown at *b*.

The paper, after being produced in any suitable making machine, such, for instance, as that for which I have obtained Letters Patent of even date herewith, is, when it passes out from such machine, wound upon one or more reels.

When the reel has received the requisite quantity of paper, it is removed to the drier, and its journals are placed in bearings, *c*, formed to receive them, and to support the reel in proximity and in proper position with relation to the drier.

The drier, in this instance, consists of a single cylinder, *A*, with hollow journals, for the admission of steam to its interior, whereby it is heated in the usual manner; and around the cylinder are arranged one or more endless aprons or bands, *B*, passing over rollers, and around the periphery of the cylinder, so as to hold the paper, and carry it along as the cylinder revolves.

When but a single cylinder is employed, its speed is so graduated, with respect to its diameter and temperature, and to the thickness of the paper to be operated on, that the paper, by being carried once around with the cylinder, will be dry and ready for removal, in accordance with the method described in Letters Patent No. 56,732, granted to me on the 31st July, 1866.

In case one cylinder be insufficient for drying purposes, two or more may be employed, their speed being also graduated in a manner similar to that above described, so that the paper, after passing over the last cylinder, will be dry and ready to be removed.



Cutters *d* may be employed, which are geared with the drying-cylinder, as usual, so as to cut the paper, as it passes from the cylinder, into any desired lengths.

One, two, three, or more reels may be combined with the drier, as desired.

Having now described my invention, and the manner in which the same is or may be carried into effect,

What I claim, and desire to secure by Letters Patent, is—

1. The method, herein described, of drying paper made by machinery independently of the "making" operation.

2. The intermediate reeling of the paper between the "making" and the drying operations, as set forth.

3. The apparatus or machinery substantially as shown and described, for operation as herein set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

LEVI DODGE.

Witnesses:

A. POLLOK,  
WM. H. MCCABE.