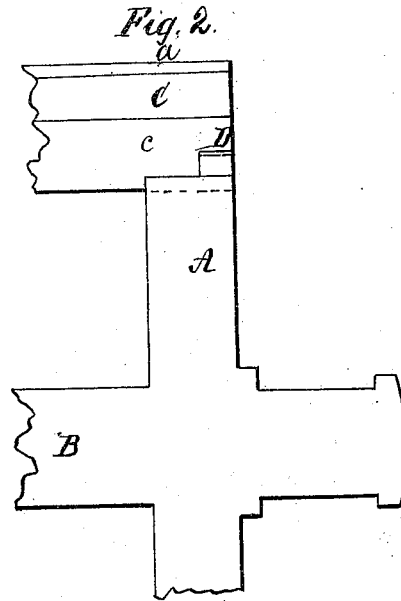
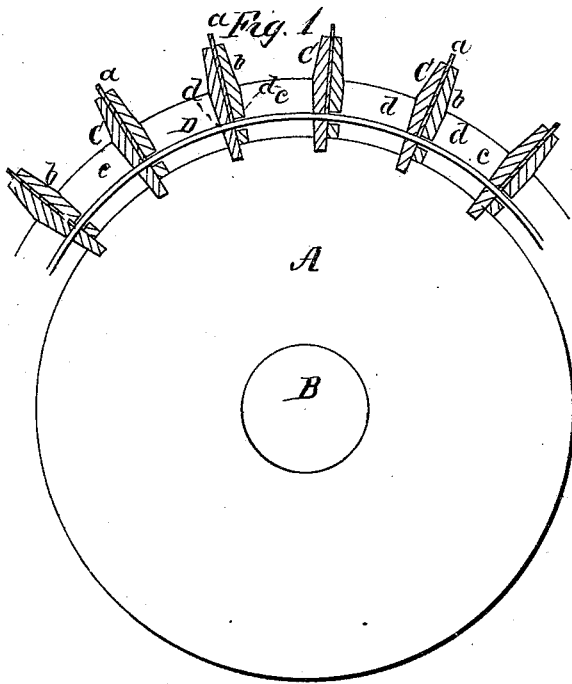


*C.T. Frost.*  
*Pulp Grinder.*

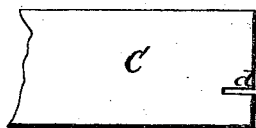
*N<sup>o</sup> 53,598. Patented Apr. 3, 1866.*



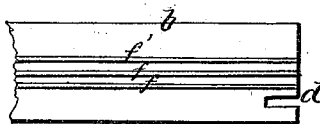
*Fig. 3.*



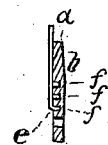
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



*Witnesses*

*Horatio L. Parker—*  
*[Signature]*

*Inventor*

*Clinton T. Frost*

# UNITED STATES PATENT OFFICE.

CLINTON T. FROST, OF MEDFIELD, MASSACHUSETTS.

## IMPROVEMENT IN GRINDING-CYLINDERS OF PAPER-ENGINES.

Specification forming part of Letters Patent No. 53,598, dated April 3, 1866.

*To all whom it may concern:*

Be it known that I, CLINTON T. FROST, of Medfield, in the county of Norfolk and State of Massachusetts, have invented a new and useful Improvement in Paper-Engine Cylinders; and I do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is an end elevation of a portion of a paper-engine cylinder constructed in accordance with my invention. Fig. 2 is a longitudinal section of the same. Fig. 3 is a section of a form of knife to be hereinafter explained. Figs. 4 and 5 are side views of the abutment-bars and supports, to be hereinafter explained. Fig. 6 is a section of the grinding knife or plate and its support in a modified form.

My invention is an improved construction of paper-engine cylinders; and it consists in so applying the grinding plates or knives that they may be moved outwardly from the circumference of the cylinder as fast as they wear under the operation of grinding paper-pulp; and further, in so constructing them and their holding bars or supports as to maintain them firmly in position as fast as they may be moved outward.

The mode first practiced of constructing paper-engine cylinders was to prepare a cylinder of wood, into which the grinding-knives, formed as shown in Fig. 3, were inserted for about one-third their width around its periphery, and the spaces between them partly filled with wood. As these knives, which were made of iron faced with steel, wore down, in order to sharpen them they were "chipped," as it is termed, without removing them from the cylinder, the operation being a laborious one and requiring much time for its accomplishment. After these knives have been worn down a comparatively short distance, on account of the increasing thickness of their cutting-edges, they are thrown aside as useless or forged over anew. In addition, the varying distances of their cutting-edges from the base of support renders their action irregular and uncertain, and the whole cylinder must be lowered as fast as they wear.

A later mode of constructing these cylinders has been to employ, instead of these knives, so constructed, a series of thin steel plates, sufficiently thin to always present a cutting-edge, and corrugated to obtain additional strength.

These plates have been fixed stationary with the cylinder and the spaces between them filled with wood, which is cut away as fast as the steel is worn down to it. In this construction of the cylinders, also, they must be raised and lowered to accommodate them to the wear of the plates to much greater extent than in my invention, and the whole outer circumference of the cylinder gradually diminishes in size, while in mine, as before stated, only the knives are worn, and are moved outward as fast as they wear, thus always keeping their outer edges nearly in the same position with respect to their base of support.

In the drawings, A A denote two cast-iron or other metallic heads, united together by a shaft, B, running axially through them. Inserted within, and extending a short distance outwardly from the peripheries of these heads, and running longitudinally from one to the other of them, is a series of metallic bars, C C C, &c., these bars serving as abutments for the support of a series of thin steel grinding-plates, a a a, &c., which are placed against them and so as to extend a short distance beyond their outer edges, as shown in the drawings.

Another support or backing, b, is then to be placed against the opposite side of the plates a a a, and a key, c, of wood or metal, driven between the said backing b and the next adjacent abutment C, this serving to hold the plates securely in place against any side pressure. In practice it may be found necessary to employ two keys in place of the key c, but one will be probably sufficient.

The abutments C, as well as the supports b, are further to be retained in place by means of a metallic ring, D, inserted in notches d, formed in their ends, as shown in the drawings, the notch in the support b being larger than the ring to allow it to slide easily therein, the same being in order that after the key c has been removed from the cylinder the support b may be loosened and allow the grinding-plates a to be easily removed for the substitution of new ones without removing the ring D from the cylinder, as this ring does not pass through the grinding plates or knives as in all other forms of construction of cylinders.

In order to hold the plates a in position against any radial strain or pressure, as fast as they may be moved outward the lower edge of each plate is bent at a right angle into a short lip, e, which rests in a groove, f, formed in the

side of the support *b*, the said support being provided with a number of such grooves, as shown in Fig. 5. Instead of this arrangement of grooves and the lip a strip of metal may be placed under each plate *a* as fast as it is pushed outward.

I do not claim, broadly, the employment of thin steel bars in the construction of paper-engine cylinders, nor corrugating them for greater strength; neither do I claim an improved bed-plate for paper-engines, as shown in United States Patent, No. 47,849, and granted on the 23d day of May, 1865.

I claim—

1. The application of the grinding-plates *a* to the cylinder of paper-engines in such manner that they may be moved outwardly from its circumference and secured in position as occasion may require, as hereinbefore explained.

2. The peculiar construction and arrangement of the plate *a* and its support *b*—that is, with the lip *e* and grooves *f f*—substantially in manner and for the purpose as above described.

CLINTON T. FROST.

Witnesses:

JOHN H. HORNE,  
S. FRANK HOLWAY.