A. F. ANDREWS.

Feeding Powder to Blasting-Fuse.

No. 17,863. Patented July 28, 1857.

Fig 1.

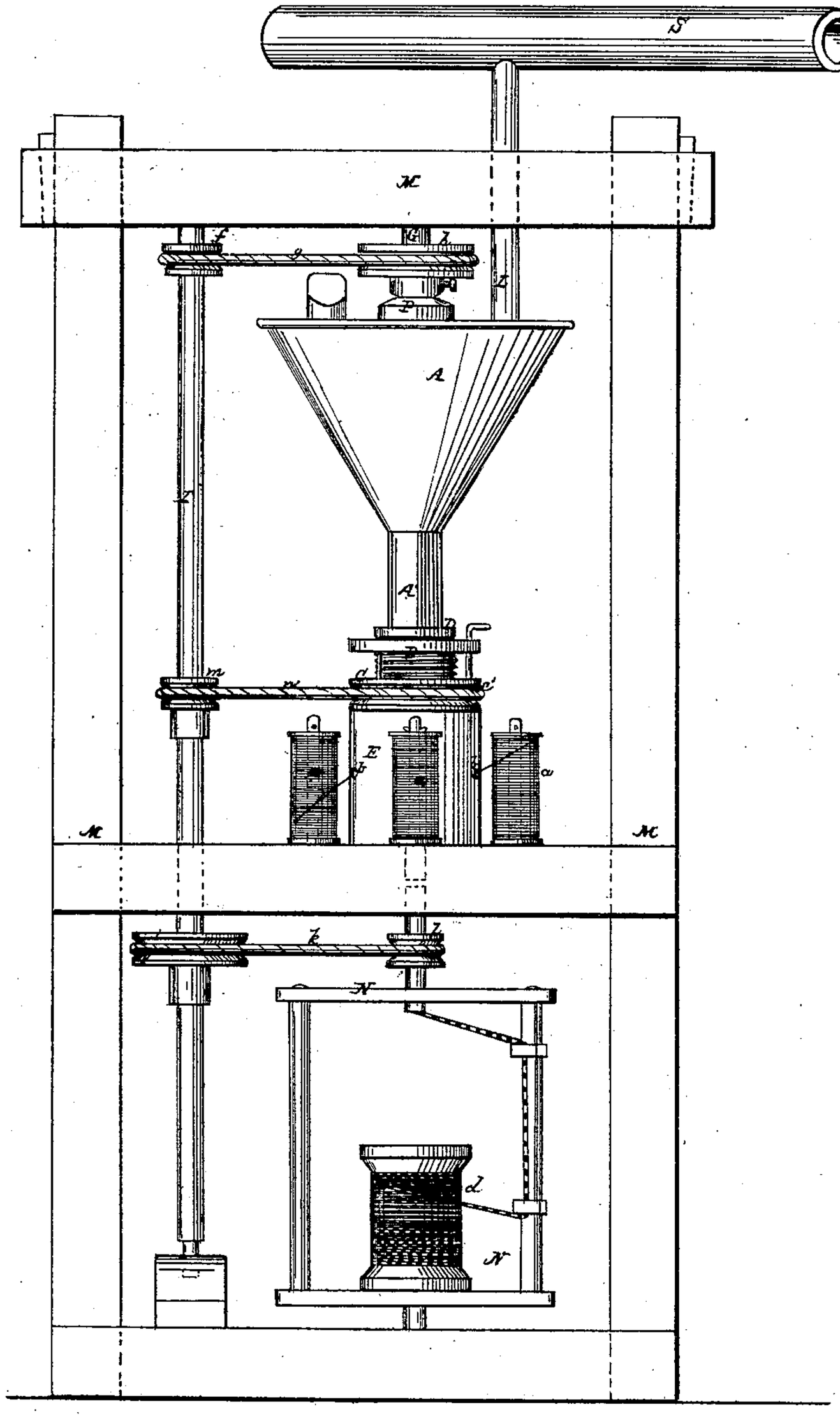
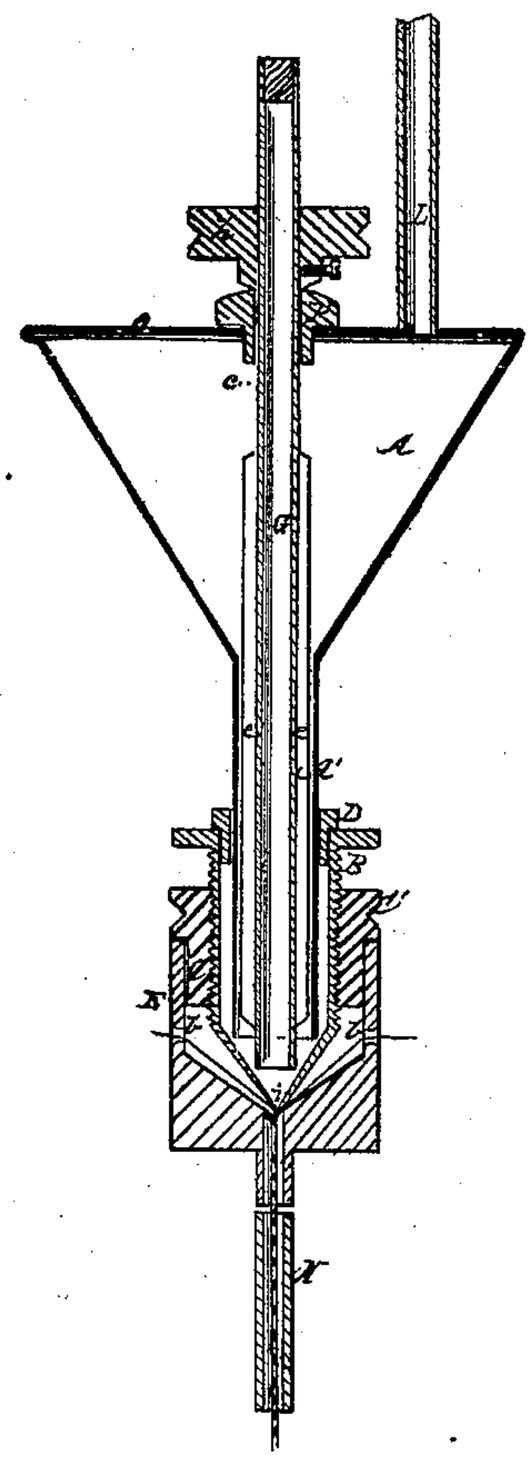


Fig 2.



UNITED STATES PATENT OFFICE.

A. F. ANDREWS, OF AVON, CONNECTICUT.

IMPROVED FUSE-MAKING MACHINE.

Specification forming part of Letters Patent No. **17,863**, dated July 28, 1857.

To all whom it may concern:

Be it known that I, ALBERT F. ANDREWS, of Avon, in the county of Hartford and State of Connecticut, have invented a new and Improved Method of Feeding the Powder in the Manufacture of Fuse; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front elevation of a machine for making fuse having my improvements applied. Fig. 2 is a central section of the filling apparatus.

Similar letters of reference indicate corresponding parts in both figures.

The principal difficulty heretofore experienced in the manufacture of fuse has been caused by the great friction of the powder in running into the fuse, and its strong tendency to lump in damp or extremely hot or cold weather.

The object of my invention is to obviate this difficulty; and to this end the nature of my invention consists, chiefly, in admitting a blast or compressed air into and among the powder as the latter is on its way to the fuse; and in combination with the admission of air, as above stated, among the powder, my invention consists in the employment of certain means of agitating or stirring the powder, to assist in its delivery from the filling apparatus to the fuse.

To enable others to make and use my invention, I will proceed to describe its construction and operation.

M is the framing of the machine.

E is a stationary hollow piece of metal, which I call the "laying-piece," having the bottom of its interior of the form of an inverted cone, and having openings *b b* in its sides to admit the threads from the bobbins *a a*, which are arranged in a circle round its exterior.

N is the revolving flier, arranged below the laying-piece E, for the purpose of laying the threads and forming the fuse, which is taken up on the bobbin *d*, that is placed within the said flier. The laying of the threads takes place near the bottom of laying-piece E, and at the laying-point the filling of the fuse with powder takes place.

A is a stationary hopper to contain the powder, closed at the top by a tight cover.

A′ is a conducting-tube from the bottom of said hopper.

B is the feeding-tube, having its bottom of funnel shape, with a small orifice, *i*, which occupies a position near the bottom of the laying-piece E, said tube screwing into what I call the "chair-piece" C, which fits snugly into the laying-piece E, and is provided with a tight collar, C′, which rests on the top of E. The stationary conducting-tube A′ extends nearly to the bottom of the feeding-tube.

D is a guide-collar, fitted into the top of the feeding-tube B and around the conducting-tube. This collar may be fitted as a stuffing-box.

G is the air-tube for conducting air to the feeding-tube, said tube G, being fitted to a bearing in the upper part of the frame, passing through an air-tight guide, P, in the center of the cover of the hopper A, and descending through the conducting-tube A′ into the bottom of the feeding-tube nearly to the orifice *i*. This tube G is closed at the top, but open at the bottom, and has an opening, *c*, in one side, near the top of the hopper, and it has attached to its sides a number of thin metal rings, *e e*, which nearly touch the sides of the conducting-tube A′.

L is a branch pipe leading from a pipe, S, which is supplied constantly with air from a blower or other air-compressing apparatus.

O is an orifice in the cover of the hopper, to fill the latter with powder. This orifice may be fitted with a loaded valve, to serve as a safety-valve to permit the escape of air when there is too great a pressure of air in the hopper.

T is a constantly-rotating upright shaft, working in bearings in the framing M, and receiving motion through any suitable agency. This shaft carries a pulley, *f*, from which a band, *g*, runs round a pulley, *h*, on the upper part of the air-tube, to give a rotary motion to the latter. It also carries a pulley, *j*, from which a band, R, runs round a pulley, *l*, on the flier N, to drive the latter, and it carries a third pulley, *m*, from which a band, *n*, runs round a groove in the collar C′ of the chair-piece, to give rotary motion to said chair-piece, which latter carries with it the feeding-tube B.

The operation is as follows: The hopper having been filled with powder up to or nearly up to the orifice *c*, the shaft T is set in motion, and the blower or air-compressing apparatus, with which the pipe S is in communication, is at the same time set in operation. The air-tube G, with its wings *e e*, and the feeding-tube B are thus caused to rotate, while the hopper A and powder-conducting tube A′ and the laying-piece E remain stationary, and the powder in the hopper A is subjected above its surface to a pressure of air, which also penetrates it in a downward direction, while air entering the orifice *c*, and being forced down the tube G, acts upon the powder which has descended the conducting-tube at the orifice *c*, to expel it from the feeding-tube. The revolution of the feeding-tube B around the stationary conducting-tube A′ undermines the column of powder in the conducting-tube at the bottom, and breaks it or separates the grains, and makes its condition such that it will not obstruct the orifice *i* of the feeding-tube, and this operation, combined with the motion of the winged air-tube G, assists the powder to obey the laws of gravity and descend the conducting-tube freely; but of greater importance than the above action is the effect of the compressed air acting on the top of and penetrating downward through the column of powder in the hopper and conducting-tube and that conveyed down the tube G to the point of escape of the powder from the feeding-tube—viz., the orifice *i*, which is the only point of escape for the whole of the air, as well as for the powder.

By the above-described action of the air, the powder is forced into the fuse (which is laid immediately below and in contact with the bottom of the feeding-tube B) in a uniform trail.

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

1. The admission of a blast or compressed air upon, into, among, or through the powder on its way through the passage or channel by which it is conveyed to the fuse, substantially as and for the purpose herein set forth.

2. Giving the feeding-tube a rotary motion outside of a conducting-tube and inside a laying-piece, both of which are stationary, substantially as and for the purpose herein specified.

A. F. ANDREWS.

Witnesses:

DARIUS SPERRY,

R. N. ANDREWS.