(No Model.) 2 Sheets—Sheet 1.

J. D. MANTION, W. C. MACDONALD & J. J. RILEY.

APPARATUS FOR MANUFACTURING MATCHES.

No. 346,597. Patented Aug. 3, 1886.

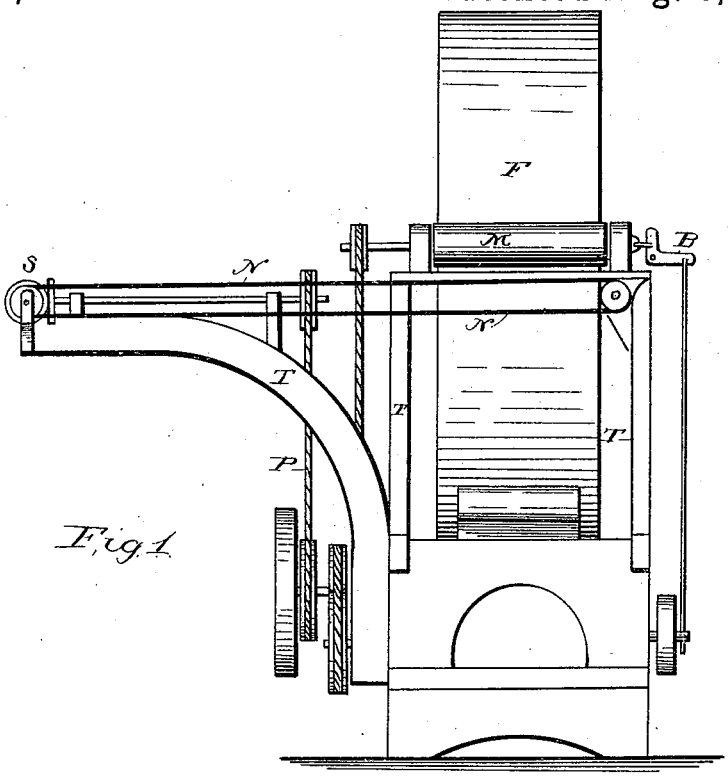

Fig. 1.

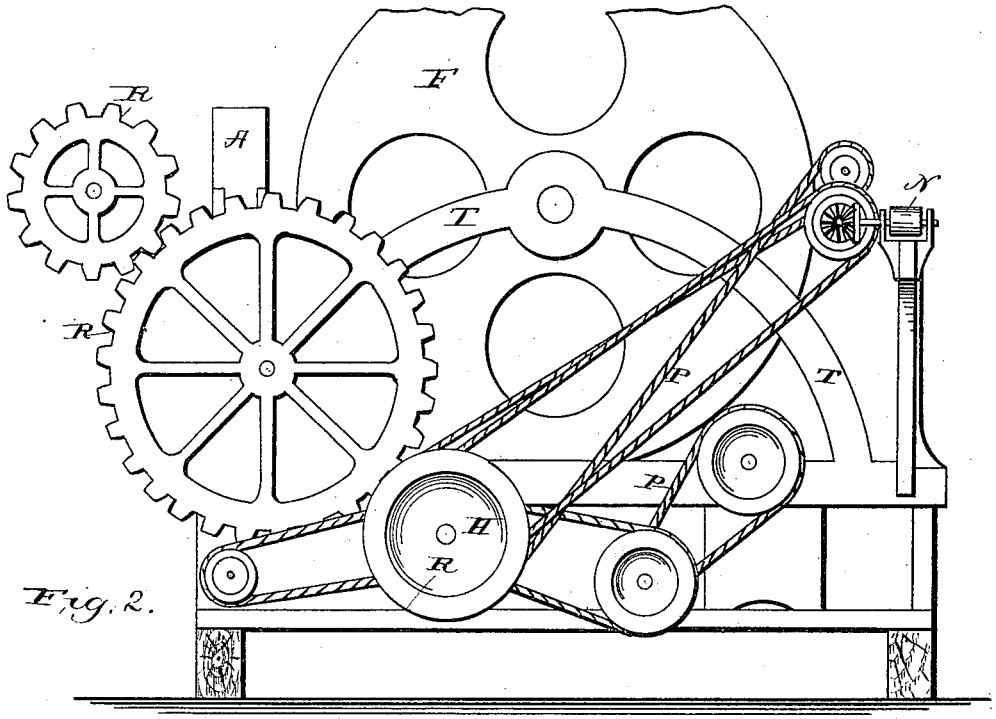

Fig. 2.

Witnesses { Wm. A. Rosenbaum, H. A. Daniels }

Inventors, John D. Mantion, William C. Macdonald, John J. Riley, By W. Burris — Atty.

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Fig. 3.

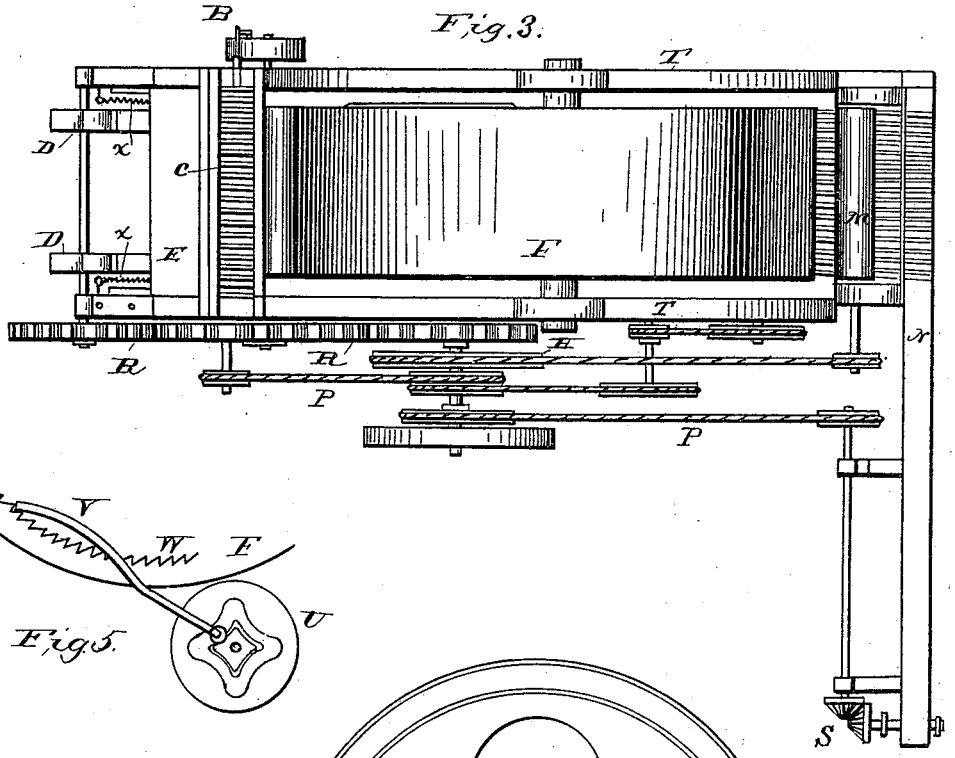
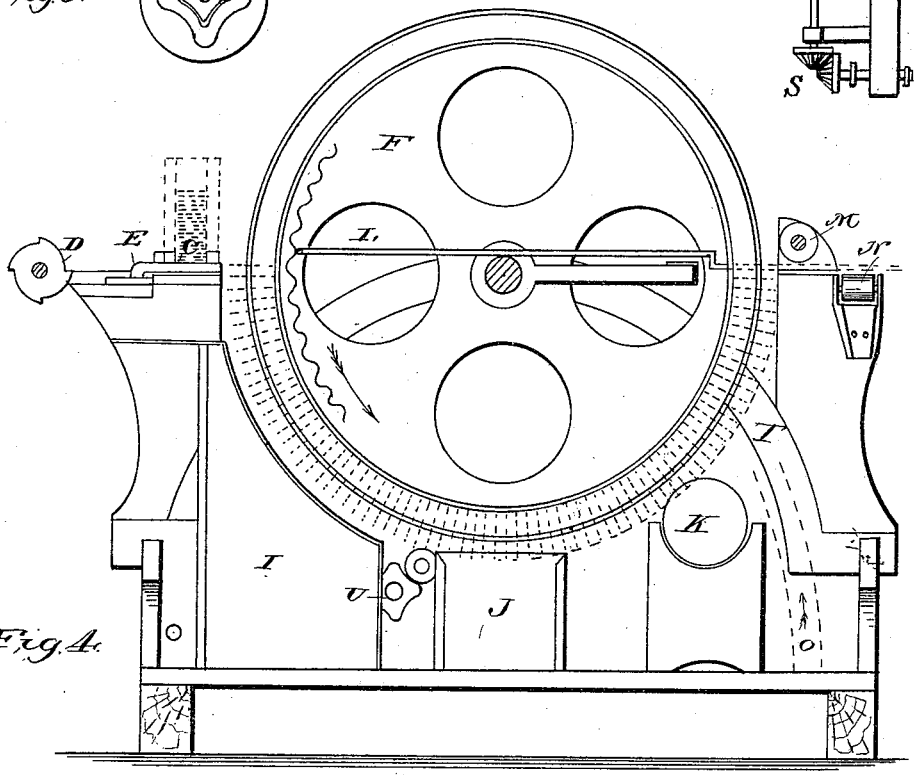


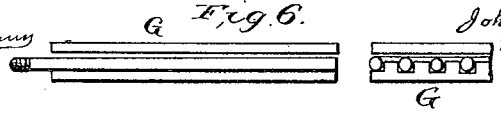
Fig. 5.

Fig. 4.



Witnesses:
Wm. A. Rosenbaum
A. A. Daniels

Fig. 6.



Inventors,
John D. Mantion
William C. Macdonald
John J. Riley
By W. Burris
Atty.

UNITED STATES PATENT OFFICE.

JOHN DARAIL MANTION, WILLIAM CHARLES MACDONALD, AND JOHN JOSEPH RILEY, OF LYONS, IOWA, ASSIGNORS TO THE DIAMOND MATCH COMPANY, OF CONNECTICUT.

APPARATUS FOR MANUFACTURING MATCHES.

SPECIFICATION forming part of Letters Patent No. 346,597, dated August 3, 1886.

Application filed November 29, 1884. Renewed February 4, 1886. Serial No. 190,848. (No model.)

To all whom it may concern:

Be it known that we, JOHN DARAIL MANTION, WILLIAM CHARLES MACDONALD, both subjects of Great Britain, and JOHN JOSEPH RILEY, a citizen of the United States of America, all residing at Lyons, in the county of Clinton and State of Iowa, have invented certain new and useful Improvements in Machines for Making Friction-Matches, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to improved devices for making friction-matches; and the object of the invention is the construction of a machine by which matches may be made in greater quantities and of a superior uniform finish than has been done heretofore by machinery, as hereinafter fully set forth.

In the drawings, Figure 1 is an end view of our improved machine. Fig. 2 is a side view. Fig. 3 is a top view, and Fig. 4 is a longitudinal section of the said machine. Fig. 5 is an enlarged view of a cam and pawl detached, by means of which the chambered cylinder is operated. Fig. 6 shows enlarged side and end views, detached, of the match-chamber.

A designates a hopper, in which are placed the match-splints, whence they are fed into the machine.

B is a pivoted crank-lever, connected with a pitman and with a hopper for shaking it.

C designates a chamber under the hopper to receive the match-splints in position to be fed into chambers in the cylinder.

D designates cams adapted to operate the plungers E, which are constructed and arranged to push the match-splints out of the chambers C into the chambers G of the cylinder F, which is provided with one of such chambers to every half-inch of its outer surface.

H designates the main pulley on the driving-shaft.

I J K designate, respectively, a drying-chamber, a brimstone-chamber, and a composition-chamber.

L designates plungers, which force the matches out of the chambers G onto an endless apron, N, which is adapted to receive and carry away the matches to a receptacle (not shown) for boxing them.

M is a rubber roller, arranged to aid the movement of the matches out of the cylinder onto the endless apron. After the matches have received the composition at the chamber K they are subjected to a hot-air blast at O.

P designates belts of any suitable material for operating different parts of the machine, as shown.

R R are gear-wheels adapted to operate the cams D and the plungers E, by means of which the matches are forced into and out of the chambers in the cylinder.

S designates bevel-gearing constructed and arranged to actuate the endless apron N.

T is the frame of the machine.

The cylinder is revolved by means of the cam U and the pawl V. This pawl is constructed and arranged so that one end engages the teeth *w* on the inner surface of the cylinder, and the other end of the pawl impinges against the cam. The chambers of the cylinder are arranged in horizontal sections, each section containing about eighty grooves or sub-chambers, each the proper size to receive and hold a match-splint, and each chamber is provided with a spring adapted to press upon and hold the splint in place while it is carried through the different operations in the machine.

Motion is imparted to the cylinder, as before stated, by the cam and pawl shown in Fig. 5 of the drawings, the cam being constructed to receive a friction-wheel on one end of the pawl, the other end of which pawl being arranged to engage teeth on the cylinder. This cam is constructed and arranged so that each of its movements will move the cylinder just one chamber-space, thus placing a row of the chambers in the cylinder in line with a tier of splints in the chamber C. The plungers L are provided at one end with friction-wheels to travel in corrugated grooves in the cylinder, which grooves are formed so as to reciprocate the plungers, and thus force the matches out

of their chambers under the rubber roller M, which draws the matches outward and drops them onto the endless apron.

The operation of this machine is as follows: The cylinder is revolved in the direction indicated by the arrow in Fig. 4 of the drawings. The splints, cut the required size, are fed into the hopper A, which, by means of the crank-lever and pitman, is reciprocated, so as to thoroughly shake down the splints into the chamber C. As the cylinder is revolved, when a row of its chambers comes in line with the bottom tier of splints in the chamber C, the cam D, which is constructed and geared for the purpose, forces the plungers E against the outer ends of the splints and moves them out of the chamber C into the chambers in the cylinder, where they are held by springs, as before stated, while they are carried through the machine. In passing through the machine the match-splints are first heated over the chamber I, and then they are passed through the brimstone-vat J, immersing about one-fourth of an inch of their ends in the brimstone. They are then passed through and are subjected to a hot-air blast between the brimstone-vat and the composition-vat, which dries the brimstone. They are then passed over and against the wheel in the composition chamber or vat K, which deposits upon them a coating of the composition, and then they are passed through and are subjected to another hot-air blast, (shown at O,) which dries their composition coating. As the cylinder continues its movement, when each row of the matches thus treated and finished comes in line with the plungers L these plungers are forced against the inner ends of the matches, moving them outward and under the rubber roller M, which carries them onto the endless apron N, by which they are conveyed to the receptacle for boxing.

The capacity of one of these improved machines may be readily estimated by multiplying together the number of tiers of chambers, the number of chambers in each row or tier, and the number of the revolutions of the cylinder in a given time.

A machine having a cylinder about eight (8) feet in diameter may contain six hundred (600) tiers of chambers. Now, if each of these tiers contains eighty (80) chambers, the cylinder will carry and make at each revolution forty-eight thousand (48,000) matches. If the cylinder be revolved thirty (30) times in an hour, it will produce one million and four hundred and forty thousand (1,440,000) per hour, and fourteen million four hundred thousand (14,400,000) in one day of ten hours.

It is evident that the capacity may be increased to any required extent by increasing the size of the cylinder and the other portions of the machine correspondingly.

By crossing the belt which drives the bevel-gearing S the endless apron N may run in the opposite direction to that shown.

What we claim as new, and desire to secure by Letters Patent, is—

1. In a match-making machine, the combination, with the revolving cylinder F, provided with a series of tiers of chambers adapted to receive and hold the match-splints, of the splint-chamber C, the cam D, and the plungers E L, substantially as and for the purposes described.

2. In a match-making machine, the combination, with the revolving cylinder F, provided with a series of tiers of chambers adapted to receive and hold the splints, of the splint-chamber C, the hot-air chamber I, the brimstone-chamber J, and the composition-chamber K, constructed to allow hot-air blasts between them, and all arranged substantially as and for the purposes set forth.

3. In a match-making machine, the combination, with the revolving cylinder F, provided with a series of tiers of chambers adapted to receive and hold the match-splints, of the splint-chamber C, the cam D, the plungers E L, the roller M, and the endless apron N, substantially as and for the purposes described.

4. In a match-making machine, the combination, with the cylinder F, provided with a series of tiers of chambers adapted to receive and hold the match-splints, and having corrugated grooves and ratchet-teeth on its inner surface, of the splint-chamber C, the cam D, the plungers E L, and the cam and pawl U V, adapted to revolve the cylinder the space of one tier of its chambers at each movement of the cam and pawl, substantially as and for the purposes described.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

JOHN DARAIL MANTION.
WILLIAM CHARLES MACDONALD.
JOHN JOSEPH RILEY.

Witnesses:
ROBERT T. T. SPENCE,
W. W. SANBORN.