No. 728,899. PATENTED MAY 26, 1903.

E. GATHMANN.

MACHINE FOR MAKING INCISIONS IN POWDER RODS.

APPLICATION FILED JUNE 19, 1901.

NO MODEL.

Fig. 1.

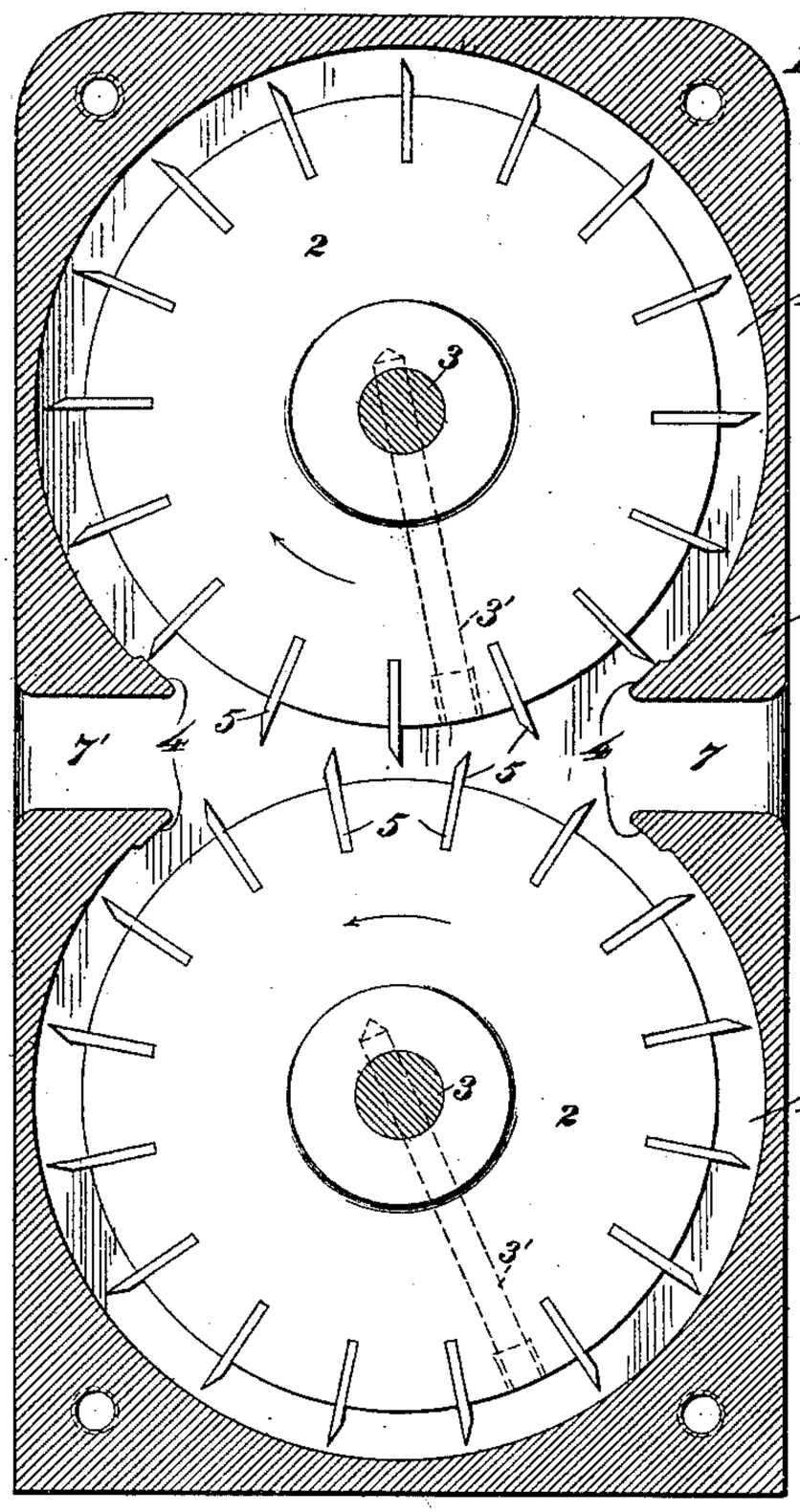


Fig. 2.

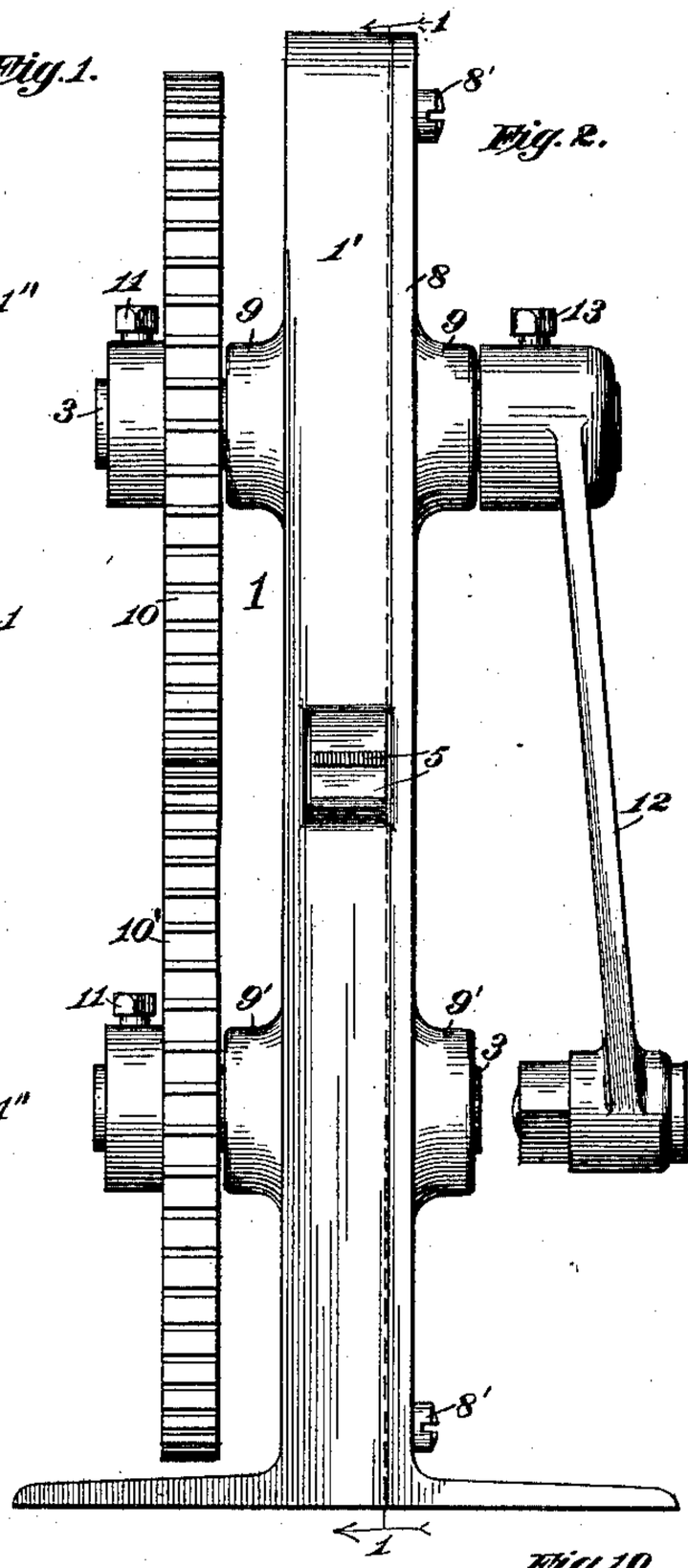


Fig. 4.

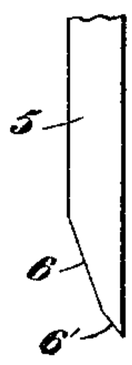


Fig. 3.

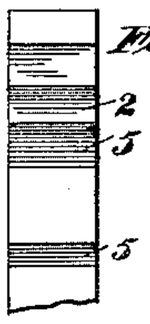


Fig. 5.

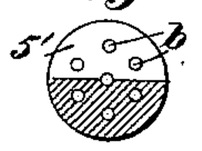


Fig. 6.

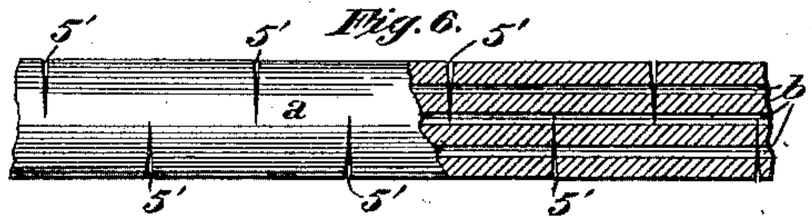


Fig. 10.

Fig. 7.

Fig. 8.

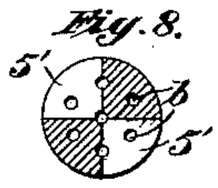


Fig. 9.

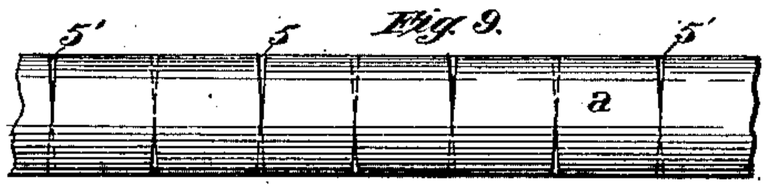


Fig. 11.

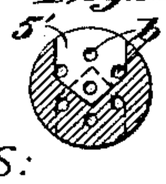
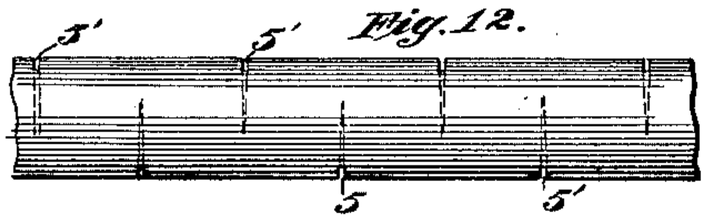


Fig. 12.



WITNESSES:

H. S. Austin

A. L. S. Graves

INVENTOR,

Emil Gathmann,

BY Offield Towle & Lindbucum

Attorneys.

No. 728,899. Patented May 26, 1903.

UNITED STATES PATENT OFFICE.

EMIL GATHMANN, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO GEORGE WHITMAN McMULLEN, OF PICTON, ONTARIO, CANADA.

MACHINE FOR MAKING INCISIONS IN POWDER RODS.

SPECIFICATION forming part of Letters Patent No. 728,899, dated May 26, 1903.

Application filed June 19, 1901. Serial No. 65,200. (No model.)

To all whom it may concern:

Be it known that I, EMIL GATHMANN, of Washington, District of Columbia, have invented certain new and useful Improvements in Machines for Making Incisions in Powder Rods, of which the following is a specification.

This invention relates to improvements in machines for making incisions in powder rods of that type which are longitudinally perforated, the incisions or indentations being made in the sides of the rod for the purpose of intercepting and venting the longitudinal perforations.

The object of the invention is to provide a simple and efficient machine of the character referred to which will operate to cut or indent the rods in various ways and will at the same time operate to automatically feed the rod through the machine, so that the incisions or indentations are located at predetermined intervals apart.

The invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims, and the same will be readily understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view taken on line 1 1 of Fig. 2 and looking in the direction of the arrows. Fig. 2 is a side elevation of the machine. Fig. 3 is a fragmentary view of a portion of one of the cutting-wheels in edge view. Fig. 4 is an enlarged detail, in edge view, of one of the cutting-knives. Fig. 5 is a transverse sectional view of the powder rod shown in Fig. 6, taken in a plane coincident with one of the transverse incisions. Fig. 6 is a side elevation of a section of the powder rod, with parts shown in longitudinal axial section. Fig. 7 is a view similar to Fig. 3 of a modified construction. Fig. 8 is a transverse sectional view taken in a plane coincident with the plane of a pair of incisions shown in Fig. 9 and showing the form of cut or indentation made by the cutting-wheel shown in Fig. 7. Fig. 9 is a side elevation of the powder rod shown in Fig. 8. Fig. 10 is a view similar to Figs. 3 and 7 of still another modified form of cutting-wheel. Figs. 11 and 12 are views, respectively, in cross-section and in side elevation of a powder rod perforated by the cutting-wheel shown in Fig. 10.

Referring to the drawings, 1 designates as a whole the outer casing or frame of the machine, within the interior of which are formed two circular cavities or chambers 1″ adapted to receive cutting-wheels 2. The casing, as shown, comprises two main members—one, designated 1′, having the cavities 1″ formed therein, and the other, designated 8, being in the form of a front plate, which is conveniently secured to the main casting 1′ by means of a plurality of screws or bolts 8′. The cutting-wheels are in the preferred embodiment shown mounted upon a pair of transverse shafts 3, both arranged to extend entirely through the front and back members of the casing, the latter being provided with hub-like bosses (designated, respectively, 9 9′) surrounding the shaft-bearings to afford a more extended support for the shafts 3. The cutting-wheels are in the present instance of equal diameter and are so located relatively to each other that a space is provided between their peripheries approximating or slightly less than the diameter of the powder rods to be perforated, a throat or passage being arranged to extend entirely through the machine in alinement with the space between said proximate peripheries, the entrance portion of which throat is designated 7 and the exit portion thereof 7″. Adjacent to each side of the throat-passages 7 7′ the circular walls of the cavities within which the cutting-wheels are located are extended inwardly slightly, as indicated at 4, so that said wall portions barely clear the cutting edges of the knives, the circular cavities being somewhat larger throughout the remainder of the circumference of the wheel, as indicated clearly in Fig. 1. One object of this invention is to insure that the edge of the knife shall be freed or substantially freed from adherent matter, so that the knives or adherent matter carried thereby will not engage the powder rod until the knives reach a point at which they will immediately begin to cut into the latter.

5 designates the several knives of the two cutting-wheels, these knives being in the preferred embodiment shown in Figs. 1, 2, and

4 seated in the periphery of the wheels, so as to extend radially therefrom, and made of a length to project beyond the periphery a distance somewhat greater than one-half the diameter of the powder rods to be treated and less than the width of the space intervening between the cutting-wheels. The knives 5 are preferably provided with chisel-shaped edges—*i. e.*, the beveling to produce the cutting edge is formed entirely upon one side, as indicated at 6 6′, Fig. 4, the bevel side of the knife being the advanced side, considering the direction of rotation of the cutting-wheel. The object of thus forming the knives is to facilitate the clearance or withdrawal of the knives from cutting engagement with the powder rod and to avoid the tendency of the knives to drag or pull the powder rod laterally out of its direct course through the machine. In the most approved form of cutting edge now known to me I form the bevel in two portions—one, designated 6, being relatively long and acute, and the other, 6′, less acute and located at the extreme point of the cutting edge. I have found in practice that this form of edge gives the best results as to properly cutting or puncturing the powder rods and as to clearances and freeing itself from the rods, as above described.

In the particular machine described the cutting-wheels are geared to the shafts 3 by means of inserted pins, as indicated clearly in dotted lines at 3′. The upper shaft 3 is arranged to extend beyond the casing at both ends, a crank 12 being secured upon one end of said shaft, conveniently by means of a set-screw 13, and a spur-gear 10 upon the opposite end, the latter being also conveniently secured by means of a set-screw 11. Similarly the lower shaft 3 is extended beyond the casing at one end and provided with a spur-gear 10′, arranged to intermesh with the spur-gear 10 and secured pivotally upon its shaft in the same manner. By reason of the foregoing construction it will be obvious that the cutting-wheels are intergeared so as to rotate positively or at a fixed rate of speed relatively to each other. In the case of the use of knives similar to that shown in Fig. 4 they are interspaced, as indicated in Fig. 1, so as to cut or perforate the powder rod alternately upon diametrically opposite sides and at uniform intervals apart in the manner shown in Fig. 6. In the case of the use of knives of the form shown in Fig. 7 or analogous thereto the cutting-knives may and preferably will be set so as to register with each other or puncture the powder rod at diametrically opposite points, it being noted that the cutting-knives shown in Fig. 7 are offset relatively to each other or arranged alternately upon opposite sides of a plane bisecting the cutting-wheel centrally in its own plane. It will be understood that the cutting-knives of one wheel in such cases will be arranged alternately with those of the opposite cutting-wheel or so that they pass each other laterally when it its desired to produce the incisions at diametrically opposite points, as shown at Fig. 8.

The form of the cutter shown in Fig. 10 produces a form of incision which leaves the rod somewhat stronger, although the form of the cut produced by this cutter is somewhat more apt to close up than the forms previously described. It will be noted that in each instance a series of adjacent incisions taken together intercept all of the longitudinal perforations *b* of the rod, and the form of the cutter may be and will be varied somewhat, depending upon the arrangement of the longitudinal perforations and other conditions, the object being in each instance to so perforate the rod as to form a free ventage from the several longitudinal perforations at frequent intervals without unnecessarily weakening the strength of the rod.

The operation of the machine constructed as thus described is probably entirely obvious from the foregoing description; but it may be stated that the powder rods are simply inserted endwise into the throat 7 one at a time far enough for the cutting-knives to engage the same, whereupon during the rotation of the cutting-wheels the knives both puncture or cut into the rod and force it out through the passage, the perforated rod being delivered at the side of the machine opposite that in which it is inserted. The rate of speed may be varied at will within reasonable limits, and, in fact, in a machine of the construction set forth is only limited by the speed at which the operator can turn the cutting-wheels and feed the machine. It will be understood that the rods are perforated while in a green, undried, and plastic condition, so that there is some tendency of the material of which the rods are formed to stick to the knives. This tendency is, however, practically overcome by constructing the knives and feed-passages in the manner shown and described.

While the machine herein shown is a hand-operated machine, it will of course be obvious that it may be so organized as to be operated by other power.

While I have herein shown and described what I deem to be a preferred embodiment of my invention, yet it will be understood that the details thereof may be modified without departing from the spirit of the invention, and I do not, therefore, wish to be limited except as to such claims as are specific in their terms.

In effect each of the wheels 2 affords a bed or abutment for the other, and, as shown, both are provided with knives and which knives effect the simultaneous incision of the rod from opposite points of its periphery. With this construction a single passage of the rod through the machine produces transverse cuts or incisions bisecting the longitudinal perforations, and thereby a pair or series of adjacent incisions taken together intercept

all of the longitudinal perforations of the rod; but only one cutting-wheel is necessarily employed, and the other wheel may constitute an abutment only, and this abutment may be provided by a member of different form and need not necessarily have rotary motion. If one cutting-wheel is employed, the rod may be fed through the machine twice and perforated from opposite sides in its passages. By making the effective length of the knife somewhat greater than one-half of the diameter of the rod and then forming the incisions from opposite points of the periphery of the rod I am enabled to effect the clearance of the knives from the rod and yet connect the axial perforation of the rod with the transverse cuts.

I claim as my invention—

1. A mechanism for incising powder rods and the like, comprising a suitable frame, a wheel journaled to rotate upon said frame, an opposing member located adjacent to the periphery of said wheel and forming in conjunction therewith a throat or passage, a series of knives mounted upon said wheel adapted to successively cut into a powder rod passed through said throat, said opposing member being so located relatively to the cutting-wheel that the knives cut into the rods a distance less than the thickness thereof and means for rotating said wheel.

2. A mechanism for incising powder rods and the like, comprising a suitable frame having a throat or passage therein, through which powder rods are adapted to be passed endwise, a wheel journaled to rotate with its periphery adjacent to said throat, and a series of knives mounted upon said wheel and projecting beyond the periphery of the latter a distance less than the width of said throat, whereby they are adapted to successively cut into but not through the rod.

3. A mechanism for incising powder rods, comprising a frame provided with a throat or passage through which powder rods are adapted to be passed endwise, and whereby they are guided and supported against the action of knives, an endless rotary cutter mounted adjacent to said passage and provided with a series of knives severally arranged to project into the passage a distance less than the width of the throat, and means for rotating said cutter, substantially as described.

4. A mechanism for incising powder rods and the like, comprising a suitable frame, a pair of cutting-wheels arranged in the same plane and with their peripheries adjacent to, but separated from, each other, a series of cutting-knives upon each of said wheels, the acting lengths of which are less than the width of the throat or passage formed between said wheels, means for rotating the wheels, means for controlling the movement of the wheels to prevent the cutters thereof being brought into register with each other while acting upon the rods, and means for rotating the wheels.

5. A mechanism for incising powder rods and the like, comprising a suitable frame, a pair of cutting-wheels arranged in the same plane and with their peripheries adjacent to, but separated from, each other, a series of cutting-knives upon each of said wheels arranged at regular intervals apart, and means for rotating the wheels in unison and at a determined rate of speed relatively to each other, said cutting-knives being arranged to project beyond the peripheries of the wheels a distance substantially less than the space between the wheels, and the knives of one wheel being interspaced relatively to those of the other, for the purpose set forth.

6. In a machine for incising powder rods, the combination of a pair of cutting-wheels arranged with their peripheries adjacent to, but separated from, each other, a series of cutting-knives upon each of said wheels, intermeshing gears connecting said wheels with each other, whereby they are caused to rotate positively in unison, and means for imparting rotation to said gears; said cutting-knives being arranged in alternate relation upon the two wheels so as to act upon the powder rods alternately upon opposite sides thereof.

7. In a machine for incising powder rods, the combination with a pair of cutting-wheels journaled to rotate with their peripheries separated from each other, of knives on each arranged to project radially beyond the peripheries of their respective wheels, said knives being interspaced to preclude the formation of meeting incisions and having chisel-shaped cutting edges, the beveled sides of which are arranged at the forward sides of the knives considered with reference to their direction of movement and means for rotating said wheels in unison and at a fixed relative speed whereby the knives of opposite wheels are maintained in interspaced relation to each other.

8. In a machine for incising powder rods, the combination of the main frame, consisting of a box-like member provided with a pair of substantially circular cavities therein, arranged in the same plane and communicating with each other at their meeting sides, shafts arranged to extend through said main frame concentric with the axes of the central cavities therein, cutting-wheels rigidly mounted upon each of said shafts, a series of radially-arranged knives upon each cutting-wheel, a throat or passage formed through the casing in the plane of said cutting-wheels and located in alinement with the space between the proximate peripheries of the wheels, a pair of intermeshing gears secured on the respective shafts of said wheels exteriorly of the casing, and a crank-handle secured to one of said shafts, substantially as described.

EMIL GATHMANN.

Witnesses:
C. C. LINTHICUM,
E. H. PARKINS.