(No Model.) 3 Sheets—Sheet 1.

# J. D. MANTION & C. D. CHITTY.

## MATCH RACKING MACHINE.

No. 532,002. Patented Jan. 1, 1895.

Fig. 1.

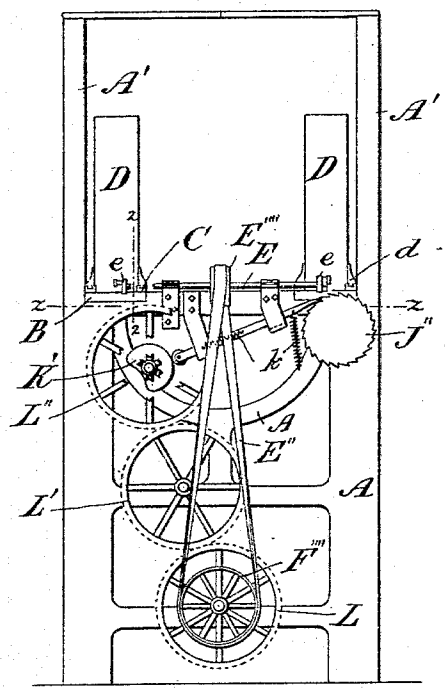


Fig. 2.

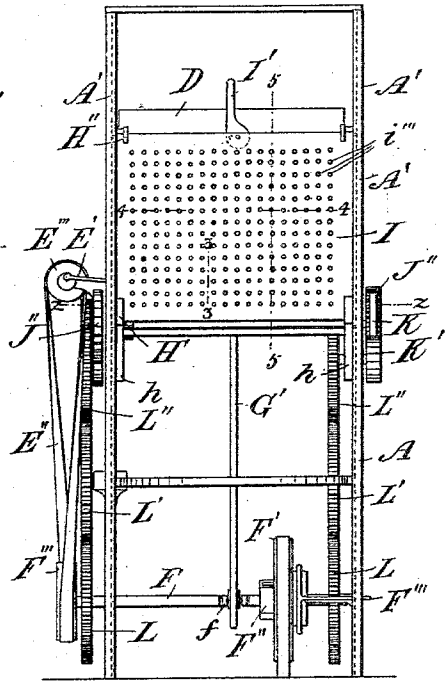


Fig. 3.

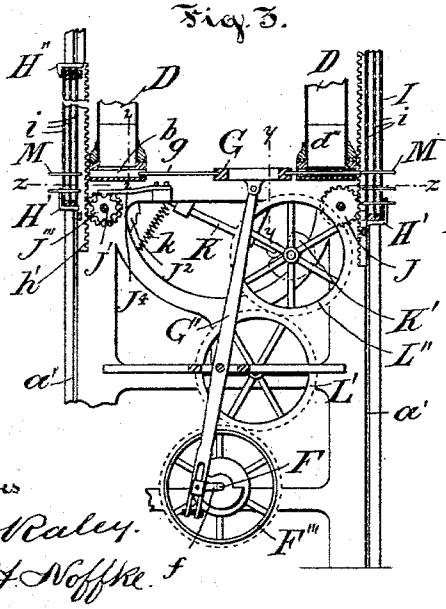


Fig. 13.

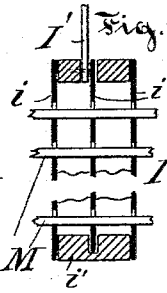


Fig. 14.

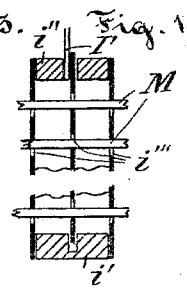
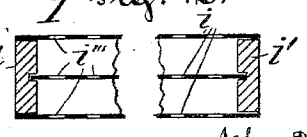


Fig. 12.



Witnesses
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(No Model.) 3 Sheets—Sheet 2.

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## MATCH RACKING MACHINE.

No. 532,002. Patented Jan. 1, 1895.

Fig. 5.

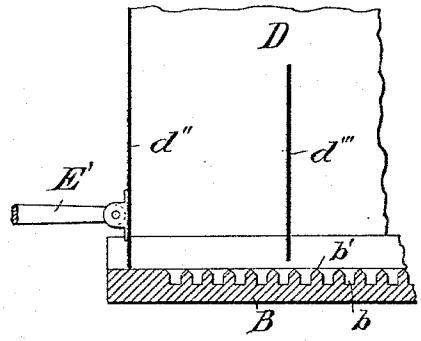



Fig. 6.

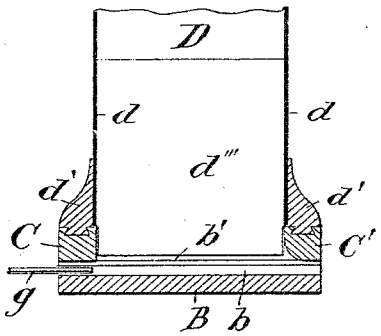



Fig. 4.

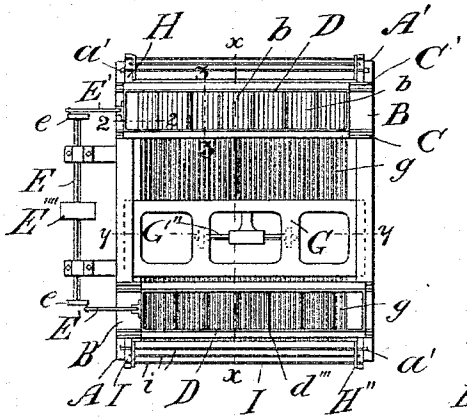
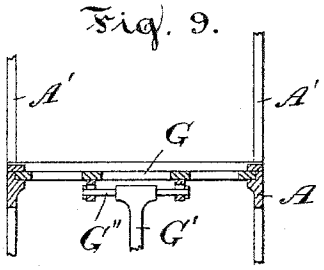



Fig. 9.



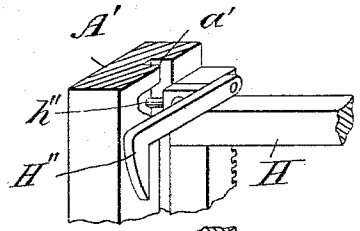
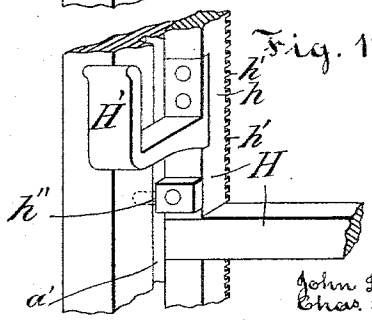




Fig. 11.

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## MATCH RACKING MACHINE.

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Fig. 7.

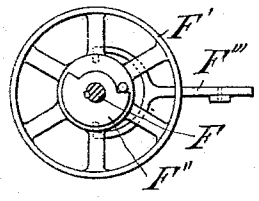



Fig. 8.

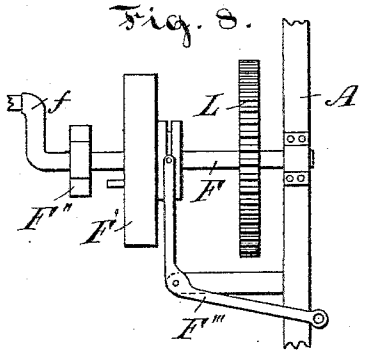
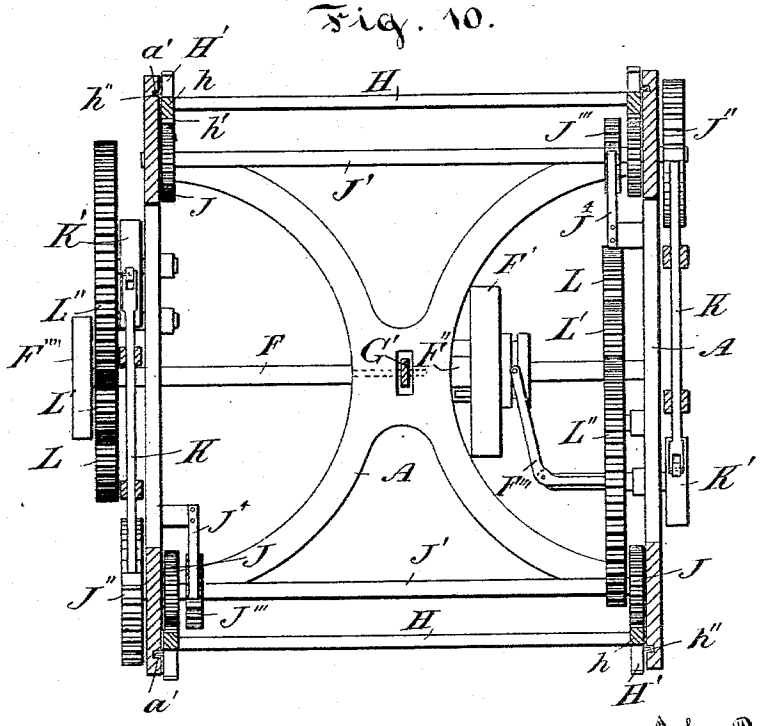



Fig. 10.




Witnesses:
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# UNITED STATES PATENT OFFICE.

JOHN D. MANTION, OF HULL, AND CHARLES D. CHITTY, OF OTTAWA, ASSIGNORS OF ONE-THIRD TO EDWIN SEPTIMUS LEETHAM, OF OTTAWA, CANADA.

## MATCH-RACKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 532,002, dated January 1, 1895.

Application filed December 15, 1893. Serial No. 493,745. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN D. MANTION, of the city of Hull, in the county of Ottawa and Province of Quebec, and CHARLES D. CHITTY, of the city of Ottawa, in the county of Carleton and Province of Ontario, in the Dominion of Canada, have jointly invented certain new and useful Improvements in Match-Racking Machines; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part hereof.

Our invention, which will be hereinafter fully set forth and claimed, relates to machines for racking match-splints, *i. e.*, putting and holding them in a convenient shape for dipping.

The object of our invention is a machine of simple, inexpensive and durable construction that will automatically place the match-splints in suitable contrivances in which they are held in quantity while being dipped with the desired composition.

Figure 1 is an elevation of one side of our new machine. Fig. 2 is an elevation of one of the other sides of the same. Fig. 3 is a transverse section of the same on line *x x* Fig. 4, corresponding to Fig. 1, portions being broken off. Fig. 4 is a top view of the same. Figs. 5 and 6 are respectively longitudinal and transverse sections of the hopper and bed on lines 2—2 and 3—3, Figs. 1, 2, 3 and 4 Figs. 7 and 8 are details of the driving and stopping and starting gear being in end and top view, partly in section. Fig. 9 is a transverse section on line *y y* Figs. 3 and 4, showing detail of the pusher carriage. Fig. 10 is a transverse section of the rack frame and slide, being a horizontal section on a larger scale on line *z z* Figs. 1, 2 and 3 and showing a top view of the rack gearing below the top of the stand. Fig. 11 is a perspective view of part of the rack frame and slide, corresponding to part of Fig. 10. Figs. 12, 13 and 14 are respectively horizontal and two transverse sections of the rack, on lines 4—4 and 5—5, Fig. 2, the center parts being broken out and the two latter, being on the same line, the corresponding part of Fig. 3 enlarged, having matches in position, loose in one and locked in the other.

Upon each side of the rectangular top of a suitably framed stand, A, is secured a plate B, (Figs. 5 and 6,) equal in width to the length of a match and the hopper bed frame resting thereon and of any suitable length. This plate has its upper surface serrated with a series of transverse grooves, *b*, each capable of holding one match freely, the upper edges of the sides of, or margins between, the grooves being beveled off to a knife edge *b'* at the top, so as to form the grooves bell mouthed in cross section and prevent a resting place between any two, being made deep enough to allow for the beveling off of the upper edge, and yet leave the lower square part deep enough to hold a match properly. Two bars C and C' are secured upon the said plate, transversely to the grooves and the length of a match apart, the outer one, C', having its lower inner edge well rounded, so as to form a bell mouth to that part of each groove which lies below the bar, this being the side at which the match takes its exit. Said bars form the bed upon which the hopper is held and made to slide by convenient means, being provided with dovetailed grooves which receive and hold slidingly the dovetailed base *d'* of the sides *d* of the hopper D which has the inner faces of its sides *d* flush with the bed, the ends *d''* of the hopper coming down to the face of the plate B. The hopper D is provided with transverse partitions *d'''* at short intervals, to prevent matches lying lengthwise, and receives a rapid shaking motion by means of a shaft E, Figs. 1, 2 and 4, journaled to one end of the stand, transversely to the two hoppers, and having a crank *e* at each end to which the end of the corresponding hopper is connected by means of a pitman E' and which shaft receives motion from the driving shaft F below by means of a half crossed belt E'' and the pulleys E'''' and F''''.

Between the two plates B a carriage G, Figs. 3, 4 and 9, is placed and slidingly held to the top of the stand so as to traverse the intervening space, a reciprocating motion from plate to plate being imparted to it by means of a lever G', Figs. 2, 3 and 9, connected to the carriage by a pin G'' (Fig. 4) and being fulcrumed below and operated by a crank *f* on the driving shaft F, the connec-

tions at each end being slotted. This carriage is provided with a series of fingers, tangs or pins *g*, Figs. 3, 4 and 6, on each side, one for each groove *b* in the plates B, corresponding to them in position and adapted to penetrate them, each pushing at the match lodged in the groove it enters.

At each corner of the table and projecting outwardly beyond the outer edge of the plate B, a bar A′ extends upward above the top, which bar is provided with a continuous groove *a′* in the inner face which is at a right angle to the edge of the plate B and hopper D, as shown in Figs. 1, 2, 3, 4, 10 and 11.

A frame H, Figs. 10 and 11, having its uprights *h* provided with pins *h″* adapted to engage the grooves *a′* and slide therein freely and keep the frame steady when in motion, is made to slide step by step up or down, preferably down, by means of a spur wheel gearing into a rack *h′* formed on, or attached to, the upright *h* at its inner edge facing the hopper. Said frame is also provided with a hooked or shouldered bracket H′ near the lower end of each upright and with a latch hook H″ at the top, these serving the purpose of holding a rack I, Figs. 2, 3, 4, 12, 13 and 14, in position thereon. Said rack consists of three parallel plates or sheets of metal or other thin material *i*, the two external ones being firmly connected at the edges to a frame *i′ i″* at a less distance apart than the length of a match, and the center one is supported movably in grooves in said frame and controlled by a suitable cam I′, pivoted in the top *i″* of the frame, by which cam it may be slightly raised and locked into position. Each sheet is perforated with a series of transverse rows of holes *i‴*, the holes in each row registering with the grooves in the plate B, the holes *i‴* being of such size as to pass a match freely and to allow for a little vertical play and there are as many rows as the height of the sheets will permit, the distance apart of the rows corresponding to the pitch of the gearing that is used to operate the rack movement, so that at each movement of the rack a row of perforations will register with the ends of the grooves in the plate B.

The frame H is operated by gearing the rack bars *h′* into spur wheels or pinions J secured upon a shaft J′ which is journaled below the top of the stand, shown in detail in Fig. 10. This shaft also carries a ratchet wheel J″ and a keeper wheel J‴ (Fig. 3), the former operated by a pawl K (Fig. 1) actuated by a cam K′ and the latter controlled by a spring keeper J⁴ which sets in the notches of the wheel to prevent the shaft from turning except by the agency of the pawl K. The pitch of the ratchet wheel J″, keeper wheel J‴, diameter of the pinions J and vertical pitch of the rows of perforations *i‴* in the rack plates *i* are duly proportioned to each other, so that one movement of the pawl brings the next row of perforations opposite the grooves in the plate B.

The pawl K is provided with a suitable guide at the lower end and pressed against the cam K′ and the teeth of the ratchet wheel by a spring, such as *k*, so that the pawl may be disengaged from the ratchet wheel for the purpose of turning it back. The cam K′ may be driven in any suitable way from the driving shaft F, so as to give one throw to the pawl for each throw of the crank *f*, timed to occur immediately after a row of match-splints M has been received in the rack I, such as a train of spur wheels L L′ L″, on the upper one of which, or its axle, the cam K′ is secured, as illustrated in Figs. 1 and 3. The driving shaft F, operating the carriage lever G′ direct, has the driving pulley F′ loose upon it, the latter being provided with a clutch face adapted to be engaged by a clutch F″ controlled by a forked hand lever F‴, as shown in Figs. 7 and 8.

The operation of the machine is as follows: The finished match-splints M are thrown into the hoppers D, the partitions *d‴* in which cause them to lie approximately parallel to each other and to the grooves *b* in the plate B below. The vibrating motion given to the hoppers by the shaft E shakes them into complete order and causes them to lie side by side. In this position the lower ones are bound to drop into the grooves *b*. The carriage G now approaches, the pins or fingers *g* enter the grooves under the inner bed-rail C, striking the ends of the match-splints which they meet in the grooves and pushing them under the outer bed-rail C′ and into the adjacent row of perforations *i‴* in the rack I. The carriage G now recedes to perform the same operation on the opposite end of its traverse. The cam K′ has in the meantime allowed the pawl K to recede and pushing it now forward causes the ratchet wheel J″ to be moved one tooth and the keeper J‴ one notch, thus turning the shaft J′ and with it the pinions J and allowing the racks *h′* and frame H to drop a corresponding distance, bringing a fresh row of perforations opposite the grooves *b*. It will be understood that, as the machine is double or two-sided, this operation occurs alternately first on one side and then on the other, while the hoppers are of course being shaken all the time. When the frame H has fully descended and the last row of perforations has been filled with match-splints M, as shown in Fig. 13, the clutch F″ is disengaged from the pulley F′ by pushing the lever F‴ to the other side, thus causing the pulley to run loose on the shaft which stops, and the operation of the whole machine is suspended. The cam I′ is now given part of a turn, by which the center plate *i* is raised and all the match-splints contained in the rack lifted in the center and the ends pressed against the upper ends of the perforations in the two outside plates, thus clamping them in position, as shown in Fig. 14. The rack is now removed from the frame H by raising the latch H″ and lifting it from the hooks H′. It is

now ready for dipping and is now replaced by an empty one by setting it on the hooks H′ and allowing the latches H″ to drop over the top, the pawl K having first been disengaged from the ratchet J‴ and the frame H raised to its highest position, so that the bottom row of perforations in the fresh rack comes opposite the grooves *b*. The machine may now be started again by pushing the lever F‴ so that the clutch engages the pulley F′.

We claim as our invention—

In a match-racking machine, the combination of a plate B having a series of transverse grooves having the margins between them beveled to a knife edge at the top, a table or stand, suitably framed, to one edge of which said plate is secured, two bed-rails secured to the longitudinal margins of said plate, a hopper held slidingly on said rails, a shaft journaled opposite the end of said hopper and provided with a crank at the end connected to the end of the hopper by a pitman, a reciprocating carriage G held slidingly to the table and moving in the direction of the grooves in the plate B and provided with pins or fingers *g* adapted to enter said grooves, a lever G′ having slotted ends one connected to said carriage and the other to a crank in the driving shaft, two vertical guide bars at the rear of the plate B rigidly secured to the table, a frame H adapted to slide in said guides provided with means of holding a rack removably and with rack teeth adapted to gear into pinions on a shaft, a shaft J′ journaled below the table and carrying pinions J gearing into said racks and provided with ratchet wheel J″ and keeper wheel J‴, a spring keeper $J^4$ engaging said keeper wheel, a pawl K engaging said ratchet wheel, a cam K′ actuating said pawl once for each double stroke of the carriage G, means for connecting said cam with the driving shaft, a driving shaft with crank actuating the lever moving the carriage, and suitable connections with the cam K′ and shaker shaft E and provided with means of starting and stopping motion and a rack I consisting of three parallel plates of which the central one is adjustably and the external one rigidly connected and all provided with a series of rows of perforations registering with the grooves in the plate B, substantially as set forth.

In testimony whereof we have signed in the presence of the undersigned witnesses.

J. D. MANTION.
CHAS. D. CHITTY.

Witnesses:
B. HARVEY,
L. PETERS.