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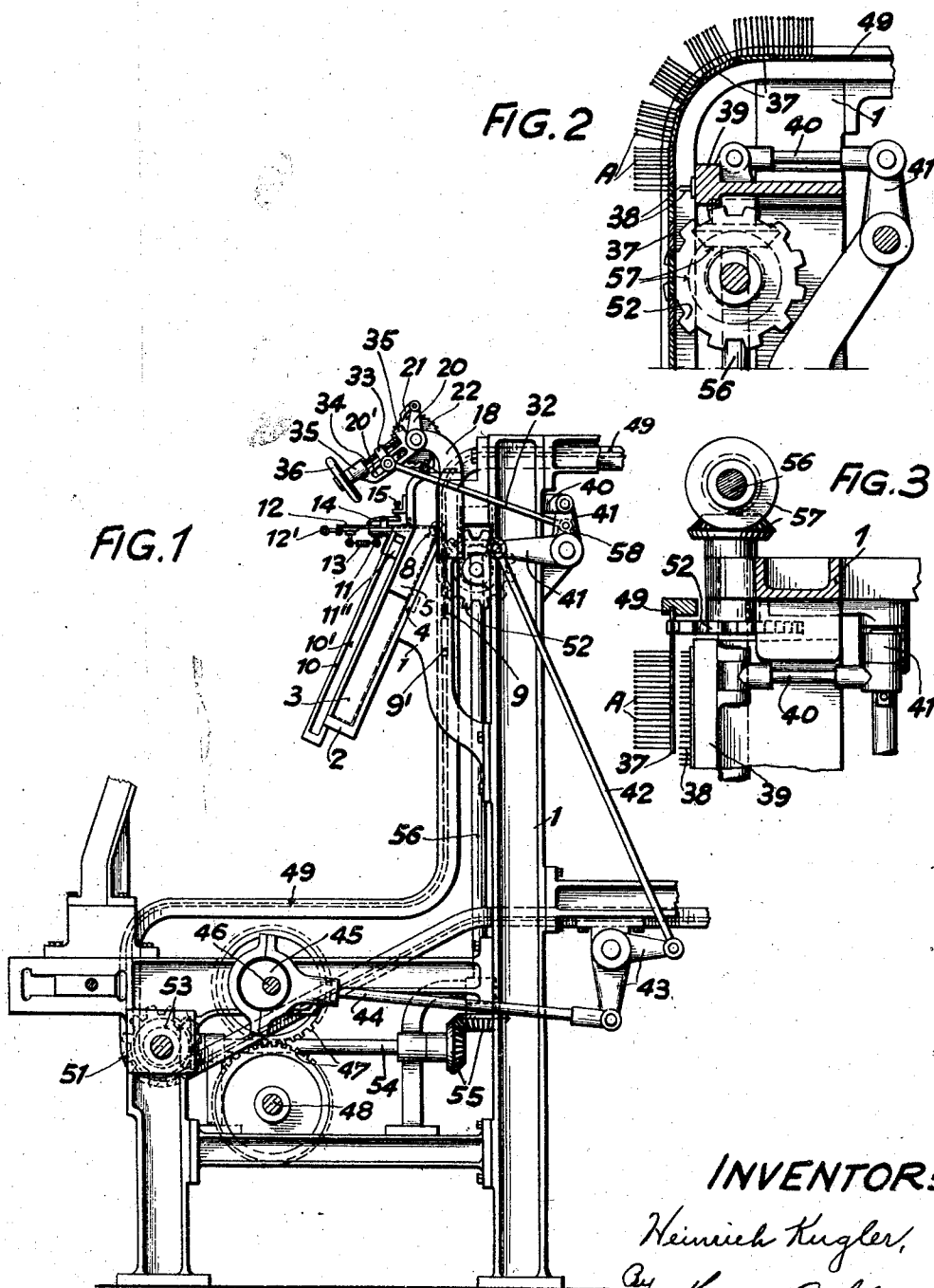
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DEVICE FOR DELIVERING MATCHES IN MATCHMAKING MACHINES

Filed June 13, 1929

2 Sheets-Sheet 1



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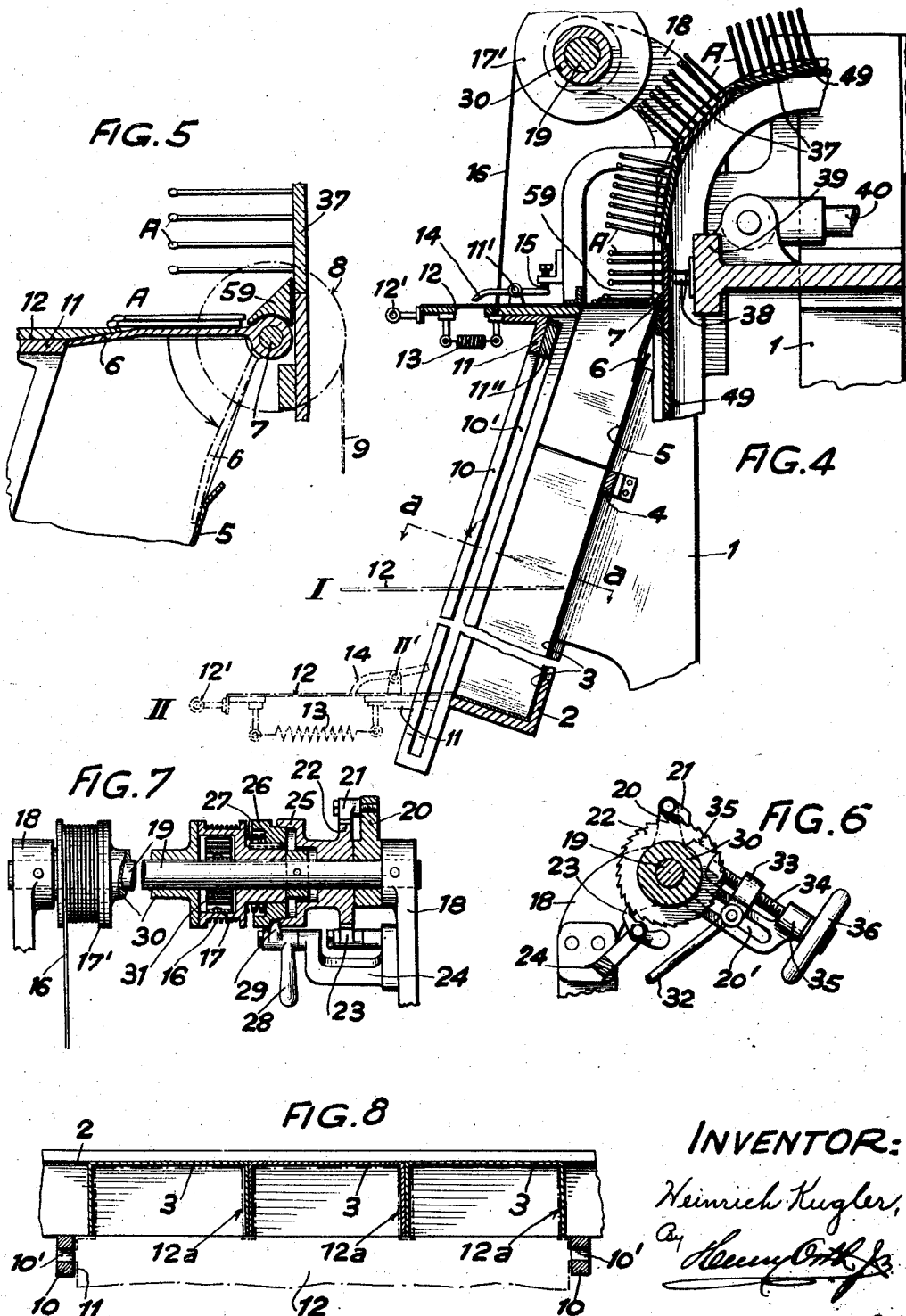
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UNITED STATES PATENT OFFICE

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DEVICE FOR DELIVERING MATCHES IN MATCHMAKING MACHINES

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The present invention has reference to a device for delivering matches in match-making machines having a supply chute arranged above collecting receptacles and a table for delivering the matches to the collecting receptacles and guided along said chute. A principal disadvantage of the known devices of this kind consists in the fact that on their way into the collecting receptacles the matches occasionally fall down and rub with their head over a long stretch, which may, for instance, be the case when the table is momentarily lowered at a higher speed for causing a distance between two subsequent charges; thereby great danger exists of the matches getting ignited. Moreover these matches falling down are not in the same regular arrangement as the other matches in the collecting receptacles and have to be rearranged by hand; in the further course of packing the matches a jamming of the disarranged matches may occur, whereby an ignition of the latter may be caused.

It is the object of the present invention to overcome these drawbacks. To this end in the delivery device according to the present invention the chute conducting the matches to the collecting receptacles is provided with a closing flap serving for transitorily holding the supplied matches and is automatically opened by means of a plate arranged on the table and supporting the matches subsequently.

This closing flap thus prevents during certain intervals of the working a falling down of the ejected matches into the chute or a falling down of matches over a longer stretch respectively and therefore a disorderly arrangement of these matches and a jamming of the latter.

The accompanying drawings serve for explaining the invention by way of a constructional example illustrated.

In the drawings

Fig. 1 shows an elevation of that part of a match making machine, in which the device according to the invention is arranged,

Fig. 2 shows in elevation with parts in section details of a device for ejecting the matches from the carrier bars.

Fig. 3 is a plan view of Fig. 2,

Fig. 4 shows the device according to the invention in a vertical section,

Fig. 5 shows a detail of Fig. 4 on a larger scale,

Figs. 6 and 7 show further details in front elevation and end elevation respectively with parts illustrated in section, and

Fig. 8 is a section along line *a—b* in Fig. 4.

Referring now to the drawings a rail 2 of angular cross-section is secured to the frame 1 of the machine and three collecting receptacles 3 are placed on the rail 2 and supported by the latter; the upper ends of the receptacles 3 rest against a bar 4. 5 denotes the upper supply chute which is inclined and open towards the front of the machine and is subdivided into three chutes situated one beside the other and below which the three collecting receptacles 3 are arranged. The rear wall of the chute 5 is formed in its upper part by a flap 6 fixed to a shaft 7; a rope pulley 8 is further secured to the shaft 7 and a weight 9' is suspended from the rope 9 passing over the pulley 8.

On the front part of the machine and laterally of the chute 5 two rails 10 are provided running parallel to the chute and having longitudinal grooves 10'. With the latter guide blocks 11'' of a delivery table 11 cooperate; the latter is displaceable along the rails and carries a plate 12 adapted to be displaced on the table 11 by means of a handle 12' against the action of a tension spring 13. The plate 12 is provided with three extensions 12^a (shown in dash and dot lines in Fig. 8) which project into the three partitions of the chute 5. The table 11 is further provided with a lever 14 mounted on a pedestal 11' which passes through a slot of the plate 12. The lever 14 rests against a stationary stop screw 15 as shown in Fig. 4.

The pulling ropes 16 running over rope drums 17 and 17' respectively are connected with their ends to the table 11. The rope drums 17 and 17' are rotatably mounted on an axle 19 which in its turn is carried with its ends in brackets 18. On the end of the axle 19 illustrated in Fig. 7 a rocking lever 20 is mounted, which cooperates by means of a

pusher pawl 21 with a ratchet wheel 22 and a locking pawl 23 cooperates with the ratchet wheel 22 and is mounted on a bracket 24 secured to the bracket 18. The ratchet wheel 22 is integral with the part 25 of a friction clutch, the other part 26 of which is secured against rotation on the hub of the rope drum 17 but is axially displaceable on said hub. A spring 27 abutting against the rope drum 17 tends to maintain the clutch part 26 in operative engagement with the clutch part 25. A lever 28 mounted on the support 24 and having a finger 29 contacting with the circumferential edge of the clutch part 26 permits the throwing out of engagement of the latter. To this end the finger 29 is provided with wedge shaped surfaces so that a small turning of the lever 28 causes the clutching out of the parts 25 and 26. The two rope drums 17, 17' are rigidly connected to each other by means of a hollow shaft 30. A spiral spring 31 is provided inside the drum 17 and has its one (outer) end connected to the latter and its other (inner) end to the axle 19.

With a slot 20' of the rocking lever 20 a rod 32 cooperates and the point in which the rod 32 acts on the slot 20' may be adjusted by means of a nut 33 and a screw-threaded spindle 34. The latter is mounted in eyes 35 of the lever 20, and a hand wheel 36 serves for turning the spindle 34 and adjusting thereby the point of cooperation of rod 32 and slot 20'.

The matches A are inserted in the dipping bars 37 and are expelled from the latter by means of needles 38 moved towards and away from the bars 37 by the reciprocating movement of the slide 39. The latter is reciprocated by the aid of a rod 40, a bell crank lever 41, rod 42, bell crank lever 43, rod 44 and eccentric 45 secured to the shaft 46. (Figs. 1-3.) The shaft 46 is rotated by means of a spur gearing 47 from the main driving shaft 48. The intermittent movement of the bars 37 along their guide groove 49 is obtained from the main driving shaft 48 by means disposed at the part of the machine in which the insertion of the splints into the bars 37 occurs as disclosed in my copending application for Letters Patent filed June 13, 1929, under Ser. No. 370,613 and of which means Fig. 1 only shows the sprocket wheel 51. The movement imparted to the sprocket wheel 51 is transmitted to the sprocket wheel 52 situated near the device for delivering the finished matches by means of bevel gearing 53, horizontal shaft 54, bevel gearing 55, vertical shaft 56 and bevel gearing 57 (Figs. 1 and 3).

Fig. 1 shows further the manner in which the rocking movement of the lever 20 is obtained; to this end the rod 32 is linked to an arm 58 secured to the same axle as the bell crank lever 41.

The matches A expelled from the bars 37 by the action of the needles 38 fall over an inclined surface of a stationary member 59

(Fig. 5) and are received at first by the flap 6 which is swung into the horizontal position by the influence of the weight loaded rope pulley 8. Later on the plate 12 is pushed by the action of the spring 13 immediately above the flap 6 when the table 11 is in its uppermost position as will be explained hereinafter. The table 11 is then lowered in a step by step movement along the guide rails 10. To this end the rocking lever 20 is oscillated by the rod 32, whereby the pawl 21 rotates the ratchet wheel 22 intermittently. The operative friction clutch 25, 26 takes part in the rotation of the ratchet wheel 22 and causes a rotation of the rope drums 17, 17' from which the ropes 16 unwind themselves whereby the table 11 suspended from the ropes is lowered. At the same time the spiral spring 31 inside the rope drum 17 is wound up and tightened.

During the downward movement of the table 11 the plate 12 on the latter acts on the flap 6, which has up to then closed the chute 5, and turns the flap 6 in the downward direction into the position indicated in dash and dot lines in Fig. 5. When the table 11 has reached a determined lowered position I shown in dash and dot lines in Fig. 4, which moment is indicated to the operator on the machine by any optical or acoustic signal, then the table 11 is moved by hand in one jerk so low that its plate 12 knocks against the lower end of the collecting receptacles 3. The staple of matches forming the charge for the collecting receptacles 3 and resting on the plate 12 follows this final movement of the table 11, the flap 6 is then given free and is turned in the upward direction by the influence of the weight loaded rope pulley 8 and closes again the chute 5 for receiving the matches A expelled from the bars 37 for forming the next charge of the receptacles 3. In the lowermost position II of the table 11 the plate 12 is pulled back by means of the handle 12' so far until the lever 14 enters a locking notch of the plate 12. Thereby the latter is secured on the table 11 in its retracted position in which it is outside of the collecting receptacles 3.

In order to permit the movement of the table from the position I into the position II the handle 28 mounted on the bracket 24 is so turned that the clutch member 26 is cut out whereupon the table 11 is released. Thus after the plate 12 has been secured in the retracted position on the table 11 moved into the lowermost position the table is released and automatically returns along the guide rails 10 into the highest position. This is caused by the release of the tightened spring 31 of the rope drum 17, whereby the two drums 17, 17' are so turned that the ropes 16 are wound on the drums and raise thereby the table 11. Shortly before the table 11 reaches its initial position the lever 11' hits

against the abutment screw 15 whereby the lever 11' is lifted out of the locking notch in the plate 12, the latter is thus released and is moved forward towards the flap 6 by the influence of the spring 13.

After the table 11 has reached its initial position the handle 29 is turned so that the clutch part 24 is thrown in again whereupon the step by step downward movement of the table starts and the above described operation is repeated, the filled collecting receptacles 3 having been meanwhile replaced by empty ones.

The contact of the heads of the matches with the parts of the device for delivering the matches is avoided as much as possible. The plate 12 of the table 11 and the flap 6 of the chute 5 as well as the latter are on those sides, which are in contact with the matches, covered with a non-metallic coating which reduces friction.

By adjusting the point in which the rod 32 acts in the slot 20' of the rocking lever 20 the magnitude of the periodic step through which the ratchet wheel 22 is turned and consequently the movement of the table may be made to correspond to the number of matches expelled per unit of time and supplied to the delivery device.

The delivery work may be watched from the front side of the device and may thus be easily checked. Owing to the small danger of igniting the matches the device according to the present invention may be used with matches of any type. The collecting receptacles may be inserted in the frame 1 or placed on the rail 2 from the front or the side of the machine.

I claim:

1. A device for delivering matches in match-making machines, comprising in combination, a chute arranged above collecting receptacles, a table guided along said chute, means to raise and lower said table, a slide for supporting the matches mounted on said table and adapted to be displaced along said table into and out of said chute, and a flap arranged in said chute for receiving expelled matches and adapted to automatically close the latter and to be turned out of said closing position by said slide.

2. A device for delivering matches in match-making machines, comprising in combination, a chute arranged above collecting receptacles, a table guided along said chute, ratchet means for lowering said table by a step by step movement, spring means wound up by the lowering movement of said table and adapted to automatically cause the upward movement of the latter into its uppermost position when released, a slide for supporting the matches mounted on said table and adapted to be displaced along said table into and out of said chute, and a flap arranged in said chute for receiving expelled

matches and adapted to automatically close the latter and to be turned out of said closing position by said slide.

3. A device for delivering matches in match-making machines, comprising in combination, a chute arranged above collecting receptacles, a table guided along said chute, means to lower said table by a step by step movement, means to automatically cause the upward movement of said table into its uppermost position, a slide for supporting the matches mounted on said table and adapted to be displaced along said table into and out of said chute, and a flap arranged in said chute for receiving expelled matches and adapted to automatically close the latter and to be turned out of said closing position by said slide.

4. A device for delivering matches in match-making machines, comprising in combination, a chute arranged above collecting receptacles, a table guided along said chute, ratchet means for lowering said table by a step by step movement, spring means wound up by the lowering movement of said table and adapted to automatically cause the upward movement of the latter into its uppermost position when released, a slide on said table, means adapted to displace said slide along said table into and out of said chute, a locking member to secure said slide in its position out of said chute, means to automatically release said locking member when said table has returned into its uppermost position, and a flap arranged in said chute for receiving expelled matches and adapted to automatically close the latter and to be turned out of said closing position by said slide.

In testimony whereof I have signed my name to this specification.

HEINRICH KUGLER.