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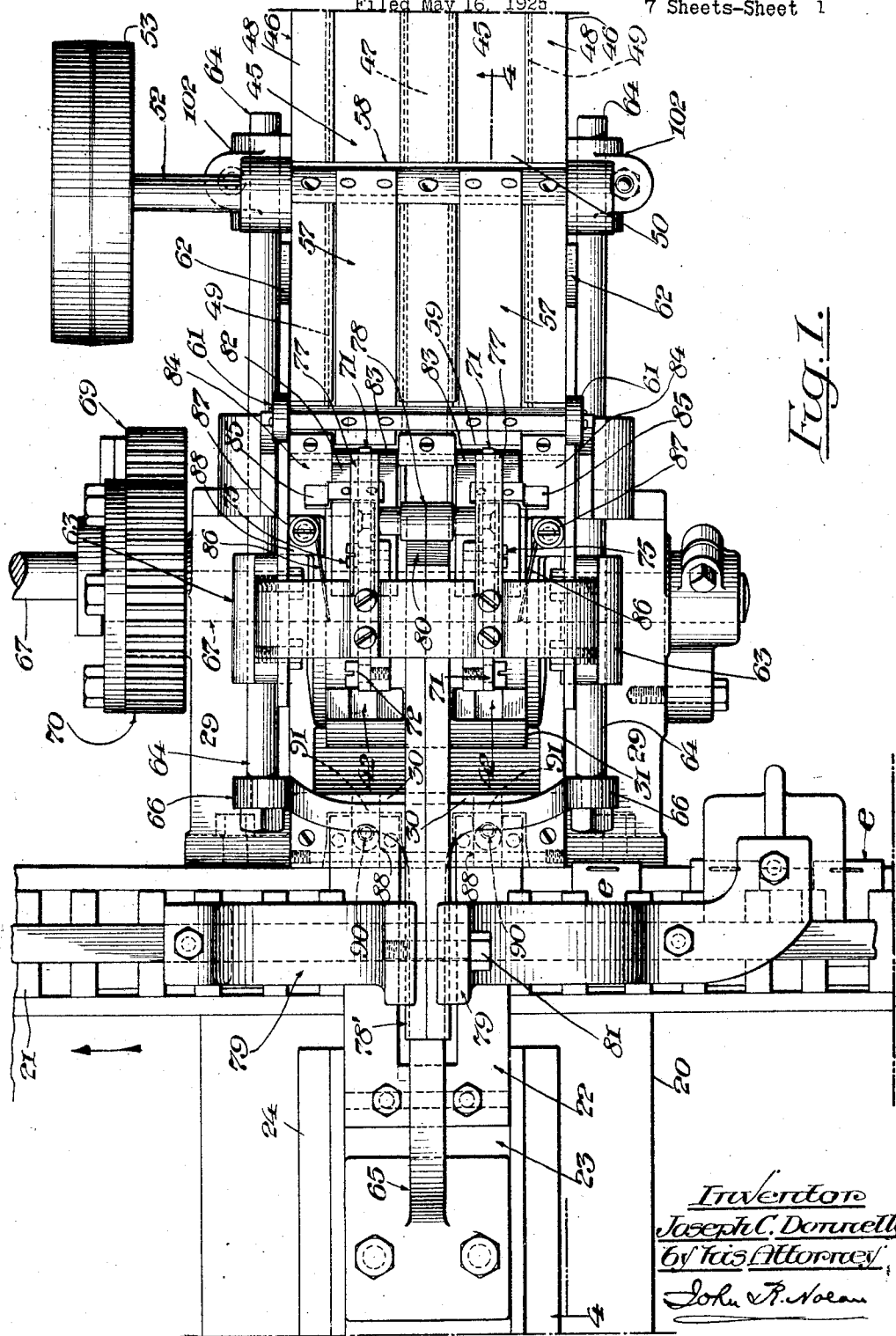
J. C. DONNELLY

1,621,316

MECHANISM FOR FILLING MATCH SAFES AND THE LIKE

Filed May 16, 1925

7 Sheets-Sheet 1



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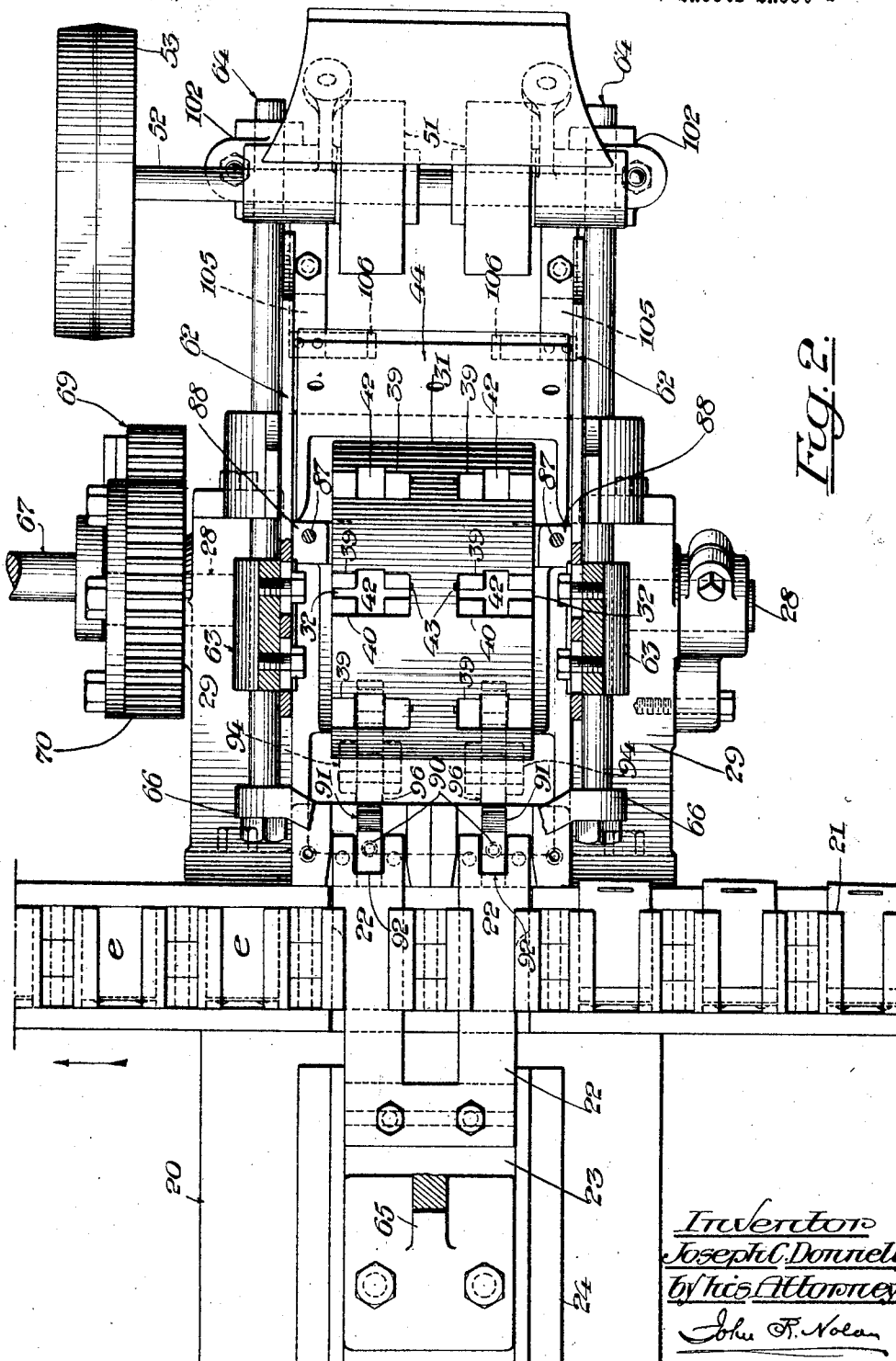
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MECHANISM FOR FILLING MATCH SAPES AND THE LIKE

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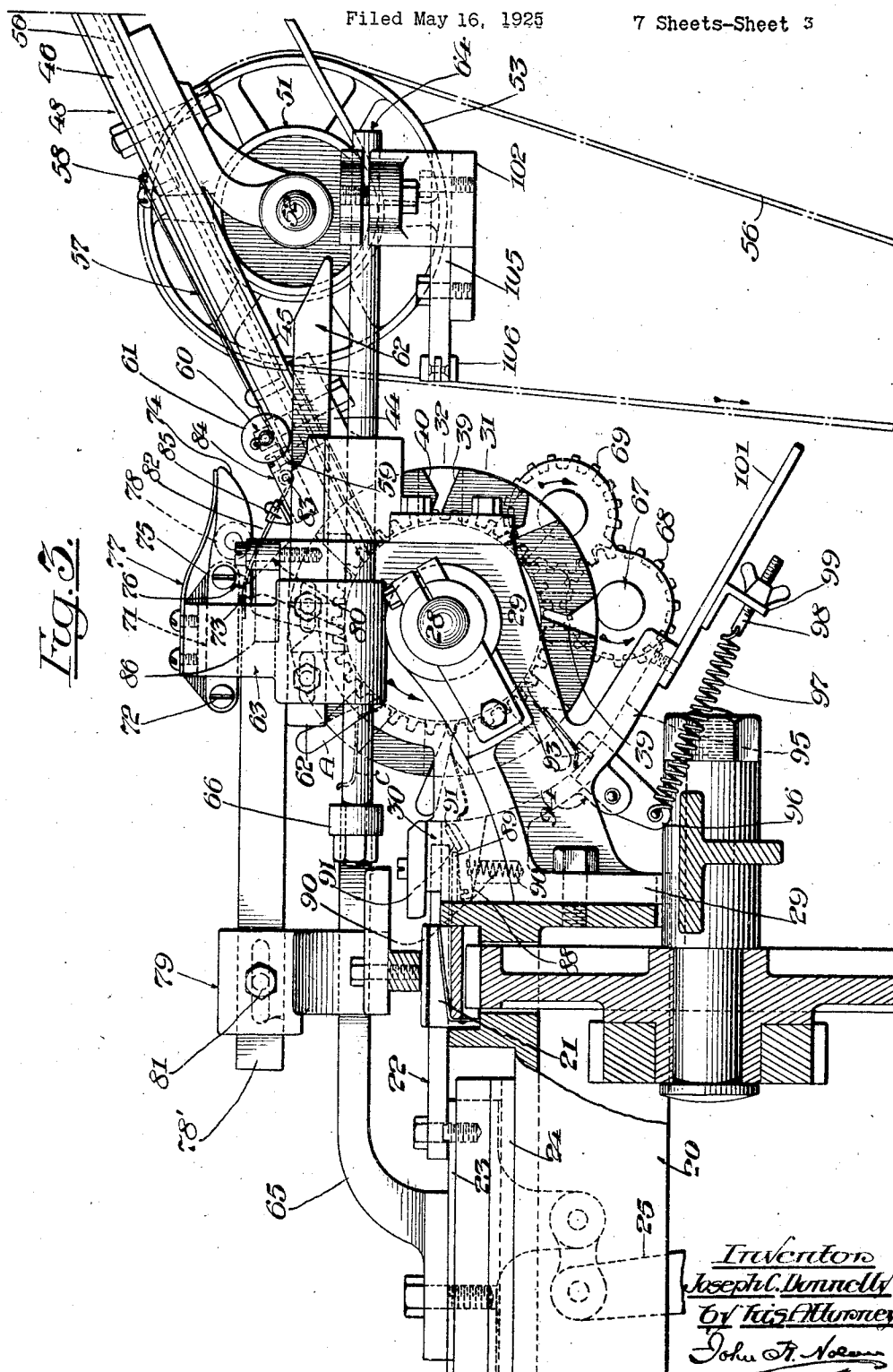
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MECHANISM FOR FILLING MATCH SAFES AND THE LIKE

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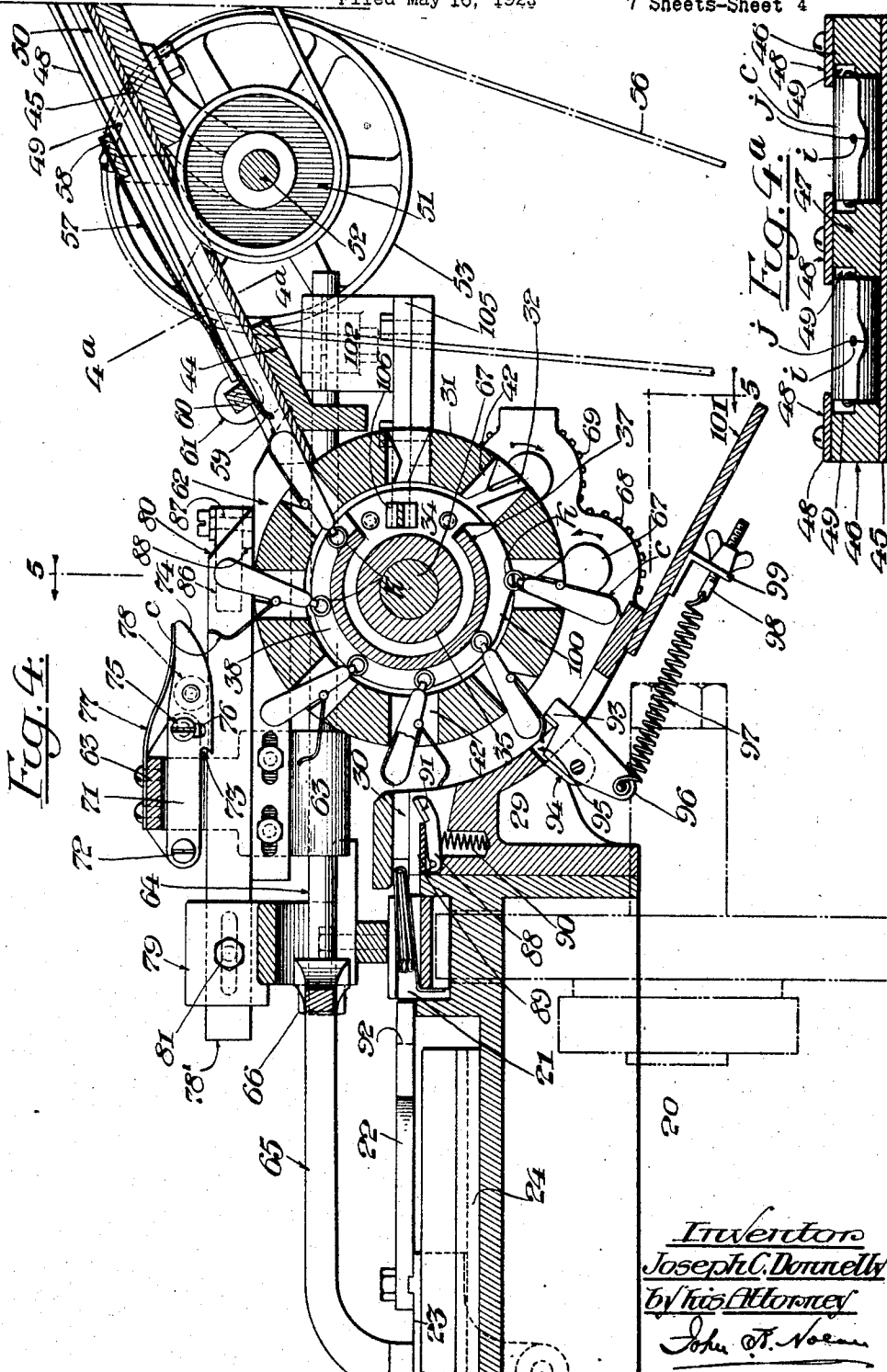
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MECHANISM FOR FILLING MATCH SAFES AND THE LIKE

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Fig. 4.

j Fig. 4. ^{C 40} ^{j 48}

Eq. 4:

5

66

86

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MECHANISM FOR FILLING MATCH SAFES AND THE LIKE

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Fig. 5.

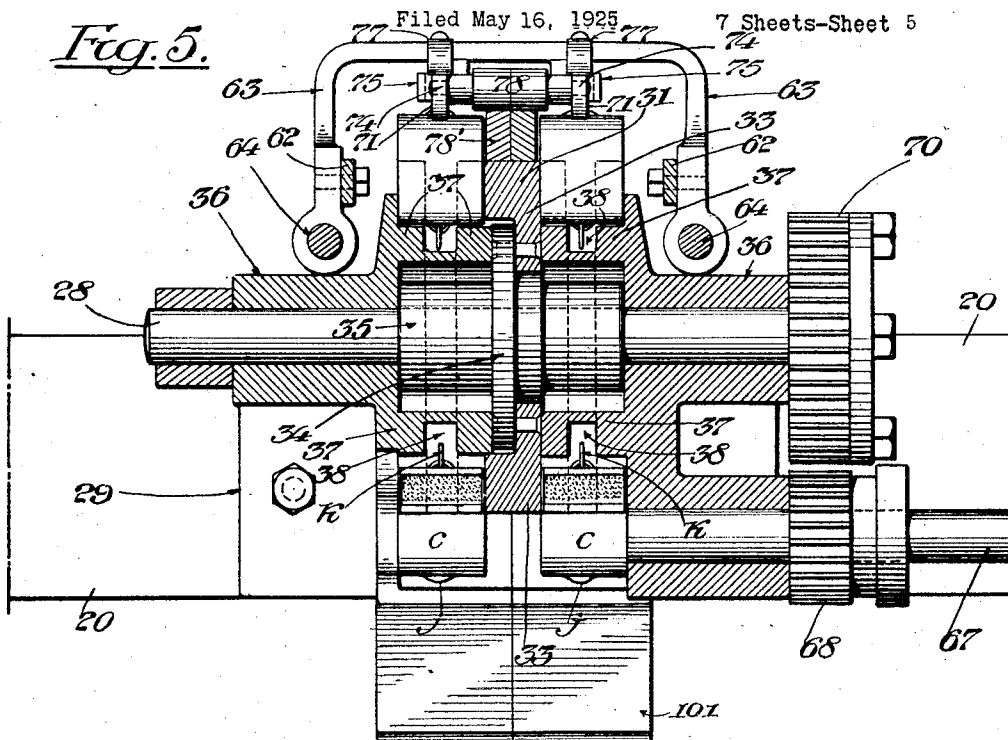
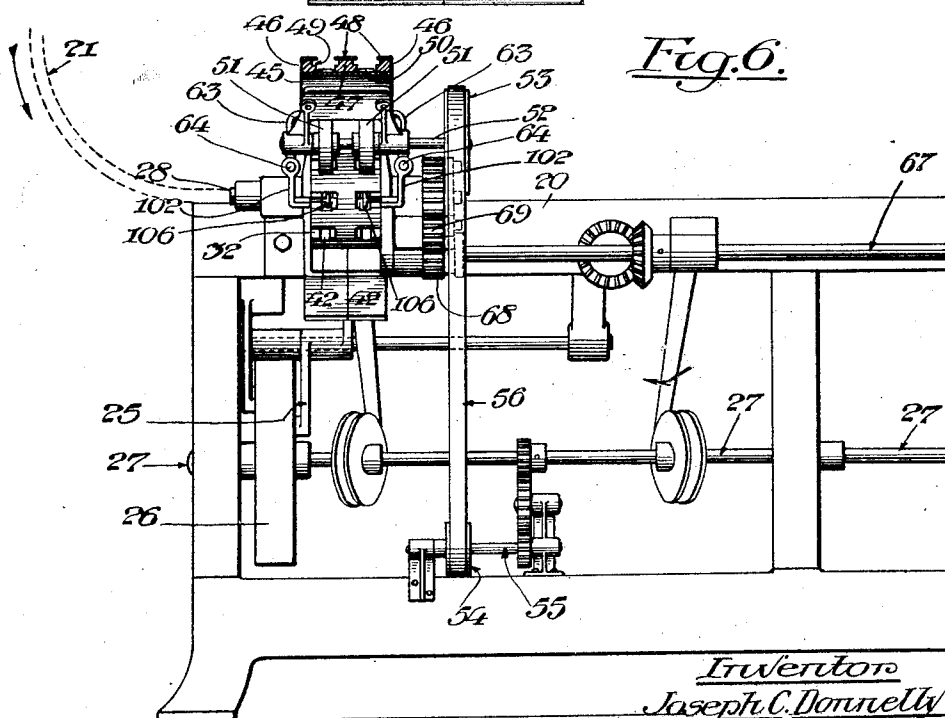


Fig. 6.



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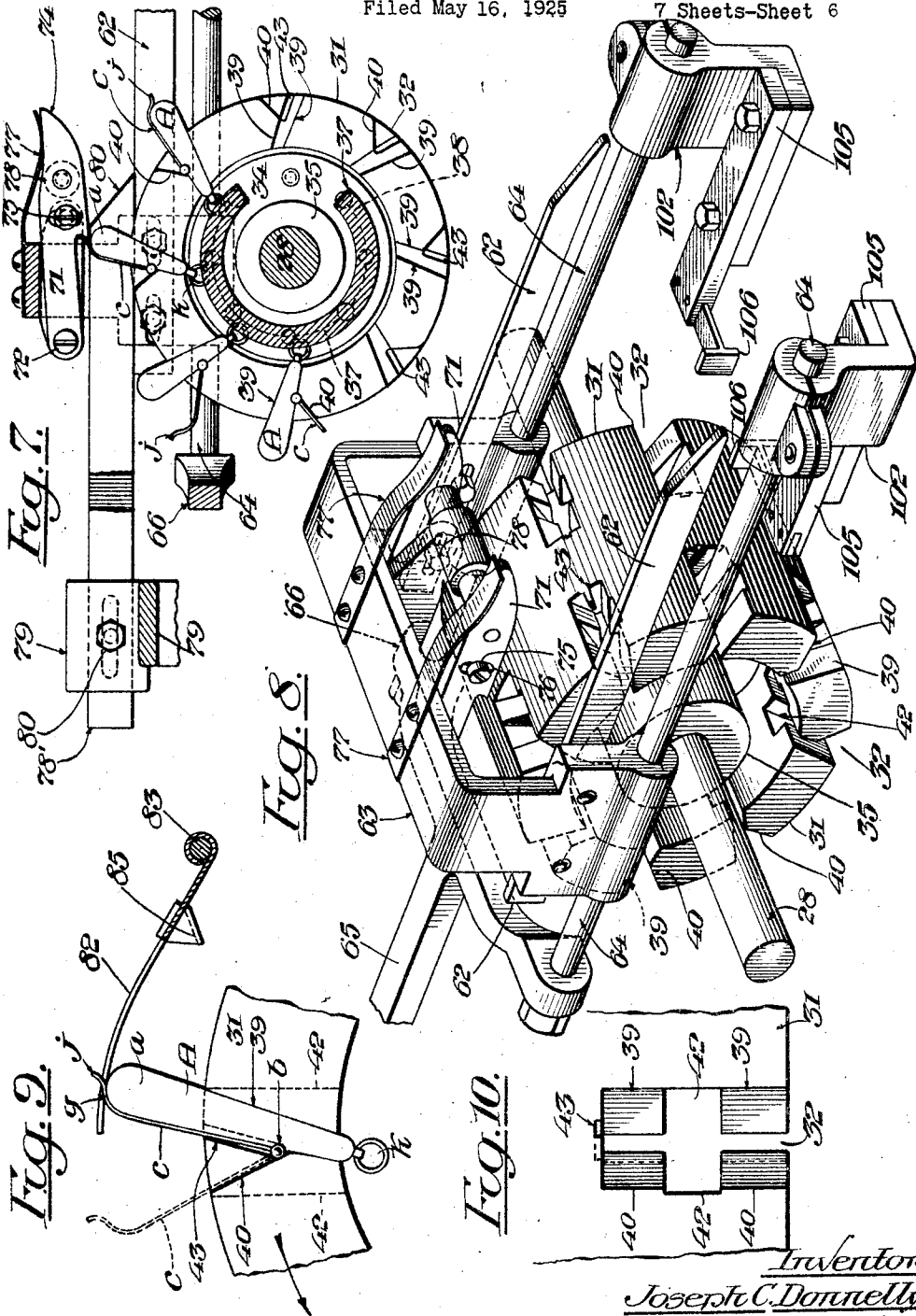
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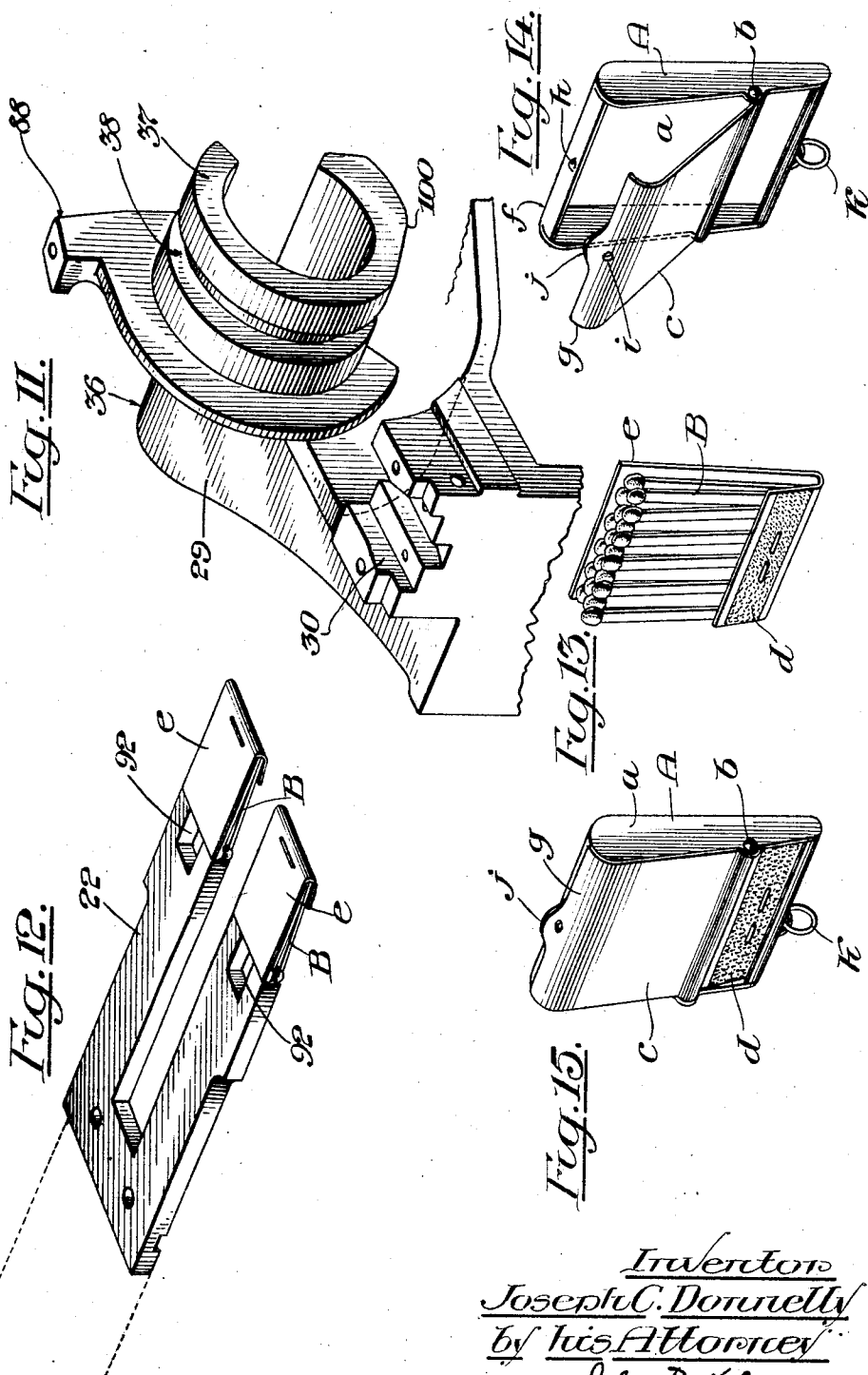
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MECHANISM FOR FILLING MATCH SAFES AND THE LIKE

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7 Sheets-Sheet 7



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Patented Mar. 15, 1927.

1,621,316

UNITED STATES PATENT OFFICE.

JOSEPH C. DONNELLY, OF BARBERTON, OHIO, ASSIGNOR TO THE DIAMOND MATCH COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

MECHANISM FOR FILLING MATCH SAFES AND THE LIKE.

Application filed May 16, 1925. Serial No. 30,646.

This invention relates to mechanism for automatically filling match containers, and more particularly pocket safes adapted to contain card or book matches.

5 The mechanism embodying my invention is more especially designed for use in connection with a continuous book-match making machine, and is arranged in such co-operative relation to the discharging instrumentalities of the machine that the safes, with their lids swung open, are positioned to receive the matches as rapidly as they are discharged from the machine, such matches being preferably devoid of foldable cover flaps.

10 My invention is herein illustrated in connection with a book-match making machine of the character illustrated in Letters Patent of the United States No. 1,042,472, dated 20 October 29, 1912, but since the safes are intended to receive book matches devoid of foldable cover flaps, the flap folding instrumentalities of the patented machine are omitted. The said mechanism is substituted 25 for the folding instrumentalities and is operable to open the hinged lids of the safes, position the open safes for the reception of the matches as the latter are discharged from the machine, and, after the entry of 30 the matches in the safes, the lids are shut and the filled and closed safes are delivered.

The invention comprises novel principles of operation, features of construction and combinations of parts, all of which will be hereinafter described and the scope of the invention be defined in the appended claims.

In the drawings—

40 Figure 1 is a plan of a filling mechanism embodying my invention, only so much of the match machine being shown as is necessary to illustrate the invention. In this view the parts are shown in the relative positions which they occupy during the insertion of the matches into a pair of safes.

45 Fig. 2 is a similar view, partly in horizontal section.

Fig. 3 is a side elevation of the filling mechanism, showing the adjacent portion of the match machine in vertical section.

50 Fig. 4 is a longitudinal vertical section, as on the line 4—4 of Fig. 1, but showing the parts in their relative positions immediately before the ejection of the matches from the carrier of the match machine.

55 Fig. 4^a is a transverse section through the

safe feeding chute, as on the line 4^a—4^a of Fig. 4.

Fig. 5 is a transverse vertical section through the safe carrying turret and adjuncts, as on the line 5—5 of Fig. 4. 60

Fig. 6 is a transverse vertical section, on a smaller scale, in a plane through the safe feeding chute, as on the line 4^a—4^a of Fig. 4, looking toward the match machine.

Fig. 7 is an elevation, partly in section, 65 of the turret and adjuncts, showing the lid opening pawls in position to engage and open the opposing lids of the adjacent safes.

Fig. 8 is a perspective view of the turret, the lid opening devices and immediate connections. 70

Fig. 9 is an elevation of a fragment of the turret, showing a safe therein and a pressure member bearing on the outer end of the safe.

Fig. 10 is a fragmentary plan of the turret, showing one of the safe-receiving slots or openings therein. 75

Fig. 11 is a perspective view of a portion of a bearing bracket in which the shaft for the turret is mounted. 80

Fig. 12 is a similar view of a bifurcated plunger for ejecting the match books from the carrier of the match machine, the books being indicated.

Fig. 13 illustrates one of the match books 85 with its cover flap omitted.

Fig. 14 illustrates a match safe with its lid open for the reception of a match book.

Fig. 15 shows the safe as supplied with a match book, and closed. 90

Referring to the drawings, A designates a known form of metal match safe comprising a shallow tapering body portion *a* having hinged thereto, at *b*, a lid *c* which is adapted partially to close the open side of the body and confine the contained matches B, except the striking surface *d* on the bound fold of the match cover *e*. The larger end of the body portion is partially closed by a curved wall *f* which is bent up from the bottom of the body, and the free end of the lid is downwardly curved to provide a flange *g* which overlaps and closely hugs the curved end wall when the lid is closed, which wall and flange have an interlocking teat and a depression *h*, *i*, respectively. The lid flange is also provided with a projection *j* to facilitate the release and opening of the lid. The body is equipped at its narrow end with an eye or ring *k* for attachment to a chain 110

or the like. Usually the cover flap is torn from the book of matches before it is placed in the safe, and, therefore, in the production of the books for insertion in the safe, I omit

5 the cover flap. See Fig. 13.

20 designates a part of the supporting frame of a book match machine, and 21 a part of the intermittently movable chain of pocketed links in which the match cards

10 and covers are assembled and bound together, the usual foldable cover flaps being in the present case omitted, as above mentioned.

22 designates a bifurcated plunger

15 mounted to reciprocate transversely of the links and eject the books in succeeding pairs from the links during the intermissions of the carrier. This plunger is affixed to a slide 23 which is guided in a bed 24 and is

20 flexibly connected to a lever 25 under the influence of a cam 26 on the main shaft 27 of the match machine. (See Fig. 6).

28 designates the intermittently rotatable shaft which carries the pocketed folding

25 wheel of the machine of Patent No. 1,042,472, which shaft is mounted in appropriate brackets 29 affixed to the frame of the machine. These brackets are provided with spaced horizontal throats 30 through which

30 the matches are discharged from the carrier.

According to my invention a turret of novel construction is substituted for the folding wheel, which turret is adapted to receive and hold the safes with their larger ends

35 projecting outward. The turret includes a hollow cylinder or drum 31 having therein pairs of regularly spaced receptacles afforded preferably by peripheral slots 32, whereof each pair, in the intermittent rotation of the turret, is positioned at successive

40 stations, to wit, a receiving station where two closed safes are entered in the slots; a lid opening station where the lids of the safes are opened; a filling station where the

45 matches are transferred from the carrier of the match machine to the open safes; a closing station where the lids of the filled safes are shut, and an ejecting station where the filled and closed safes are discharged from the slots of the turret.

In the present instance the slotted drum is formed with an internal web 33 which is fastened to the circular flange 34 of a collar

35 fast on the shaft 28. The shaft bearings 36 in the brackets, are expanded and extended inwardly to afford mutilated cylindrical portions 37 which partially encircle the collar and are spaced therefrom, such

60 portions each having a circumferential groove 38 for a purpose hereinafter appearing. (See Figs. 4, 5, 7, 8 and 11).

The peripheral slots 32 are open at the respective ends of the drum and their interior walls are each beveled or inclined, at

65 39, correspondingly with the sides of a match

safe, so as to support the safe not only at both sides, but also disposed at an angle or inclination to the radius of the turret; it being noted that the groove 38 in the adjacent cylindrical portion 37 freely receives

70 the eye or ring $\frac{1}{2}$ of the safe. One of the walls of each slot is beveled outwardly to the periphery of the turret, as at 40, to permit the partial opening of the lid *c* of the safe when the latter is supported in the slot,

75 and both walls of each slot are offset or recessed, as at 42, for the passage therethrough of a clearing plunger hereinafter described. The inner or closed end wall of each slot

80 has a suitable groove 43 therein to accommodate the adjacent head of the hinge rod of the safe which is entered in the slot.

Two safes, bottom sides down and narrow ends forward, are entered in each succeeding pair of slots during each dwell of the turret

85 in its intermittent rotation. In the present instance the means for this purpose comprises an inclined chute provided with parallel ways leading to the path of the successive pairs of slots. In these ways two orderly

90 rows of closed safes, in end to end relation, are guided toward the turret, and as a pair of slots reach and come to rest at the lower end of the chute, the leading safes, narrow

95 ends forward, are permitted to enter the slots. The chute, which is supported on an inclined stationary bed 44, includes a bottom

100 45, side rails 46, and an intermediate partition rail 47. On the tops of the rails are strips 48 which overhang the edges of the respective ways formed between the rails, and thus prevent upward displacement of the safes contained in the ways. The rails

105 are suitably recessed longitudinally, as at 49, to accommodate the projecting heads of the hinge pins of the respective lids.

Running in the bottom of each of the ways is the upper run of an endless belt 50 upon which the safes are imposed. This belt passes about suitably-disposed pulleys, the

110 lower one 51 whereof is spaced somewhat rearwardly of the lower end of the chute. The shaft 52 for this pulley bears a pulley 53 which is connected with and driven from

115 a pulley 54 on a continuously driven shaft 55 of the match machine by means of a belt 56. The belts 50 tend continuously to feed the two rows of safes toward the turret, but means are provided whereby the descent

120 of the safes is temporarily checked after the passage of each leading pair to the turret. Such means preferably comprises a pair of spring escapement arms 57 overhanging the respective rows of safes and affixed to a

125 cross-bar 58 on the chute; the free extremities of the arms being downwardly bent, as at 59, so as to lie normally in front of the lower ends of the leading safes. (See Fig. 4.) The spring arms are connected at their

130 lower ends to a cross-bar 60 which is pro-

vided at its respective ends with rollers 61 that lie in the paths of a pair of longitudinally reciprocative cam bars 62. These cam bars extend rearwardly from the sides of a transverse yoke frame 63 supported by a pair of parallel rods 64 forming part of a frame which is reciprocated by and with the plunger slide 23. This frame includes an upwardly and rearwardly extending bar 65 which is affixed at its lower end to the slide 23 and is provided at its rearward end with a cross member 66 to which the ends of the rods 64 are secured. During the rearward stroke of the slide the cam bars in their concurrent travel therewith impinge against and raise the rollers 61, together with the bar 60 and its fingers 57, thus releasing the leading safes and permitting them to pass to the turret. In the succeeding forward stroke of the slide 23 the cam bars 62 recede from the rollers and permit the bar 60 and its fingers 57 to drop, the down bent ends of the latter consequently barring the passage of the succeeding pair of descending safes in the chute until the next following rearward stroke of the yoke and cam bars, and so on.

When each pair of match safes has entered the opposing slots in the turret the turret is advanced in a counter-clockwise direction so as to carry the contained safes upwardly. In the present instance the requisite motion is transmitted to the turret from an intermittently rotatable shaft 67 of the match machine, said shaft having a gear 68 in mesh with an idler 69 which, in turn, meshes with a gear 70 on the shaft of the turret.

When the safes borne by the turret reach their uppermost position, as seen in Figs. 4, 7 and 9, their lids are forcibly swung partially open. The preferred means for this purpose comprises a pair of oscillatory pawls 71 pivoted on the yoke 63, as at 72, and extending rearwardly. These pawls are provided on their under sides with hooks 73 and terminate in upwardly curved or inclined cam portions 74. Preferably the pawls are vertically guided by suitably disposed screws or studs 75 extending through arcuate slots 76 in the arms, and are maintained yieldingly depressed by pressure springs 77 extending thereon from the yoke.

Mounted on each of the pawls 71 is a freely rotatable roller 78 positioned to ride upon a horizontal rearwardly extending supporting bar 78' affixed to a stationary bridge member 79 overlying the chain of the match machine. The bar terminates in an inclined portion 80 slightly rearward of the projections *j* of the lids of the upstanding safes in the turret. The pawls 71 and their rollers 78 are so disposed in relation to the respective bars 78' that in the rearward stroke of the reciprocating frame the rollers escape the beveled extremities 80 of the bars and

the pawls drop upon the opposing lid projections *j* and slide rearwardly thereon until the projections are engaged by the hooks 73, as seen in Fig. 7. Thereupon, in the succeeding forward stroke of the frame, the pawls pull the lids into partially open position, and the roller runs on the top of the bar, which bar thus raises the roller and the pawls so that the latter will not bend the lids of the safes during the remainder of the stroke of the pawls. (See Fig. 4). In other words, the yoke frame has more travel than is necessary to open the lids, and therefore in order to avoid the bending of the lids during the excess travel of the pawls, the latter are raised above the lids, as mentioned. The two bars 78' are arranged side by side as illustrated, and they are adjustably secured to their respective supporting members 79 by bolts 81 passing through slots in the respective bars, in order that the bars may be independently adjusted longitudinally to position their beveled ends in accurate operative relation to the respective pawl rollers 78.

Pressure arms 82 (Figs. 1, 3 and 9) are arranged to overhang and bear yieldingly upon the outer ends of the safes as they are being carried upward and forward from the chute, which arms press the safes down into the slots of the turret and also hold them therein while the lids are being opened. Preferably each of these arms comprises a bifurcated spring strip which flanks the lid projection *j* of each successive safe. The strip is secured at its lower end to a cross-rod 83 supported in side blocks 84 at the lower end of chute so as to extend upwardly and forwardly in the path of the safes. Each strip has fastened thereto a stop member 85 that co-operates with the side blocks 84 to limit the descent of the strip.

Suitably arranged at the respective sides of the turret are spring fingers 86 (Fig. 1) which bear yieldingly against the outer sides of the safes as they approach and pass the lid opening devices, which fingers tend to press the safes into the slots of the turret. When the lids are pulled open the free ends of the fingers 86 spring between the open lids and the bodies of the safes and thus prevent the rebound and closing of the lids. These fingers are composed of spring strips which are secured to vertical studs 87 mounted on suitably disposed projections 88 on the respective bearing brackets 29.

After the lids are opened as described, the safes are advanced by the turret toward the carrier of the match machine and in a position laterally thereof to receive the matches as they are discharged by the plunger from the carrier. At this juncture such safes occupy the inclined position indicated at the left in Fig. 4, wherein the bottoms of

the safes are upward, the open lids are downward, and the curved ends of the safes are adjacent to and above the throats 30 through and beyond which the matches are pushed from the carrier by the plunger 22. Hence as the matches are forced through and beyond the throats, the leading or bound ends of the matches enter the proximate safes, bear against the opposing inclined bottoms, and are forced down to the narrow ends of the safes in such a manner that the ignition surfaces *d* of the matches are exposed through the openings of the safes adjacent the hinges of the lids, respectively.

Each of the bearing brackets 29 is provided, immediately beneath the throat 30, with a pivoted guide pawl 88 (Fig. 4) which is partially covered by a plate 89 and is pressed yieldingly upward by a suitably-disposed spring 90. The pawl has an upwardly inclined nose portion 91 which acts against the leading end and bottom of the opposing match cover as the matches are advanced by the plunger to the safe, and thus presses the matches upward and insures their accurate guidance and entry into the safe. The nose member supports the front ends of the covers and matches until they are pushed into the respective safes; the acting ends of the plunger members being recessed, as at 92, to embrace and escape the nose portions of the respective pawls 88.

As the filled safes are moved from the filling station, by the rotary action of the turret, their open lids impinge against the opposing arms 93 of spring pressed dogs that are positioned to effect the forcible closing of the respective lids. These dogs are pivoted to lugs 94 on the respective brackets 29 and extend through slots 95 in the brackets, the lower depending arms 96 of the dogs being connected by means of retracting springs 97 to adjusting screws 98 which are fitted to pieces 99 on the under sides of the brackets. When the lids are closed the ends of the safes, as the turret advances therewith, force the respective dogs backward until the safes escape the dogs, whereupon such dogs resume their normal position.

As the closed safes pass the dogs the inner ends of the safes impinge against opposing cam projections 100 formed on the mutilated cylindrical portions 37 of the shaft bearings and projecting into the space between such portions and the turret. These projections gradually depress the safes in a manner to release them and permit them to drop by gravity from the retaining slots of the turret and upon an inclined discharge bed 101.

Adjustably fastened to the rearward ends of the reciprocative parallel rods 64 are L-shaped brackets 102 respectively, to the

lower member of each of which is secured a bar 105 parallel to the adjacent rod. Attached to the inner end of each of the bars 105 is a T-head 106 which is reciprocable into and from the enlarged or offset portion of each succeeding slot of the turret; that is to say, when the ejecting plunger 22 is withdrawn from the match carrier and the turret is at rest, the rods are similarly moved so as to draw the heads 106 into the adjacent slots of the turret and within the opening of the mutilated cylindrical portions 37. Thereupon the match carrier advances and the turret is partially rotated. At the interval of rest of the carrier and the turret, the plunger 22 pushes the matches into the adjacent safes as previously described and the heads 106 are moved rearwardly and outwardly through the adjacent slots of the turret, which heads in their outer movement remove and clear from the slots any matches that may have been inserted into such slots in the absence of match safes.

It is to be understood that my invention is not limited to the particular construction herein disclosed, as the mechanism may be modified within the principle of the invention and the scope of the appended claims.

I claim—

1. In mechanism for filling match safes having hinged lids, the combination of a turret having peripheral openings therein for the reception of the safes, means for rotating said turret to advance the said openings to and past successive stations, means at one station for feeding a row of match safes having closed lids toward said turret and entering the safes in succeeding openings of the turret, means for opening the said lids at a second station, means for introducing matches into the open safes at a third station, and means for closing the lids at a fourth station.

2. In mechanism for filling shallow match safes having open tops, the combination with a match carrier, and a plunger for ejecting the matches therefrom in a horizontal path, of an element constructed to carry the said match safes into the path of the matches and support them with the bottoms of the safes in upper position and inclined in relation to the plane of the plunger.

3. In mechanism for filling shallow match safes having open tops, the combination with a match carrier, and a plunger for ejecting the matches therefrom in a horizontal path, a throat member into and through which the matches are pushed, and a resilient supporting member in the bottom of the throat, of an element constructed to carry match safes adjacent to and in inclined relation to the throat and with the bottoms of the safes in upper position.

4. In mechanism for filling match safes

having hinged lids, an element constructed and arranged to receive and carry closed safes at spaced intervals, means for actuating said element, a pawl member having a lid-engaging portion, and means for reciprocating said pawl across the top of each lid presented thereto, whereby the lid-engaging portion engages the lid and pulls it open.

5 In mechanism for filling match safes having hinged lids, an element constructed and arranged to receive and carry closed safes at spaced intervals, means for actuating said element, a pawl member having a lid-engaging portion, means for reciprocating said pawl across the top of each lid presented thereto, whereby the lid-engaging portion engages the lid and pulls it open, and means for raising the pawl after the opening of the lid thereby.

20 6. In mechanism for filling match safes having hinged lids, an element constructed and arranged to receive and carry closed safes, means for actuating said element, a pawl member having a lid-engaging portion, means for reciprocating said pawl across the top of each lid presented thereto, whereby the lid-engaging portion pulls the lid open, and means, including a stationary guide and cam bar, for raising the pawl after the opening of the lid thereby.

7. In mechanism for filling match safes having hinged lids, the combination with a match carrier, and a reciprocating plunger for ejecting the matches therefrom, of an element having spaced receptacles for safes, means for actuating the said element to position the said receptacles adjacent successive stations, means for supplying closed safes to said receptacles at one station so that the free ends of the lids are exposed, a pawl member having a lid-engaging portion to open the lid, a support for said pawl reciprocative concurrently with the said plunger, and means, including a stationary guide and cam bar, for raising the pawl after the opening of the lid thereby.

8. In mechanism for filling match safes having hinged lids, the combination with a rotary turret having peripheral receptacles for safes, means for actuating said turret to position the said receptacles adjacent successive stations, means for feeding closed safes to said turret at one station, a pressure member arranged to overhang and bear upon the outer end of each succeeding safe during its travel to another station, and means for opening the lid of the safe at the latter station.

9. In mechanism for filling match safes having hinged lids, the combination with a rotary turret having peripheral receptacles for safes, means for actuating said turret to position the said receptacles adjacent successive stations, means for feeding closed safes to said turret at one station, a resilient

pressure member arranged at one side of the turret to bear laterally against the outer portion of each succeeding safe as it approaches and reaches another station, and means for opening the lid of the safe at the latter station.

10. In mechanism for filling match safes having hinged lids, the combination with a rotary turret having peripheral receptacles for safes, means for actuating said turret to position the said receptacles adjacent successive stations, means for feeding closed safes to said turret at one station, a pressure member arranged to overhang and bear upon the outer end of each succeeding safe during its travel to another station, a resilient pressure member arranged at one side of the turret to bear laterally against the outer portion of the safe as it approaches and reaches the second station, and means for opening the lid of the safe at the latter station and permitting the free end of the latter pressure member to spring between the body of the safe and the lid.

11. In mechanism for filling match safes having hinged lids, the combination with a match carrier, and a reciprocating plunger for ejecting the matches therefrom, of an element having spaced receptacles for safes into which the matches are delivered, means for actuating the said element to position the said receptacles adjacent successive stations, including the station where the matches are delivered to the safes, a chute for closed safes leading to the path of the said element at one station, means for successively releasing the safes from the delivery end of the chute, means operative concurrently with the plunger for actuating said releasing means, whereby the leading safes are delivered to the succeeding receptacles with the free ends of the lids projecting outward, and means for opening the said lids at another station before the passage of the safes to the filling station.

12. In mechanism for filling match safes, the combination of a turret comprising a hollow cylinder having spaced peripheral openings extending therethrough and providing receptacles for the safes to be filled, so that the inner ends of the safes project into the interior of the cylinder, a shaft upon which said turret is mounted, a support including a bearing for said shaft, means for rotating the said shaft and turret, and means for supplying matches to succeeding safes in the turret, said bearing having a cam portion located within the interior space of the turret and in the paths of the inner ends of the filled safes and operable to eject the latter successively from the turret.

13. In mechanism for filling match safes, the combination with a match carrier, and a reciprocating plunger for ejecting the

matches therefrom, of a turret having spaced peripheral openings therethrough extending to one end of the turret and adapted to receive the safes at a location remote from the match carrier and carry them to a position to receive the matches ejected from the carrier, means for actuating said turret, a frame reciprocative concurrently with the plunger, and including a rearwardly extending rod and adjacent the end of the turret, and a clearing member supported by said rod and reciprocable thereby into and from succeeding openings of the turret remote from the match carrier.

Signed at Barberton, in the county of Summit and State of Ohio this 13 day of May, A. D. 1925.

JOSEPH C. DONNELLY.