

(No Model.)

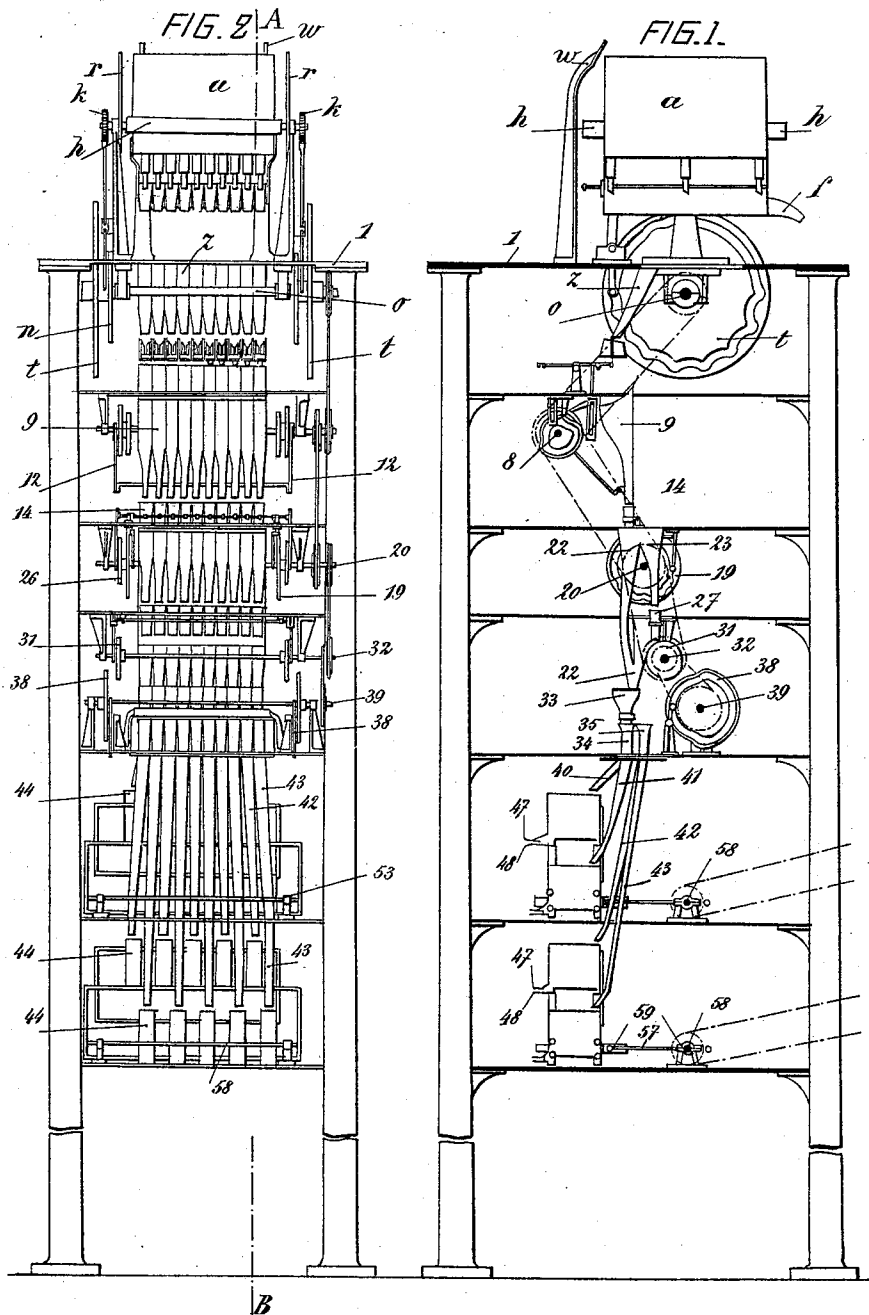
18 Sheets—Sheet 1.

V. CARASSALE.

APPARATUS FOR AUTOMATICALLY FILLING BOXES WITH MATCHES.

No. 588,265.

Patented Aug. 17, 1897.



Witnesses:
L. M. Hachschlager,
George W. Warr.

Inventor
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his Attorneys

(No Model.)

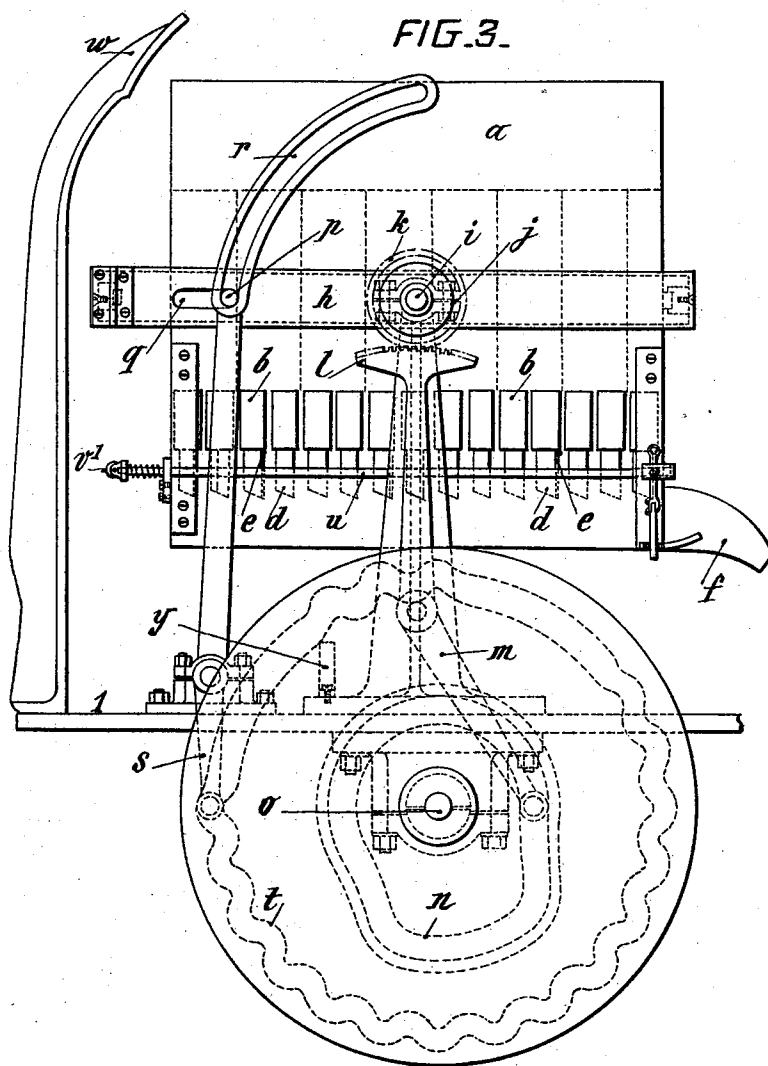
18 Sheets—Sheet 2.

V. CARASSALE.

APPARATUS FOR AUTOMATICALLY FILLING BOXES WITH MATCHES.

No. 588,265.

Patented Aug. 17, 1897.



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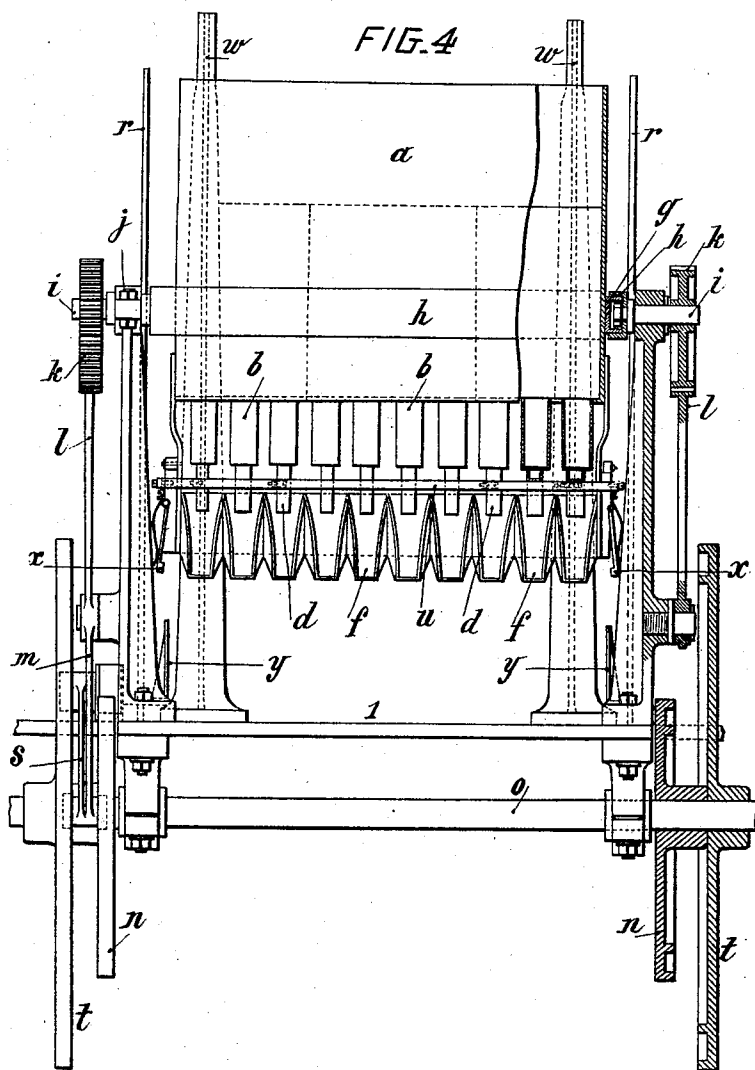
18 Sheets—Sheet 3.

V. CARASSALE.

APPARATUS FOR AUTOMATICALLY FILLING BOXES WITH MATCHES.

No. 588,265.

Patented Aug. 17, 1897.



Witnesses:
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FIG. 4.

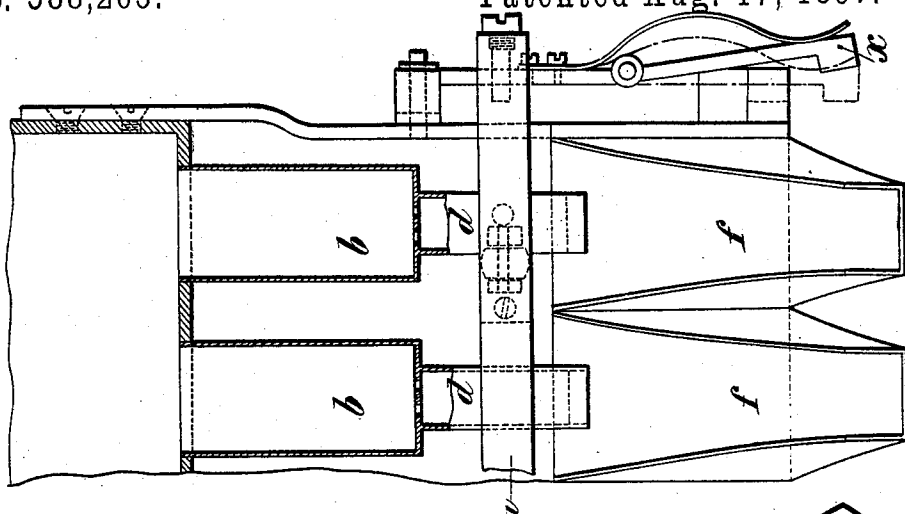
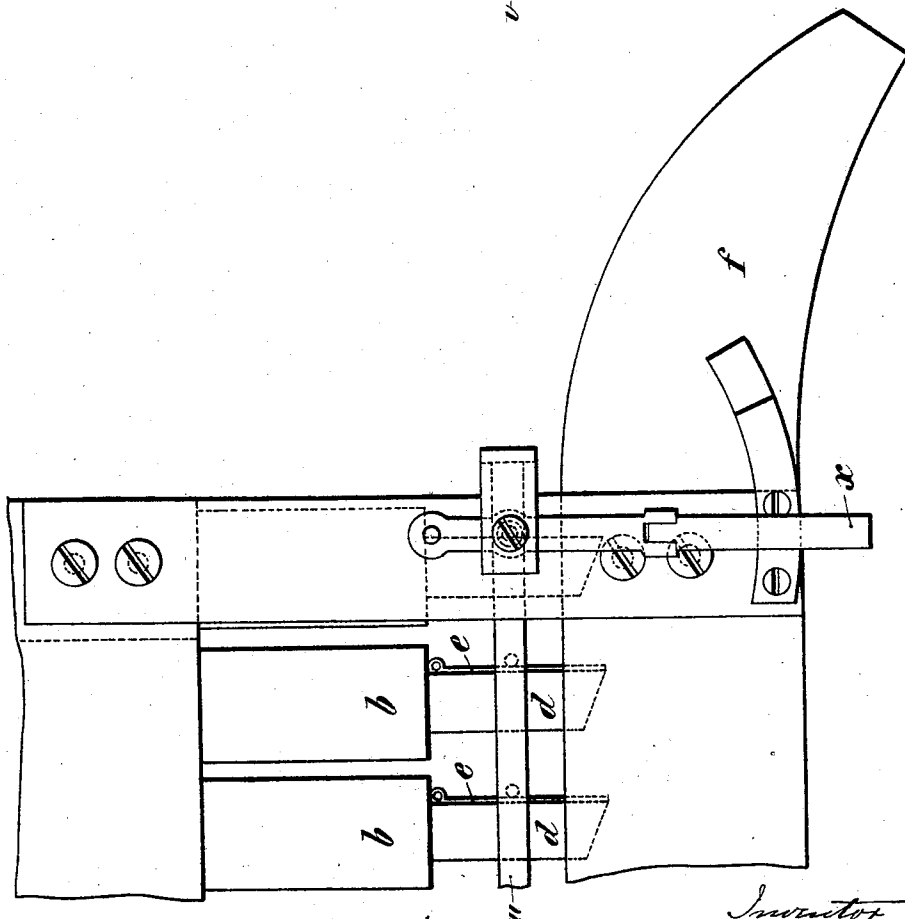


FIG. 3.



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(No Model.)

18 Sheets—Sheet 5.

V. CARASSALE.

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FIG. 6.

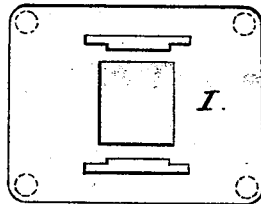
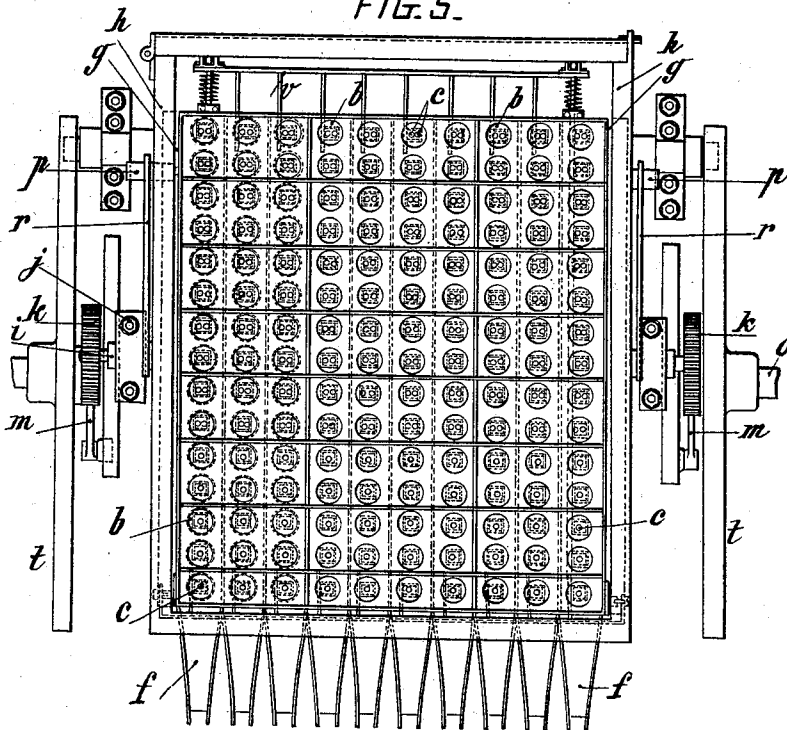


FIG. 5.



Witnesses:
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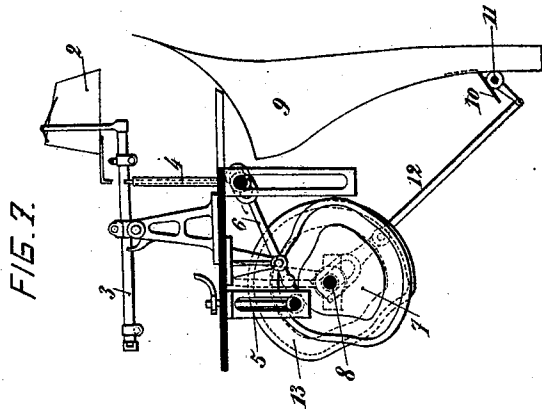
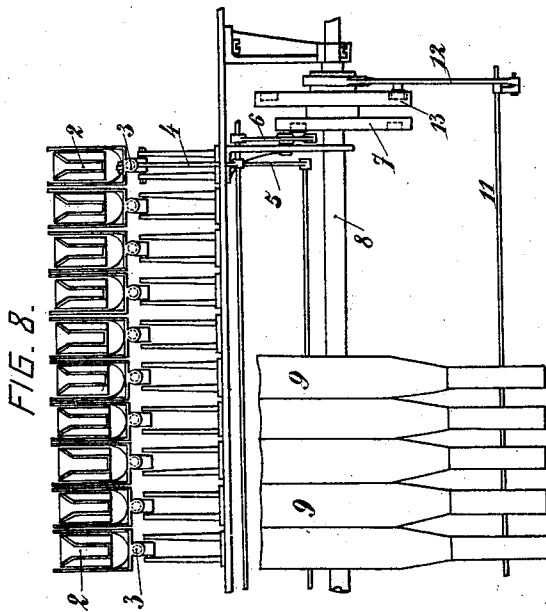
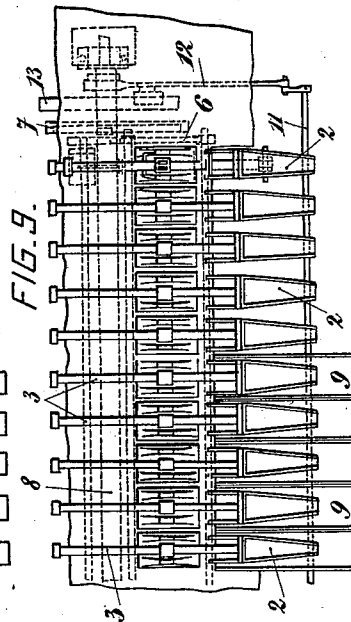
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(No Model.)

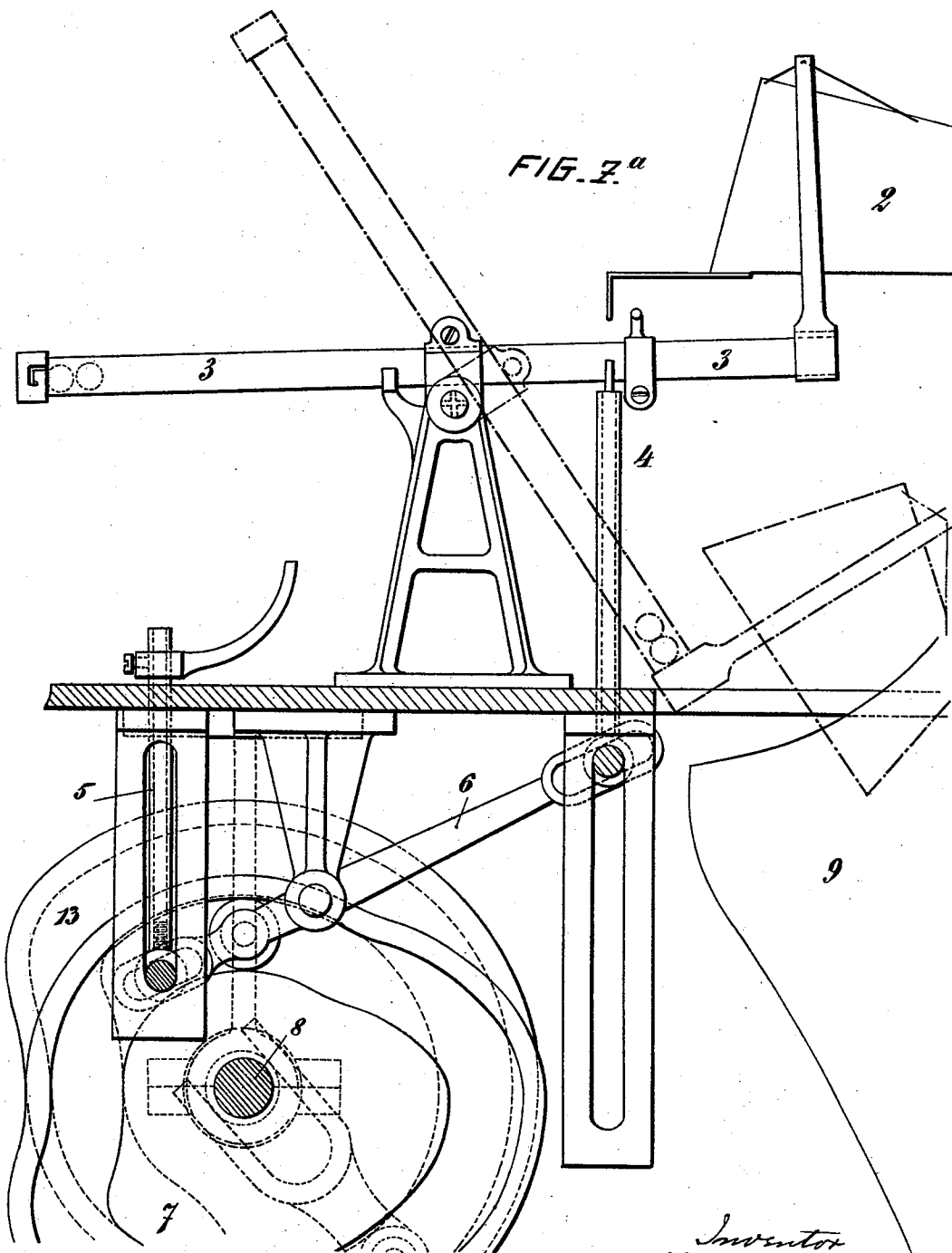
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Patented Aug. 17, 1897.



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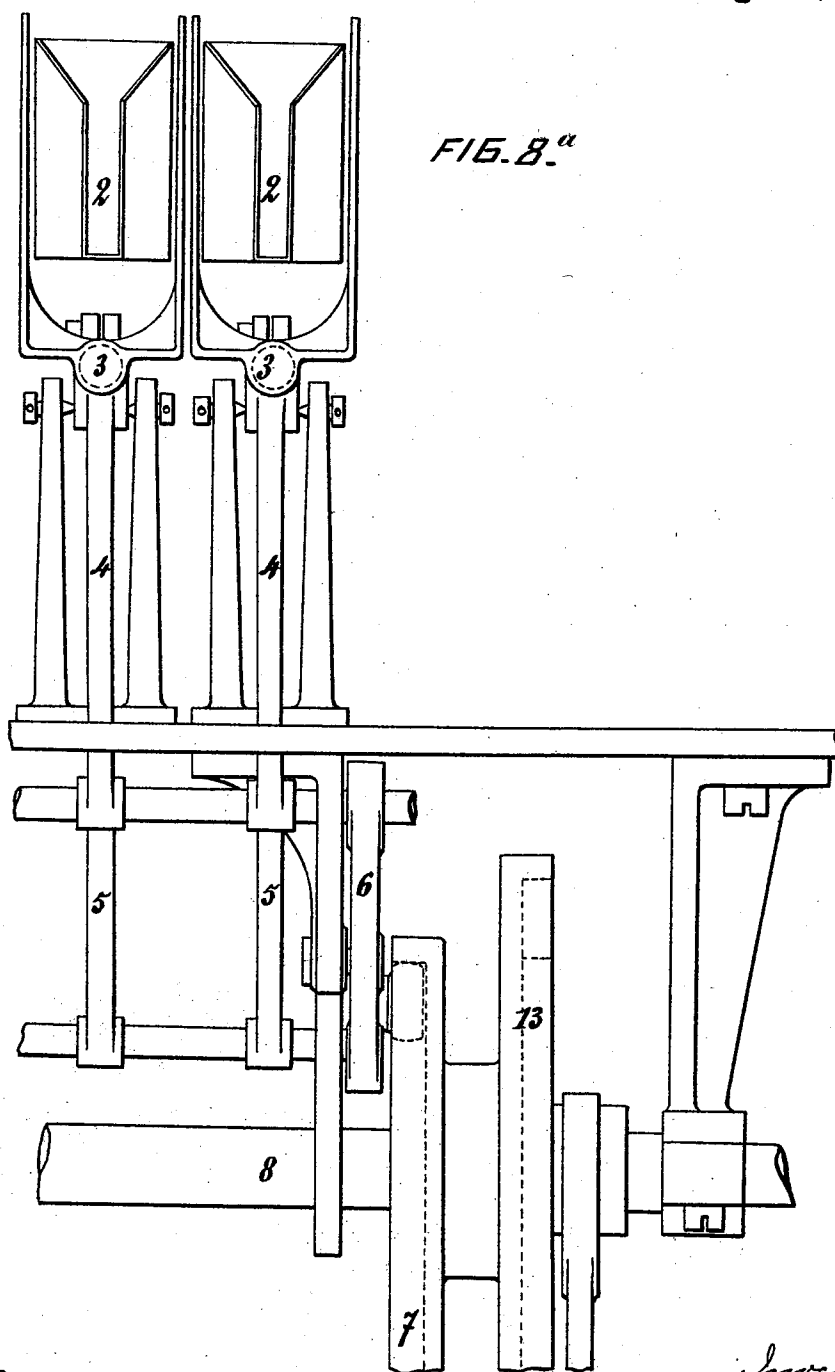
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V. CARASSALE.

APPARATUS FOR AUTOMATICALLY FILLING BOXES WITH MATCHES.

No. 588,265.

Patented Aug. 17, 1897.



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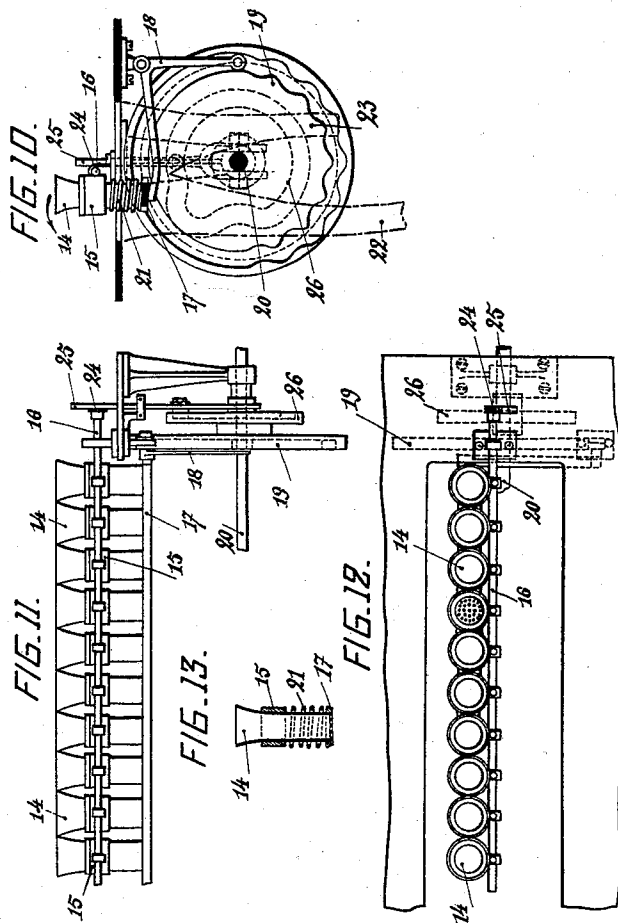
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V. CARASSALE.

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No. 588,265.

Patented Aug. 17, 1897.



Witnesses:
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18 Sheets—Sheet 10.

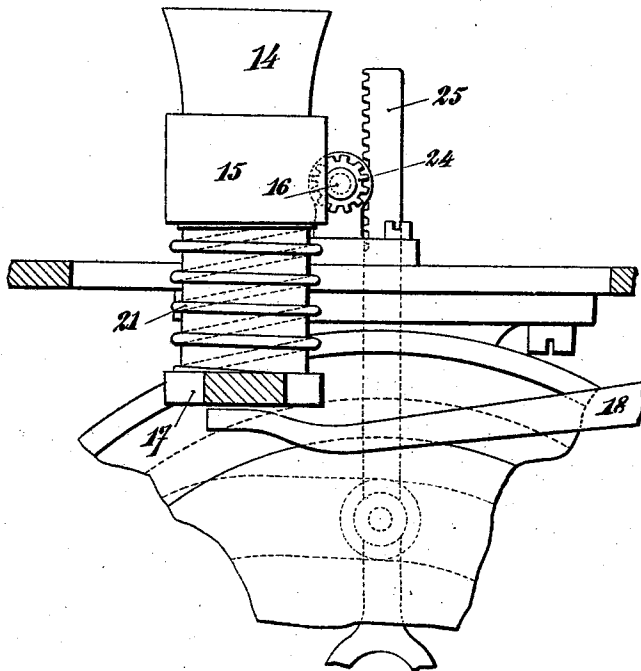
V. CARASSALE.

APPARATUS FOR AUTOMATICALLY FILLING BOXES WITH MATCHES.

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FIG. 10."



Witnesses:
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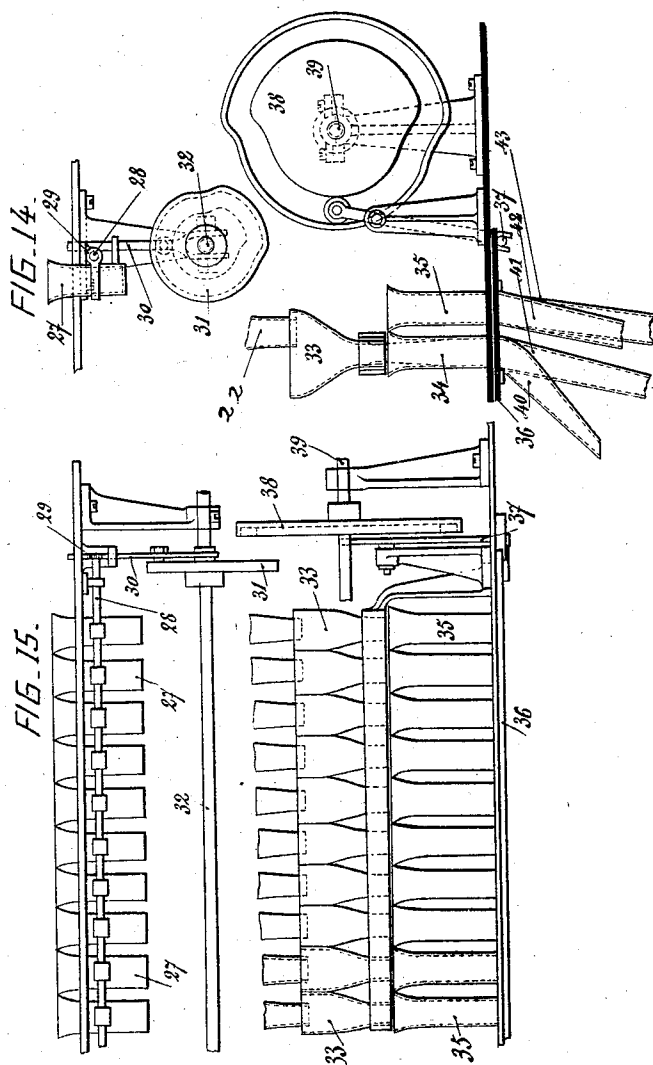
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V. CARASSALE.

APPARATUS FOR AUTOMATICALLY FILLING BOXES WITH MATCHES.

No. 588,265.

Patented Aug. 17, 1897.



Witnesses:
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18 Sheets—Sheet 12.

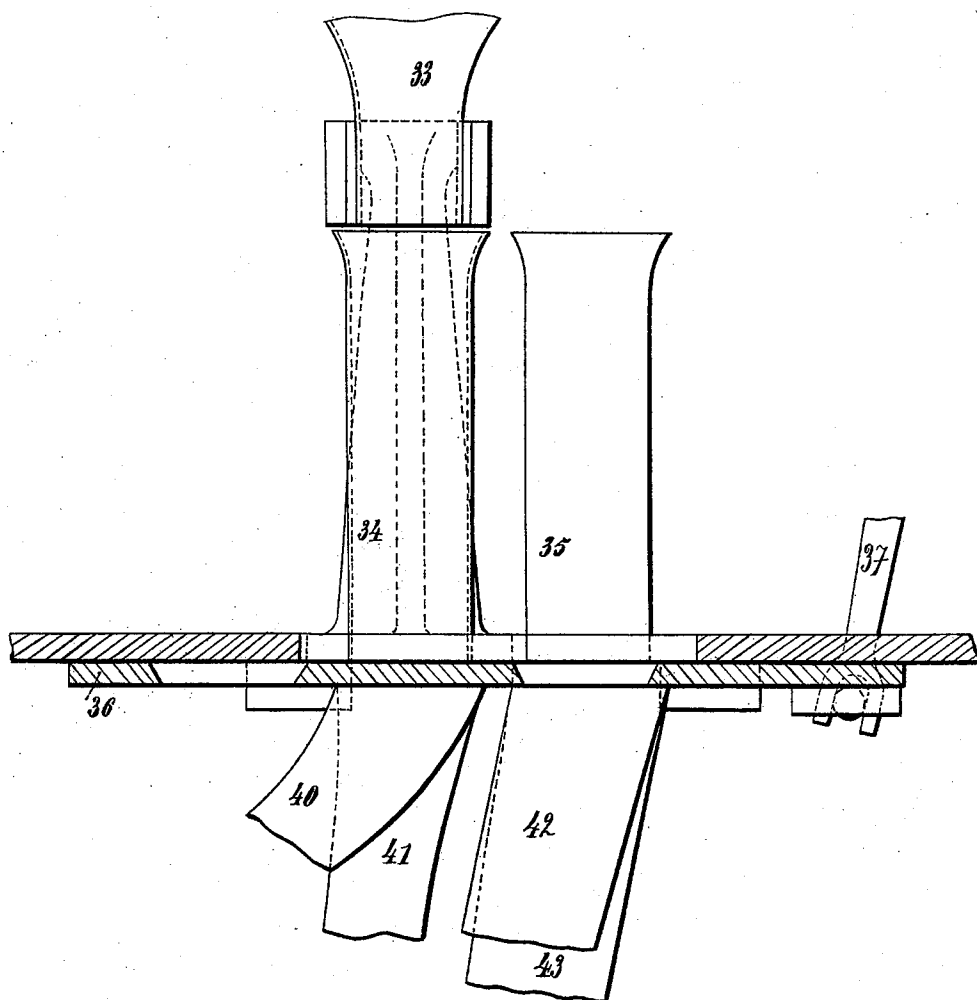
V. CARASSALE.

APPARATUS FOR AUTOMATICALLY FILLING BOXES WITH MATCHES.

No. 588,265.

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FIG. 14.^w



Witnesses:
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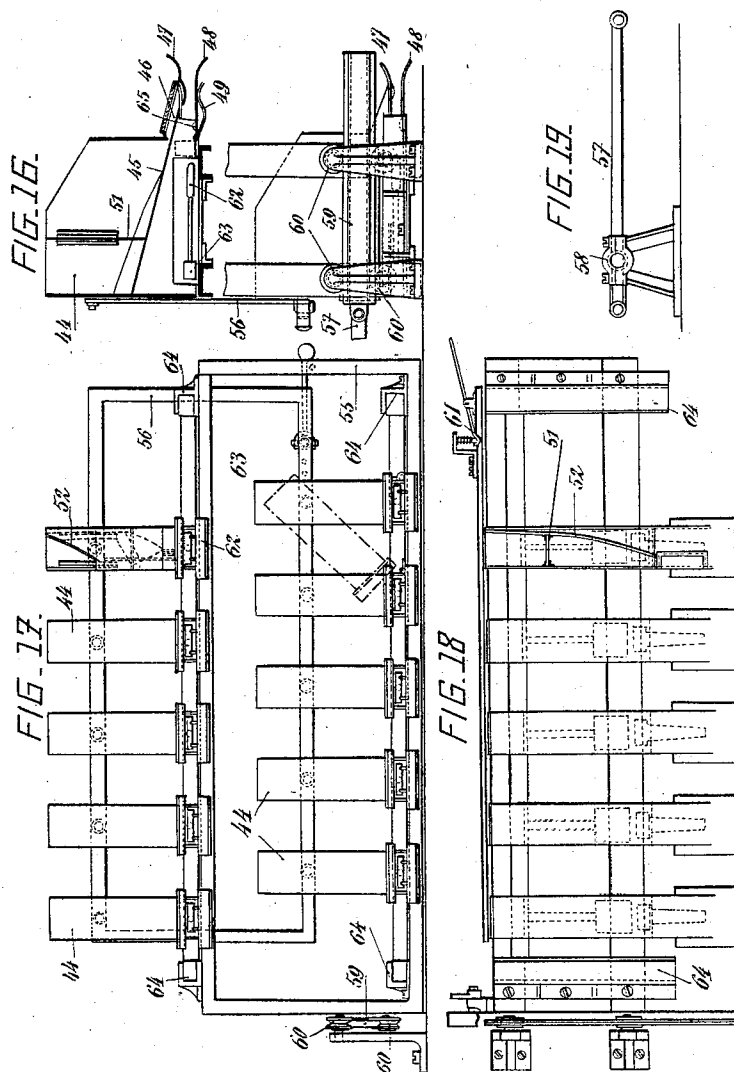
18 Sheets—Sheet 13.

V. CARASSALE.

APPARATUS FOR AUTOMATICALLY FILLING BOXES WITH MATCHES.

No. 588,265.

Patented Aug. 17, 1897.



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18 Sheets—Sheet 14.

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APPARATUS FOR AUTOMATICALLY FILLING BOXES WITH MATCHES.

No. 588,265.

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FIG. 12^b

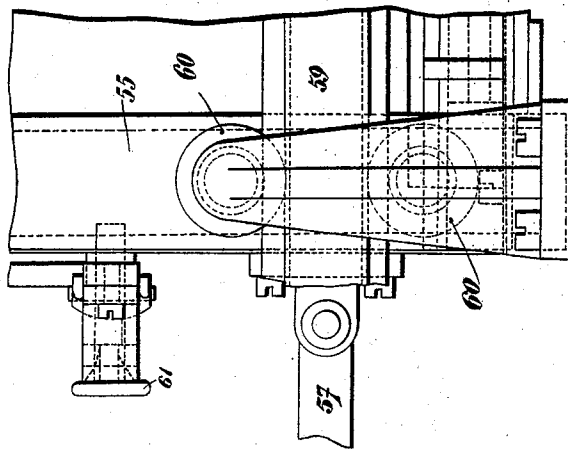


FIG. 12^a

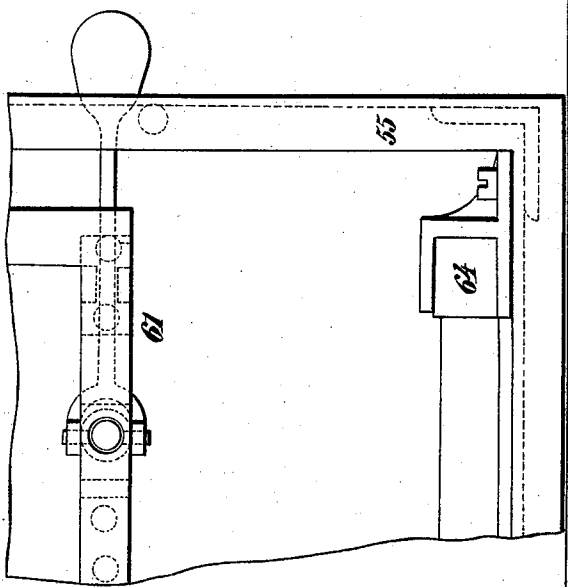
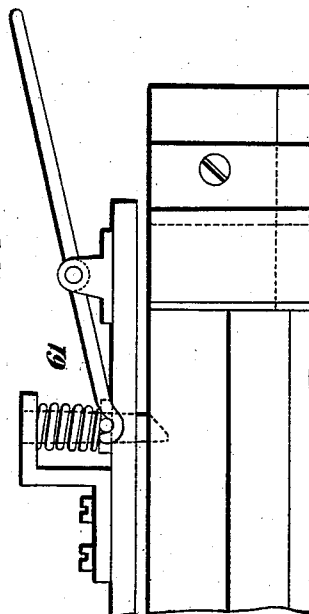


FIG. 12^c



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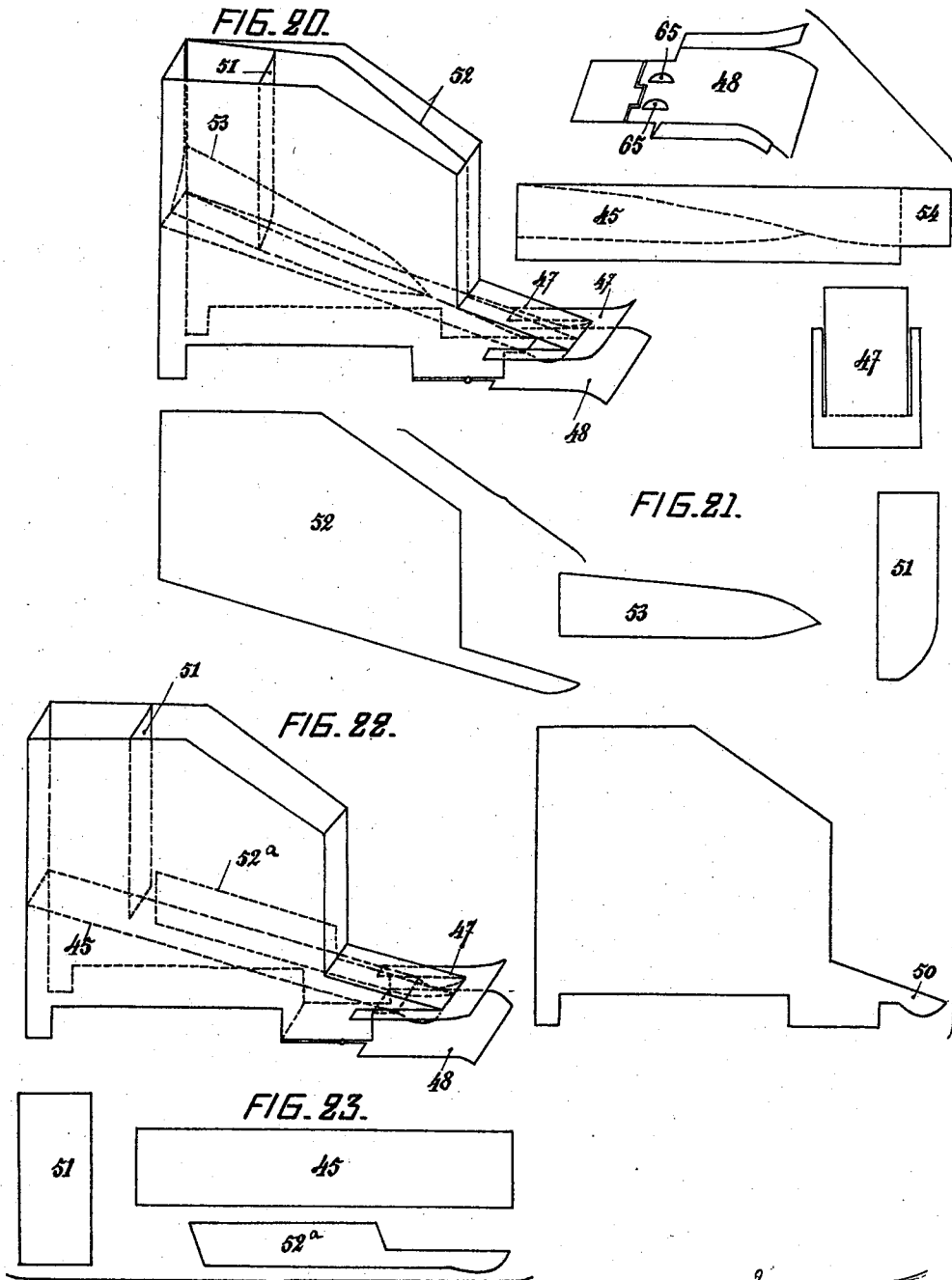
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Witnesses:
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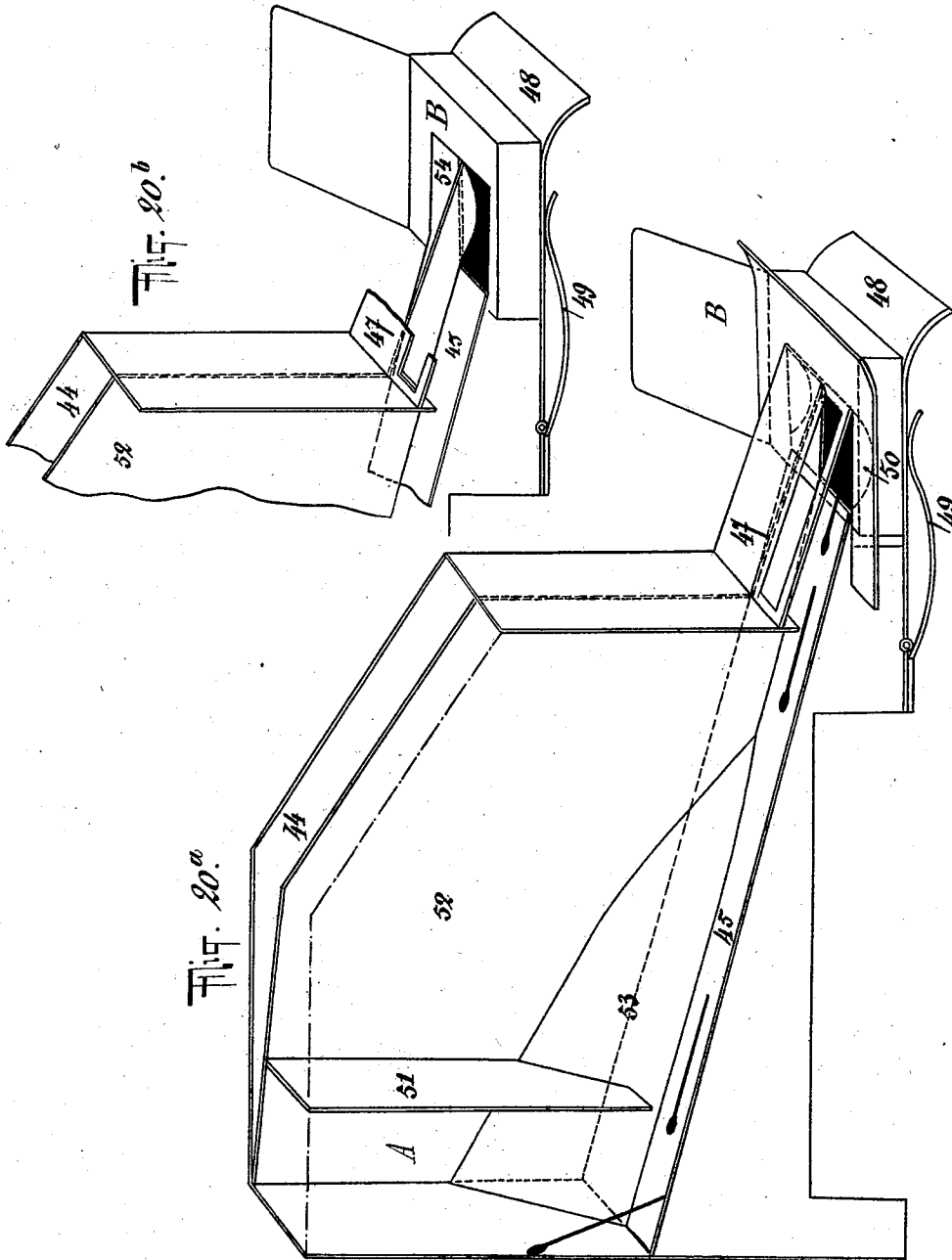
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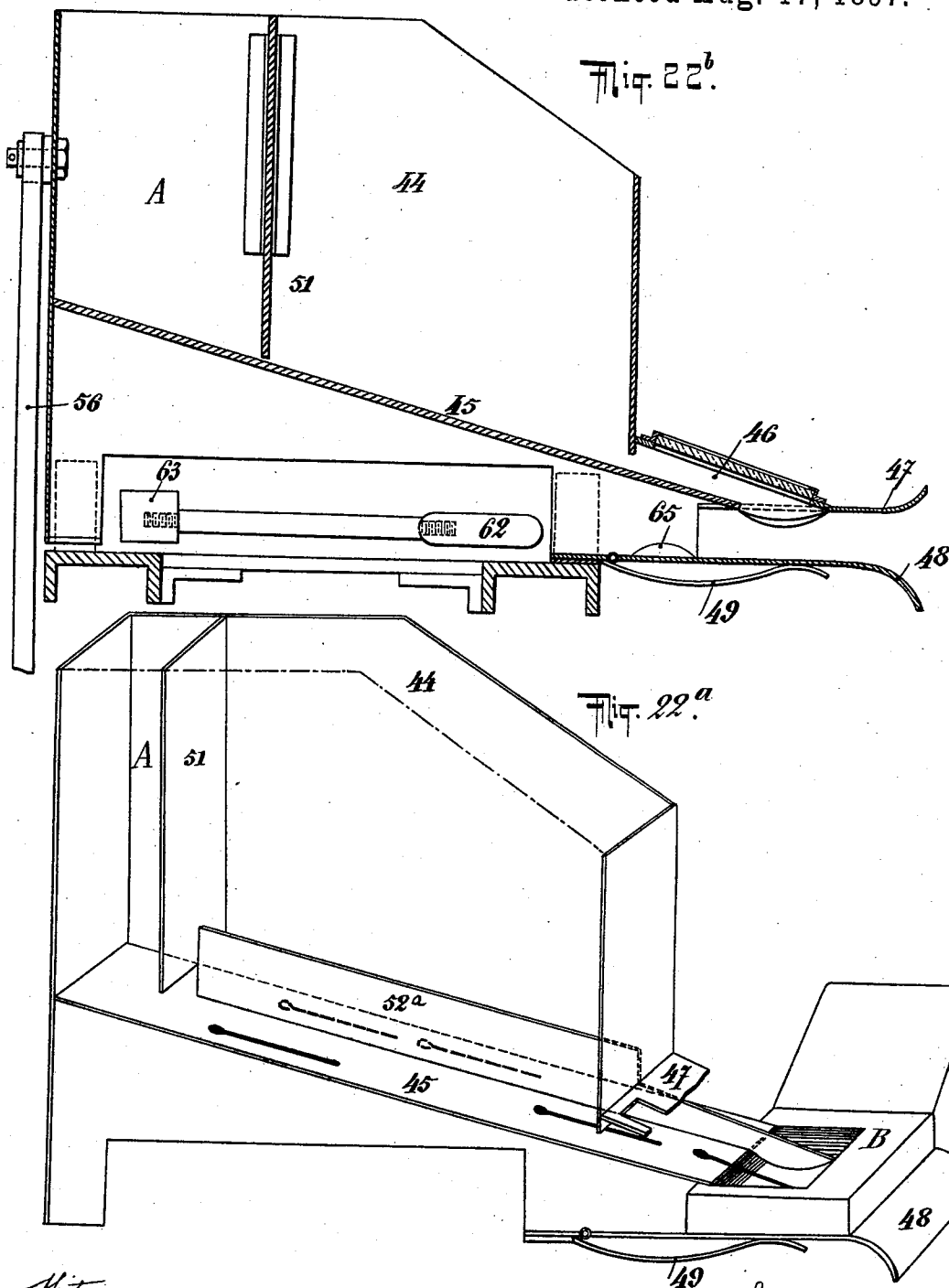
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V. CARASSALE.

APPARATUS FOR AUTOMATICALLY FILLING BOXES WITH MATCHES.

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Patented Aug. 17, 1897.



Witnesses:
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(No Model.)

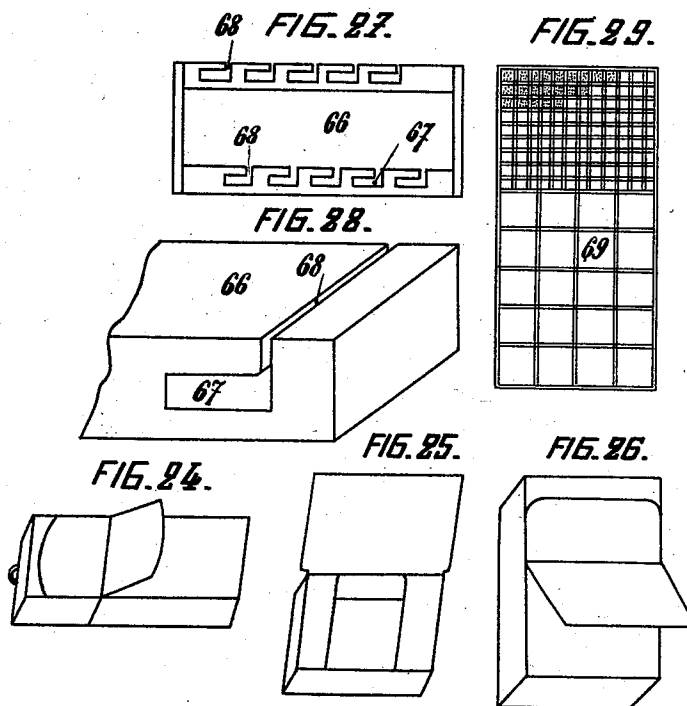
18 Sheets—Sheet 18.

V. CARASSALE.

APPARATUS FOR AUTOMATICALLY FILLING BOXES WITH MATCHES.

No. 588,265.

Patented Aug. 17, 1897.



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UNITED STATES PATENT OFFICE.

VICTOR CARASSALE, OF PARIS, FRANCE.

APPARATUS FOR AUTOMATICALLY FILLING BOXES WITH MATCHES.

SPECIFICATION forming part of Letters Patent No. 588,265, dated August 17, 1897.

Application filed February 24, 1896. Serial No. 580,404. (No model.) Patented in France July 27, 1895, No. 249,230.

To all whom it may concern:

Be it known that I, VICTOR CARASSALE, of the city of Paris, France, have invented Apparatus for Automatically Filling Boxes with Matches or the Like, (for which I have obtained Letters Patent in France for fifteen years, dated July 27, 1895, No. 249,230,) of which the following is a full, clear, and exact description.

This invention relates to apparatus for automatically filling boxes with matches, and particularly wax matches.

The method of operation comprises the following steps: first, division into parceling out quantities; second, checking by weighing; third, sorting or arranging the matches in one direction; fourth, putting the matches into boxes. These successive operations are performed automatically by a series of devices, one for each operation.

Reference is to be had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a vertical section on line A B, Fig. 2, of the entire apparatus; and Fig. 2, an end elevation of same. Figs. 3, 4, and 5 are detail views in elevation, section, and plan, respectively, of the device for parceling the matches into given quantities drawn on a larger scale. Figs. 3^a and 4^a are enlarged details of a portion of the same in side elevation and section, respectively. Fig. 6 is a plan of the top plate of the framing. Figs. 7, 8, and 9 respectively represent detail views, in elevation, section, and plan, of the weighing device and its operating mechanism. Fig. 7^a is an enlarged side elevation of a portion of the same. Fig. 8^a is an enlarged end elevation of the same. Figs. 10, 11, and 12 respectively represent an elevation, end view, and plan of double-acting tipping cups and their operating mechanism. Fig. 10^a is an enlarged side elevation of a portion of the same. Fig. 13 is a detail view, in vertical section, of one of the cups. Figs. 14 and 15 respectively represent side and end elevations of the single tipping cups and their operating mechanism. Fig. 14^a is an enlarged detail side view, partly in section, of a portion of the same. Figs. 16, 17, and 18 respectively represent part sectional end elevation, side elevation, and plan

of the box-filling apparatus. Figs. 17^a, 17^b, and 17^c are enlarged front end and top views, respectively, of details to be hereinafter described. Fig. 19 is a detail of the operating mechanism. Figs. 20, 20^a, and 20^b are perspective views of one of these box-filling devices. Fig. 21 represents the component parts of the device. Figs. 22 and 22^a are perspective views, and Fig. 22^b a longitudinal sectional view, of a modified form of box-filling device; and Fig. 23 represents the component parts thereof. Figs. 24, 25, and 26 are perspective views of different kinds of match-boxes in use. Fig. 27 represents the holder for supplying empty boxes to the box-fillers. Fig. 28 is a detail perspective view. Fig. 29 is a plan of a gage-screen for the preliminary grading of the matches.

The same letters and figures of reference indicate corresponding parts in all the figures.

My improved automatic match-box-filling apparatus is constructed as follows:

a is a container divided into compartments for the reception of matches, the bottom being pierced with holes from which project downward a series of tubes *b*, open at top and whose bottom ends have one or two small holes *c* (see Fig. 5) for the passage (singly or two at a time, according to the number of holes *c*) of the matches into box-spouts *d*, closed at bottom and provided with a hinged flap *e*, which opens to discharge the match or matches contained therein. (See Figs. 3, 4, and 5.) The number of the tubes *b*, spouts *d*, and holes *c* may vary according to the number of matches to be separated or parceled out at a time. The tubes *b* are of a length slightly greater and a diameter less than the length of a match, so that the matches cannot assume a crosswise position.

The box-spouts *d* may be divided by longitudinal partitions into two or more compartments, and the holes *c* may be varied in diameter, so as to give passage to one or several matches at once, the number being, however, always restricted, since the smaller the number the greater the accuracy. The greatest accuracy is therefore attained by a single hole *c*, giving passage to one match only at a time, (and not allowing two to enter at once, which may cause choking,) a spout *d* shorter

than the match, so that the end of the match will remain in the hole *c* and prevent the entrance of a second match. If the hole *c* gives passage to two or more matches at one time, spout *d* must admit only the same number or must be shorter than a match, or it may be of a size and length to hold several matches in line end to end. Each of the spouts *d* discharges its contents when its hinged side *e* is opened into a channel *f*, extending beneath each row of tubes *b*.

The matches pass from container *a* into tubes *b* and thence into the spouts *d* by their own gravity. To the long sides of container *a* are fixed two slide-bars *g*, received in guides *h*, which are braced at their ends by cross-bars forming a complete frame, and a horizontal vibrating motion is imparted to container *a* to cause the matches to drop into the tubes *b* and box-spouts *d*. For this purpose studs *p* on the bars *g* pass through longitudinal slots *q* in the guide-bars *h*, and are engaged in curved slotted limbs *r*, carried by levers *s*, operated by sinuous cams *t*, keyed on the main shaft *o*. The guide-bars *h* are also provided with journals *i*, supported in bearings *j*, and upon which the container *a* may be oscillated through ninety degrees, when the matches are to be discharged into the channels *f*, each journal *i* having keyed upon it a pinion *k* in gear with a toothed sector *l*, carried by a bell-crank lever *m*, operated by a cam *n*, fast upon shaft *o*.

The hinged flaps *e* of the spouts *d* are operated by rods *u*, united by cross-rods *v*, and are kept lightly closed by means of springs, as shown in Figs. 3 and 5. The opening of the flaps *e* and the delivery of the matches into the channels *f* are effected during the oscillation of container *a* by fixed abutments *w*, through rollers *v'*, and cross-rods *v* on rods *u*. *x* are hinged latches for retaining the rods *u* and holding the flaps *e* in the open position while the container *a* receives a slight shaking movement by the action of cam *t*. When the container *a* returns to its initial position, the latches *x* are released by the abutments *y* by which they are engaged, when the container is swung on its pivots so as to permit of the flaps *e* being closed by their springs. For each channel *f* there is a corresponding spout *z*, carried by the upper table 1. (See Figs. 1 and 2.) When the container *a* is swung on its pivots *i*, the outlets of the channels *f* are brought into register with the spouts *z* and discharge the matches therein. Each spout leads to a weighing apparatus, consisting of a kind of balance, comprising a scale-pan 2, mounted on a scale-beam 3, which is inclined downward at the end opposite to the scale-pan which received the charge of matches from spout *z*. The beam 3 is tubular and contains a liquid or a ball free to run along the beam and tending to run to the ends of the beam. When the beam is inclined under a full charge of matches, the ball or its equivalent runs to that end and

causes the complete descent of the scale-pan 2 and retains the beam in the inclined position.

The oscillations of the scale-beams otherwise than by a full charge are produced by lifter-rods 4 5, carried by cross-rods jointed to the ends of two levers 6, actuated by cams 7, fast on shaft 8, Figs. 7, 8, and 9, which are operated from the main shaft *o*. Cams 7 are so set out that the movement of beams 3 are divided into three periods. During the first period the lifters 4 are lowered to allow the balances to oscillate under the full charges of matches. During the second period the lifters 5 tip the scale-beams which have received deficient charges of matches, so that these matches are thrown out by the device hereinafter described. During the third period the lifters 4 rise and return the beams 3 to their initial position, where they rest on fixed stops, which limit their oscillation. It is to be understood that this weighing device is only given as an example which may be varied or replaced by another fulfilling the same purpose.

The matches discharged from the scale-pans 2 fall into spouts 9, placed one opposite each balance. Each spout 9 is open at its lower end, but is provided with a movable deflector 10, that fits in an aperture in the wall of the spout, so as to leave clear passage to the full charge of matches, the deflector being, however, adapted to be placed in an inclined position across the spout, so as to throw out a short charge. For this purpose the deflectors are mounted on a shaft 11, operated, through links 12 from cams 13, fixed on shaft 8, and so timed with regard to cam 7 that the different positions of the deflectors correspond in point of time to the different movements of the balances under the action of full charges and of lifters 5, respectively. The charges of matches delivered by the spouts 9 are therefore of full weight, but as they fall pell-mell they should, before being boxed, be arranged with their heads all the same way. For this purpose each spout 9 delivers the matches to a sorting-cup 14 whose bottom is perforated with holes of a diameter greater than the stem of the match but less than that of the head, so that the matches which fall heads upward pass into the holes and remain suspended by their heads, while those falling heads downward cannot pass through and remain at the upper part of the cups 14. The sorting-cups, which are shown in Figs. 10 and 13, receive a shaking motion in order to facilitate the passage of the match-stem through the holes. For this purpose the cups 14 are supported by collars 15, carried on shaft 16, and their lower ends engage in a cross-bar 17, which receives rapidly-repeated blows from bell-crank levers 18, acted on by sinuous cams 19, mounted on shaft 20, spring-cushions 21 being interposed between collars 15 and cross-bar 17.

The sorting-cups 14 afterward receive a

double tipping or reversal, so as to discharge in separate lots the matches which they contain. The cups are first tipped through an arc of one hundred and thirty-five degrees in order that the matches which rest head downward on the perforated bottom of the cups shall be inverted and fall into the spouts 22 with their heads upward. The cups 14 are then completely inverted by being turned in the opposite direction, so that the matches which were retained by their heads in the holes of the perforated bottoms shall fall into the spouts 23 with their heads downward.

The rotary tipping motion of the cups 14 is effected as follows: The shaft 16, on which they are mounted, is provided at each end with a pinion 24 in gear with rack 25, actuated by cam 26, keyed on shaft 20. The matches are thus sorted, all those which are head upward falling through spouts 22 and all those which are head downward passing through the spouts 23. The cups 14 may be divided into one or more compartments of a diameter less than the length of a match, and they may also have a second bottom parallel to the first at a distance therefrom greater or less than the length of a match, according as it is or is not desired that the matches shall remain suspended by their heads during the operation.

Opposite each spout 23 is a match-reversing cup 27, the purpose of which is to receive all the matches whose heads are downward and which by its reversal delivers them head upward into a branch of the corresponding spout 22. (See Figs. 14 and 15.)

All the reversing-cups 27 are mounted on a shaft 28, gearing by a pinion 29 at its ends with racks 30, receiving motion through cams 31, keyed on shaft 32, which is operated through shaft 20. The matches on leaving spouts 22 are therefore all head upward.

It is to be understood that the sorting mechanisms might be dispensed with if it is not required that the matches should be placed with their heads all the same way.

Each spout 22 opens into a hopper 33, which delivers the charges of matches alternately to the distributing-spouts 34 35, Figs. 14 and 15, the hopper 33 being carried by a sliding gate 36, which receives to-and-fro motion through a lever 37 from a cam 38, fixed on shaft 39, driven from shaft 32, and by such motion opens and closes the lower ends of the distributing-spouts 34 35.

The distributing-spouts 34 35 connect, respectively, with spouts 40 41 42 43, which deliver the matches into the compartments 44 of the box-filling device shown in Figs. 16, 17, and 18.

Each box-filling device consists of a sort of receiver having an inclined bottom 45, (the several parts being of the shape shown in Fig. 21,) leading to a channel 46, through which the matches pass, the device being provided with two holding-jaws, of which the upper one 47 is fixed and the lower one 48

movable and held in position by a blade-spring 49 or its equivalent. The boxes to be filled are placed between the jaws 47 48 and are held between two wings 50, formed on the two side walls of the device, the boxes being guided when introduced by the splayed side flanges of the movable jaws 48. A sliding door 51 enables the height of the passage for the matches to be regulated. An internal division 52, as shown in Figs. 17, 18, 20, and 21, is provided at its lower part with an inclined surface 53, which tends to bring the matches toward one point, and, furthermore, the bottom 45 is terminated by an extension 54, designed to cover a portion of the mouth of the box and forming a temporary division serving to retain the matches in the box during the shaking motion which the box-filling device receives during the filling operation, as will be hereinafter explained.

When the quantity of matches to be put in the boxes is very small or when the boxes have a very narrow mouth, the form of the box-filling device may be slightly modified, as shown in Figs. 22 and 23. In this case the division 52^a, which serves to guide the matches, is parallel to the two sides of the filler, and the bottom 45 terminates at the point where the channel 46 commences, so that the mouth of the box is completely free.

By the apparatus described all kinds of boxes whatever their shape may be filled whether the box be of the sliding-tray form shown in Fig. 24 or has a hinged lid, as in Fig. 25, or be of the form shown in Fig. 26, &c., the box-filling devices being modified to suit in so far as regards the parts by which the boxes to be filled are held.

The space 44 in which the matches are received may be divided into several vertical compartments in order to hold the matches always in the same position heads upward.

In order to fill the matches into the boxes, the box-filling devices receive to-and-fro motion, and when constructed as shown in Fig. 20 they should, moreover, be inclined at an angle of forty-five degrees during the to-and-fro motion in order to effect the filling. For this purpose they are hinged at their lower part to a frame 55 and are coupled by pivots at the upper part to a frame 56. The frame 55 receives to-and-fro motion through a link 57 from a crank on the shaft 58, driven through any suitable means. The link 57 being jointed to the slide-bar 59, fixed to the frame 55 and guided by rollers 60, causes repeated shocks which free the matches. A latch 61, Figs. 17 and 18, enables the box-filling devices to be released, whereby they may be inclined at the same time that they receive to-and-fro motion.

The box-filling devices of the kind shown in Fig. 22 are not inclined at forty-five degrees during the filling operation and always retain their vertical position.

The boxes when filled are removed either by hand or by pushers 62, mounted on a rod

63, movable in guides 64. The pushers 62 first act on the projection 65 (see Fig. 16) of each of the movable jaws 48, so as to cause the latter to open and then push out the filled boxes. The bar 63 may be operated either by hand, as in the example shown, or automatically by any suitable device.

The empty boxes are placed between the jaws 47 48 either one at a time by hand or all at once by means of a frame 66, (shown in Figs. 27 and 28,) the bars of this frame having channels 67 receiving the empty boxes and corresponding to the jaws of the box-filling device—that is to say, each of the channels 67 in the frame 66 is adapted to register with a pair of jaws 47 48 of the box-filling device to receive boxes of the snuff-box pattern. Each channel of the frame 66 has a slot 68 for the passage of the lid when the latter is raised perpendicular to the box in order to present the box open to the filler. It is obvious that unless some means were provided for maintaining the lids of the boxes open in their passage through the frame 66 they would be forced into the jaws 47 48 of the box-filling device with the lids closed, and thereby prevent the boxes from being filled. However, by use of the slots in the channels of the frame 66 the boxes can be presented to the jaws of the box-filling devices, as indicated in Fig. 22^a. The channels of the frame 66 may contain one or more boxes which are pushed forward either by hand or automatically by means of followers arranged and operated in any suitable way, the frame 66 being temporarily held in front of the box-fillers during the transfer of empty boxes from the frame to the box-filling devices.

When the matches have heads of unequal size it may be necessary to subject them to a preliminary grading by passing them through a gage or screen 69, constructed as shown in Fig. 29. The holes are of a diameter corresponding to a given size of head and should afford passage to one match at a time, but should never allow the stems of two matches to enter at once in the same hole, and the area of the gage or screen is divided into numerous compartments in order to diminish the danger of ignition.

By referring to Figs. 1 and 2, which show the general arrangement, it will be seen that the different mechanisms which together constitute the entire machine may be mounted on independent shafts and carried by the two standards of the frame, these mechanisms being operated in succession either by hand or mechanically, it being understood that the different shaking and inverting motions may be produced by any suitable means.

The operation of the machine is as follows: The matches having been gaged, if necessary, through the screen 69, are thrown into the container *a*, which receives horizontal shaking motion from the levers *s*, in order to cause the matches to descend into the different tubes *b* and spouts *d*, whereby a given

number of matches, equal to the number of holes *c*, are separated from the bulk, the number thus separated being, say, twenty-five matches in each row. The container *a* is then tipped through ninety degrees by the two sectors *l*, operated by the levers *m* and cams *n*. During this tipping motion the abutments *w* act on the roller *v'*, force back the rods *u*, and open the flaps *e* of the spouts *d*, which then occupy nearly a horizontal position, whereupon the matches contained are caused by the shaking motion of the container *a* to fall into the channels *f* beneath each row of tubes *b*, after which the container *a* is returned to its initial position. Each channel *f*, therefore, contains twenty-five matches, which it delivers to the corresponding spout *z*, the several charges of twenty-five matches being thereupon checked by the weighing mechanism. The full charges delivered to the scale-pans 2 tilt the beams 3 and are delivered to the spouts 9, by which they are conducted to the sorters. A short charge will fail to tilt the scale-beam and will not be delivered to the corresponding spout 9 until the beam is tilted by the rod 5, at which moment the deflector 10 is placed in position to eject the incomplete charge. The full charges fall from spouts 9 pell-mell into the vibrating sorters 14, which separate those matches which are head uppermost from the remainder and deposit them head uppermost in the spout 22, when the cups are made to describe an arc of about one hundred and thirty-five degrees in the direction of the arrow, Fig. 10. The matches which were not discharged, but which were suspended by their heads in the holes of the sorting-cups, are deposited head downward in spouts 23, when the cups are completely inverted in the reverse direction, the matches thence falling into reversing-cups 27, which on being inverted deliver them head uppermost into the spouts 22, so that the whole of the matches are arranged in the same direction when they arrive in the hoppers 33, by which they are delivered alternately to the distributors 34 and 35.

The proportions of the driving-pulleys and the form of the cams are such that two successive charges will be delivered to the distributors for filling boxes with fifty matches. For this purpose the shaft 39 has a speed four times less than that of shafts *o* 8 20 32, which operate the other parts. The matches are delivered by the spouts 40 41 42 43 to the box-fillers, as before mentioned, by which they are caused to slide parallel one to the other along inclined planes 45 under the action of the to-and-fro movement which the latter receive, the matches finally passing through the channels 46 into the boxes. The shafts *o* 8 20 32 39 are geared together by means of pitch-chains in order to insure the necessary correspondence between the different operations.

The operation of automatically filling

match-boxes is effected by the combination of apparatus for separating or parceling out the matches in given quantities, weighing devices, sorting-cups, and box-filling devices. The action of the first-mentioned apparatus is based on the separation of the matches in a vertical position by the action of gravity and a shaking movement, so as to cause them to pass through holes of a certain gage, the matches thus separated being then delivered in the horizontal position and the remainder being retained. The weighing apparatus check the quantities of matches distributed and consist, essentially, of a balance which will only be tilted by the charge when the latter is a full one. The sorting-cups arrange the matches all in the same directions, the operation of the first set of cups depending on their diameter and the size of the holes and on the double reversal permitting the matches remaining on end partly to fall into the holes and to follow one or other of two directions, according to the position of the heads, the two lots being finally reunited and delivered in the same direction after the inversion of the second cups.

The box-fillers consist, essentially, of an inclined plane or horizontal surface on which the matches are caused to slide parallel to each other under the action of the vibratory movement and, if necessary, of shocks imparted at each end of the stroke for the purpose of loosening the matches and facilitating their entrance into the boxes, of which the mouths, whatever their form, are partly closed by the filler, leaving only a small aperture for the entrance of the matches, so as to prevent the matches being thrown out by the shaking motion. Any number of sets of these apparatus may be arranged side by side, all the corresponding parts being placed on the same shafts and working in unison.

I claim—

1. In a machine of the kind specified, apparatus for parceling out matches into given quantities, comprising perforated vibratory containers each compartment of which is adapted to receive matches in numbers substantially equal to the charges to be boxed, means for releasing said charges from the containers at predetermined periods, weighing mechanism and means for conveying the parceled charges from the containers to the weighing mechanism, substantially as described.

2. In a machine of the kind specified, weighing or checking apparatus each comprising a balance, suitably-actuated supports adapted to engage opposite ends of the scale-beam, a spout for receiving the charges from the scale-pan, a deflector adapted to be projected across the path of the spout and means for projecting said deflector across the spout when the support at the end of the scale-beam opposite the scale-pan is operated to discharge the contents thereof, substantially as described.

3. In a machine of the kind specified, the sorting-cups for separating in each charge the matches whose heads are in the one direction from those whose heads are in the other direction, by imparting a vibratory motion to said cups which are provided with a bottom having perforations of such diameter as to allow only the stems of the matches to pass through and retain the heads, each of said cups discharging the matches by means of a double reversing movement into two separate spouts uniting at their lower ends, and one of said spouts being intercepted by a cup which by a single reversing movement arranges the matches it receives in the same direction as the remainder as hereinbefore described.

4. In an apparatus for automatically filling match-boxes, the combination of weighing apparatus, mechanism for automatically delivering charges of matches thereto, sorting-cups for receiving matches from said weighing apparatus and rectifying the relative positions thereof and means for delivering the sorted matches to the boxes to be filled.

5. In an apparatus for automatically filling match-boxes, the combination of weighing apparatus, mechanism for automatically delivering charges of matches of a given quantity thereto, means for automatically shifting the weighing mechanism to discharge light charges therefrom, sorting-cups for receiving complete charges of matches from said weighing apparatus and rectifying the relative positions thereof and means for delivering the sorted matches to the boxes to be filled.

6. A machine for sorting matches and filling all kinds of boxes therewith in exactly-determined quantities, said machine combining in operative combination an oscillating container *a* divided into compartments, tubes *b*, box-spouts *d*, and channels *f*, the matches being caused to fall by the action of gravity and a shaking motion from container *a* into the tubes *b* whence they pass separately or in limited number through small holes into the spouts *d*, said matches which are contained in separate compartments of the container *a* being discharged by the oscillation of said container into the channels *f* whence they drop onto a scale 2, 3, the oscillations of the scale-beams being regulated by lifter-rods 4, 5, whereby full charges may freely fall into spouts 9, but short charges are thrown out by a deflector, vibrating sorters 14 to receive the full charges from the spouts 9 and separate the matches into two lots according as they fall heads upward or downward, and delivered into separate spouts 22, 23, united at bottom, the spouts 23 having each a reversing-cup 27 corresponding thereto, by means of which the matches are placed with their heads all the same way and delivered to an oscillating box-filling device 44 having jaws 47, 48, to receive the boxes to be filled and pushers 62, 63, for discharging the filled boxes.

7. In a machine of the kind specified, the combination of tubes *b* of a diameter less than the length of a match so as to prevent their assuming a crosswise position and provided
 5 with holes of a size to admit only one or a limited number of matches at a time and spouts *d* connecting with said tubes *b* and being shorter than the matches in order that the ends of the matches received therein may remain in the
 10 holes and so prevent the entrance of other matches.

8. In a machine of the kind specified, the combination of an oscillating container *a* having tubes *b* and spouts *d*, said container adapted to be tipped to discharge the matches therefrom into channels *f* without being followed
 15 by those contained in *b* owing to the horizontal position occupied at this moment by said spouts, notwithstanding the shaking motion, in order that the desired number of matches
 20 shall not be exceeded.

9. In a machine of the kind specified, the combination of sorting and reversing cups 14 and 27 made of a diameter less than the length
 25 of a match and the first-mentioned cups having their bottoms perforated with small holes of a diameter greater than the stem but less than that of the heads of the matches, means to impart a double tipping movement to the
 30 sorting-cups 14 for inverting the matches which rest head downward on the bottoms of said cups and for discharging the matches retained in the holes by their heads and which are again reversed by the cups 27 and ar-

ranged with their heads in the same direction 35 as the remainder.

10. In a machine of the kind specified, a box-filling device comprising an inclined plane 45, means for imparting a to-and-fro movement
 40 thereto and jaws 47, 48, for holding the boxes disposed either horizontally or in the plane of the incline 45 the said jaws being capable of adapting themselves to the form of the boxes and the said jaws or the extension 54 of in-
 45 cline 45 being also arranged so as to be capable of covering a portion of the mouth of the box so as to leave only a small aperture for the entrance of the matches, corresponding to the outlet from the fillers, arranged either
 50 at the side or end of the box, so as to prevent the matches being thrown out and enabling the boxes to be inclined so as to present their greatest depth to receive the matches.

11. In a machine of the kind specified, a frame 66 provided with channels for receiving 55 and allowing of the longitudinal movement of the empty boxes therein and a longitudinal slot extending throughout the extent of one of the walls of each of said channels
 60 for the passage of the lid.

The foregoing specification of my apparatus for automatically filling boxes with matches or the like signed by me this 24th day of January, 1896.

VICTOR CARASSALE.

Witnesses:

CLYDE SHROPSHIRE,
 MAURICE PIGNET.