

(No Model.)

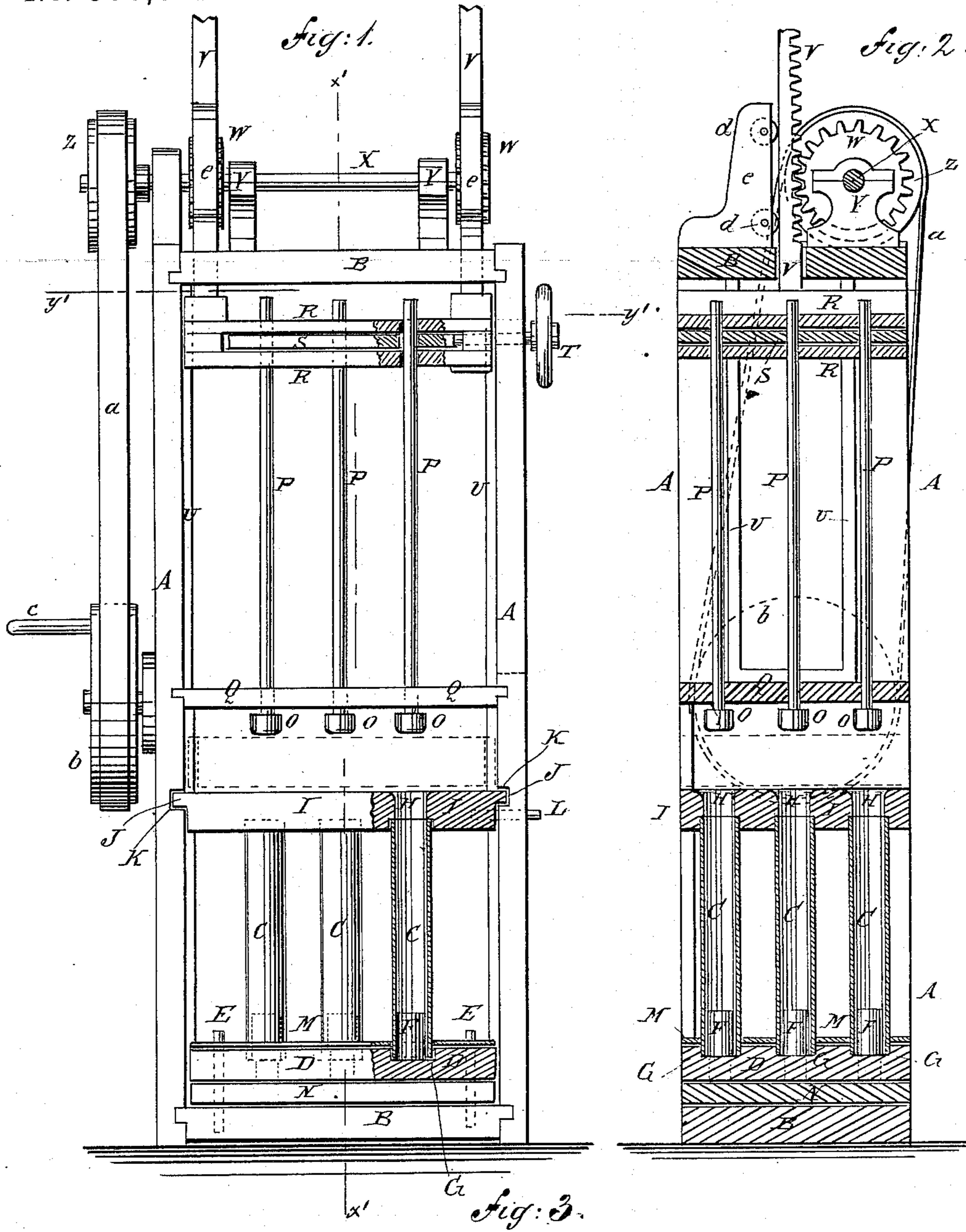
2 Sheets—Sheet 1.

O. A., H. & F. MINCH.

APPARATUS FOR MAKING ROMAN CANDLES, &c.

No. 308,687.

Patented Dec. 2, 1884.



WITNESSES:  
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*L. Sedgwick*

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*Minch & Co*  
ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

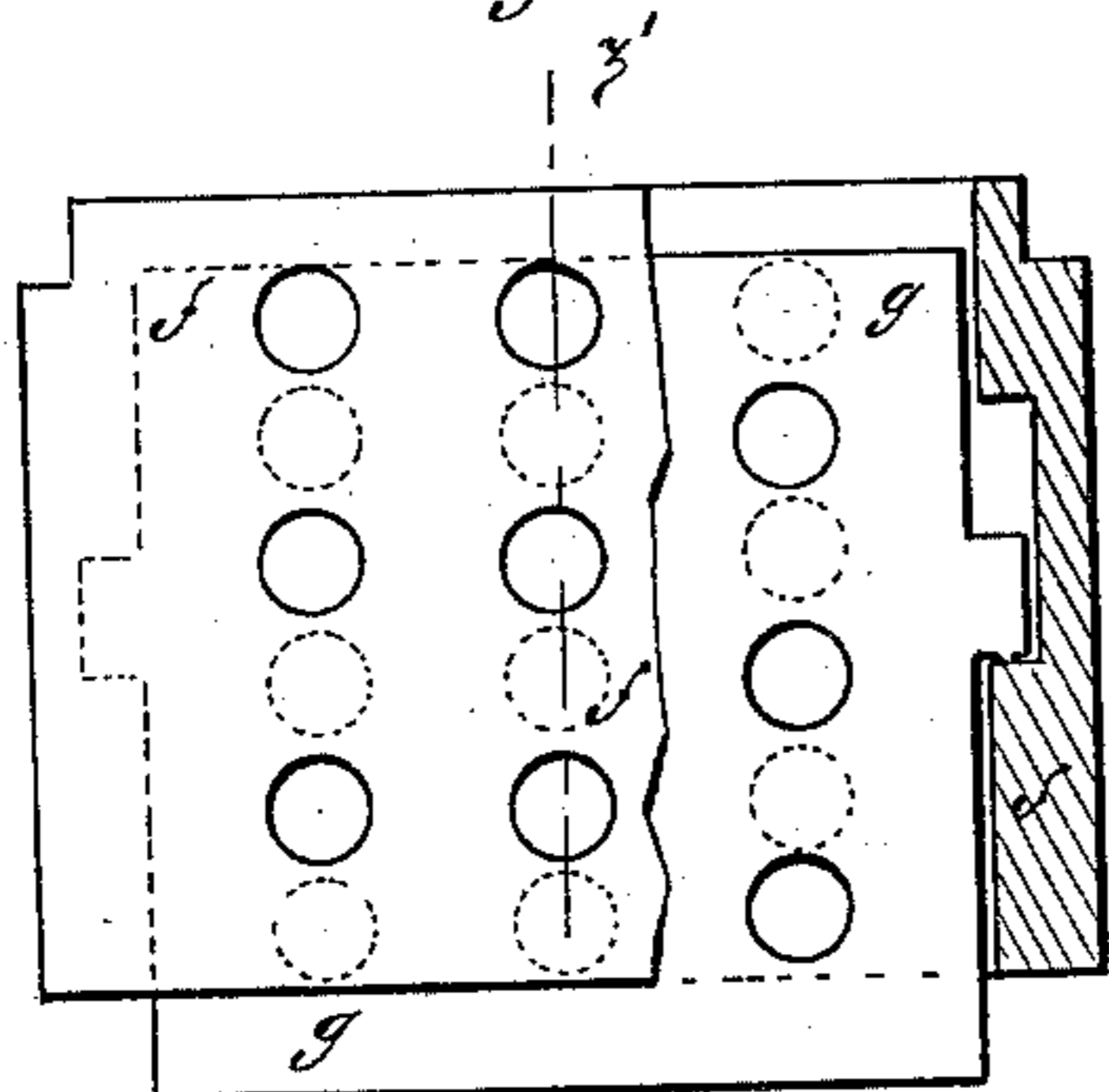
O. A., H. & F. MINCH.

APPARATUS FOR MAKING ROMAN CANDLES, &c.

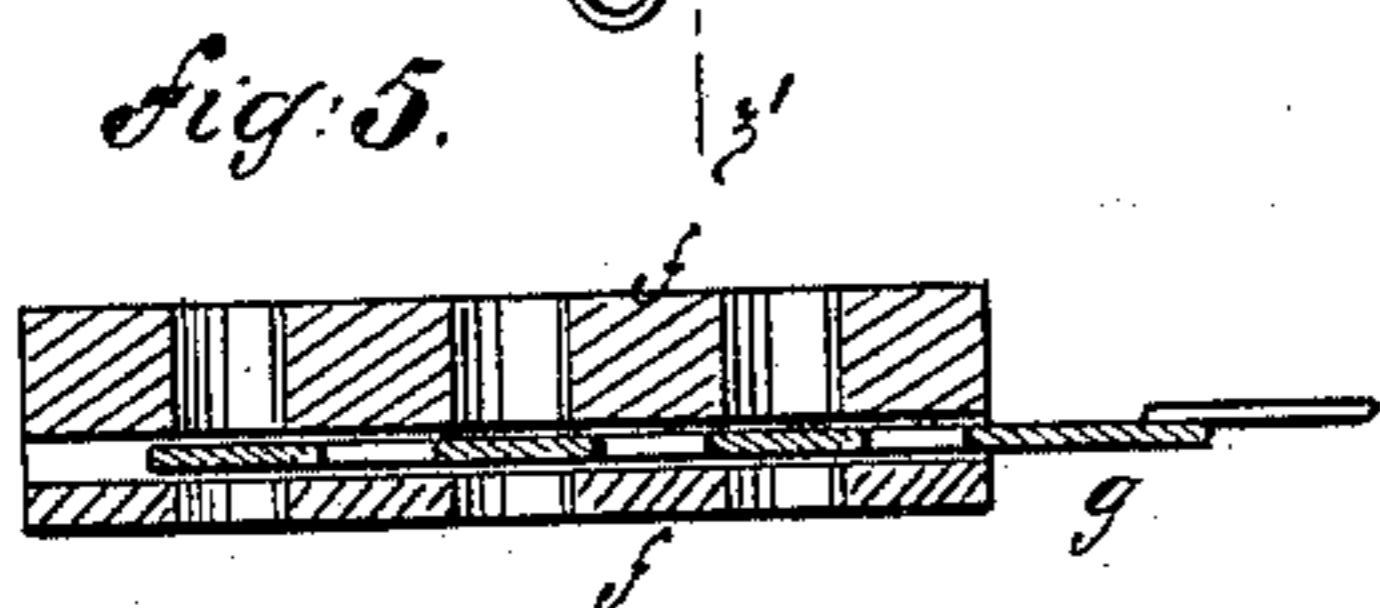
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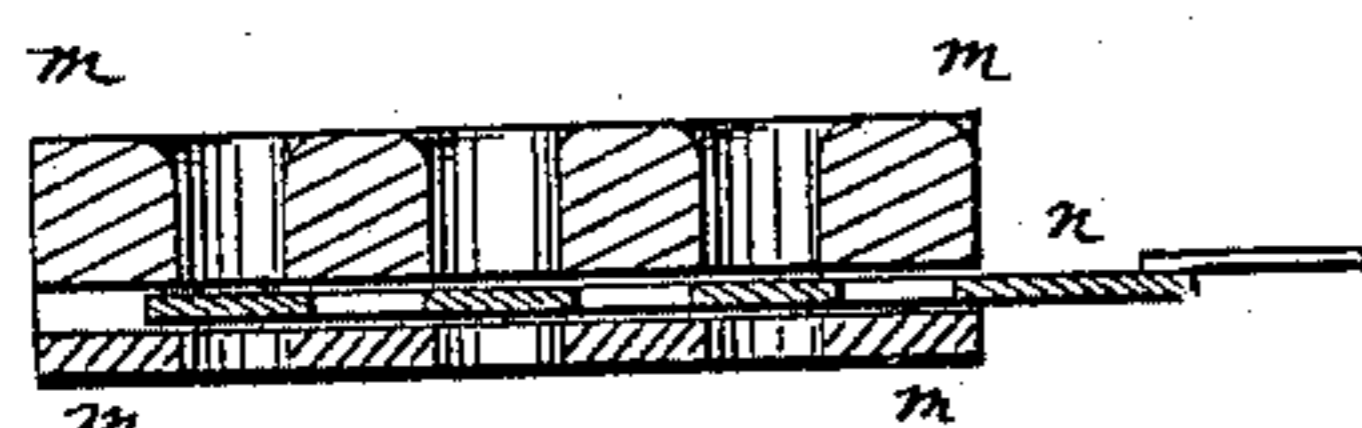
*Fig. 4.*



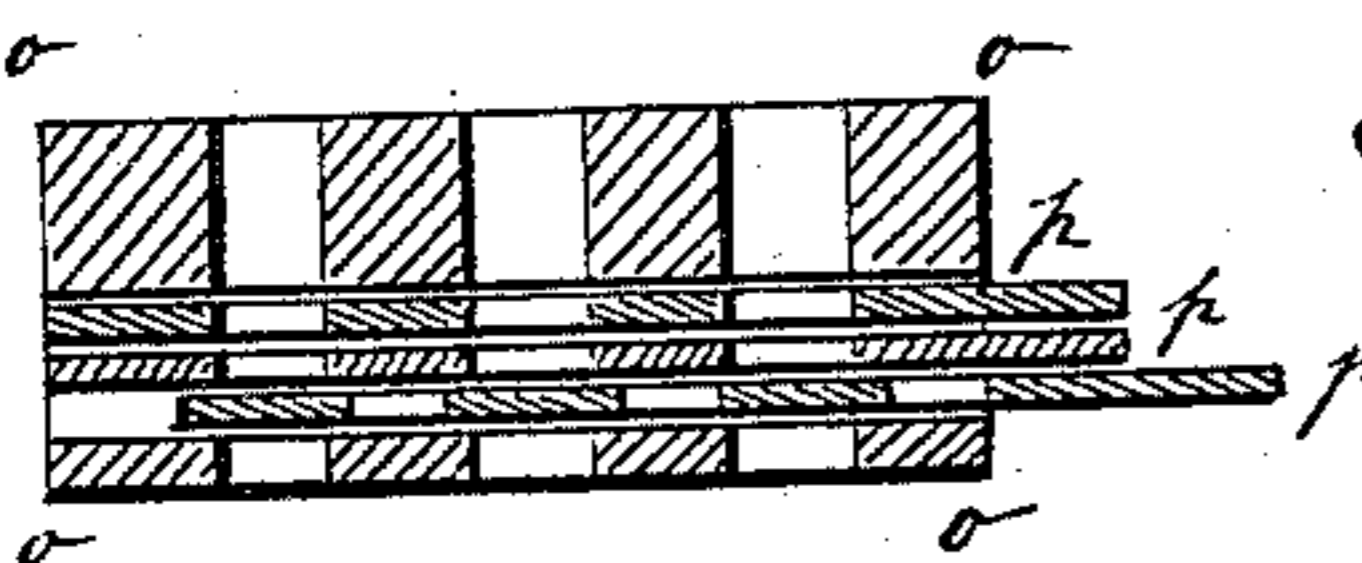
*Fig. 5.*



*Fig. 10.*



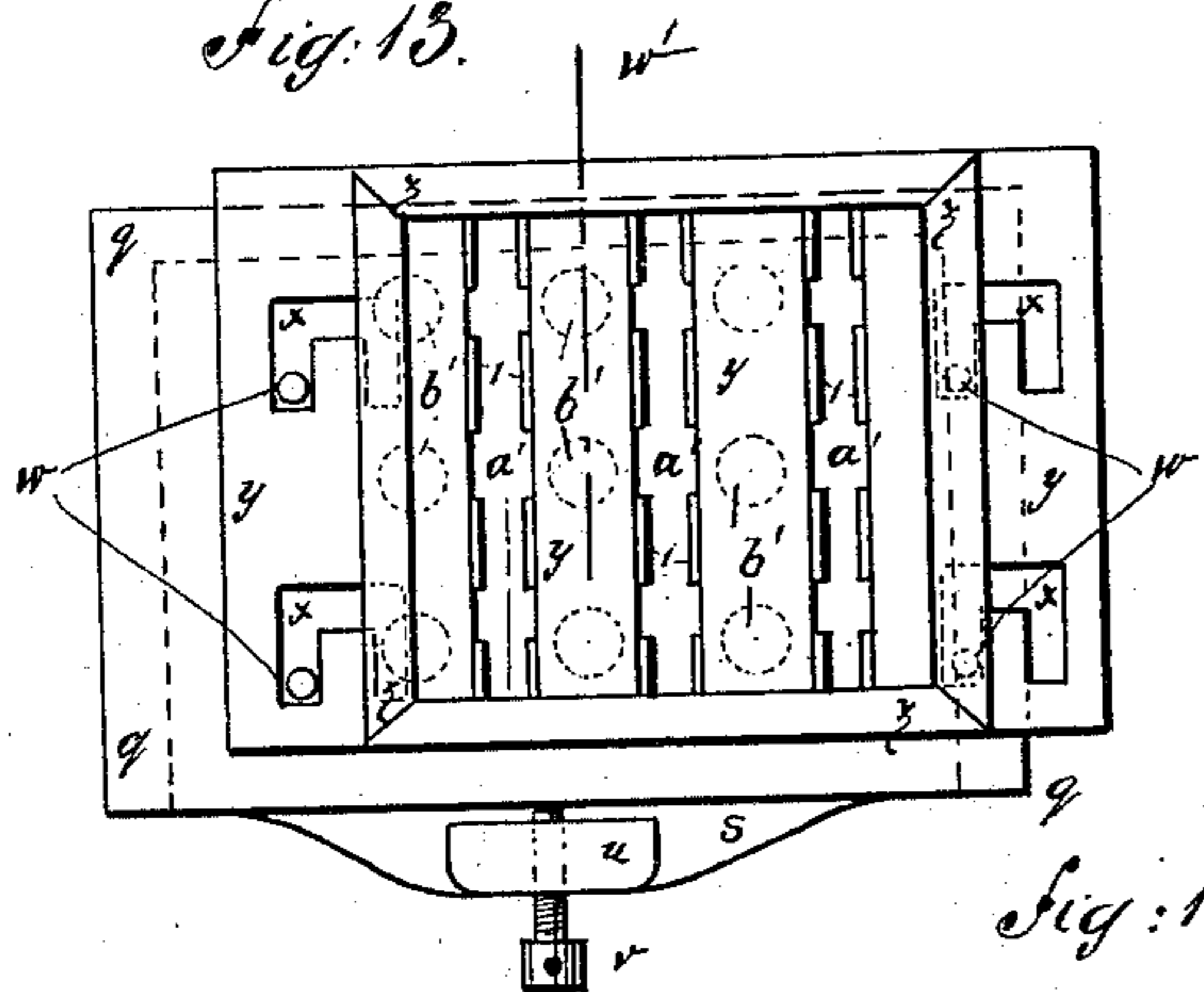
*Fig. 11.*



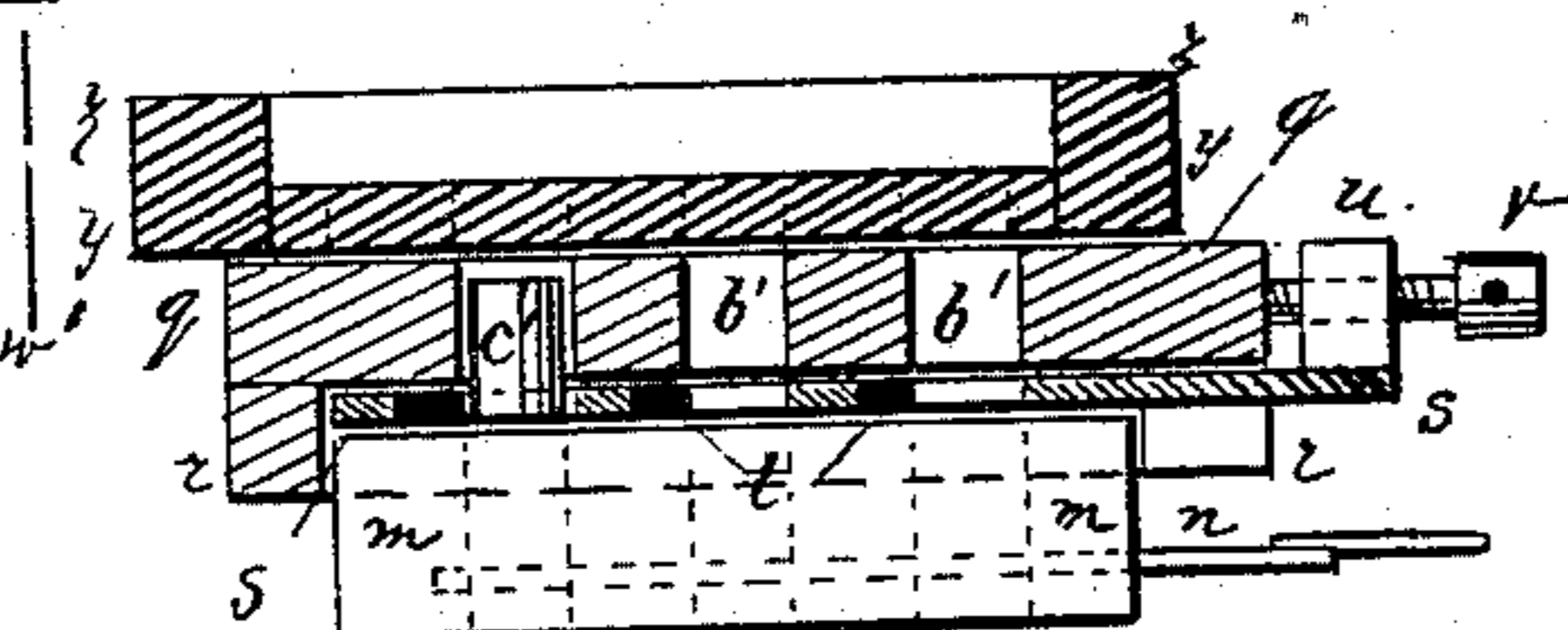
*Fig. 12.*



*Fig. 13.*



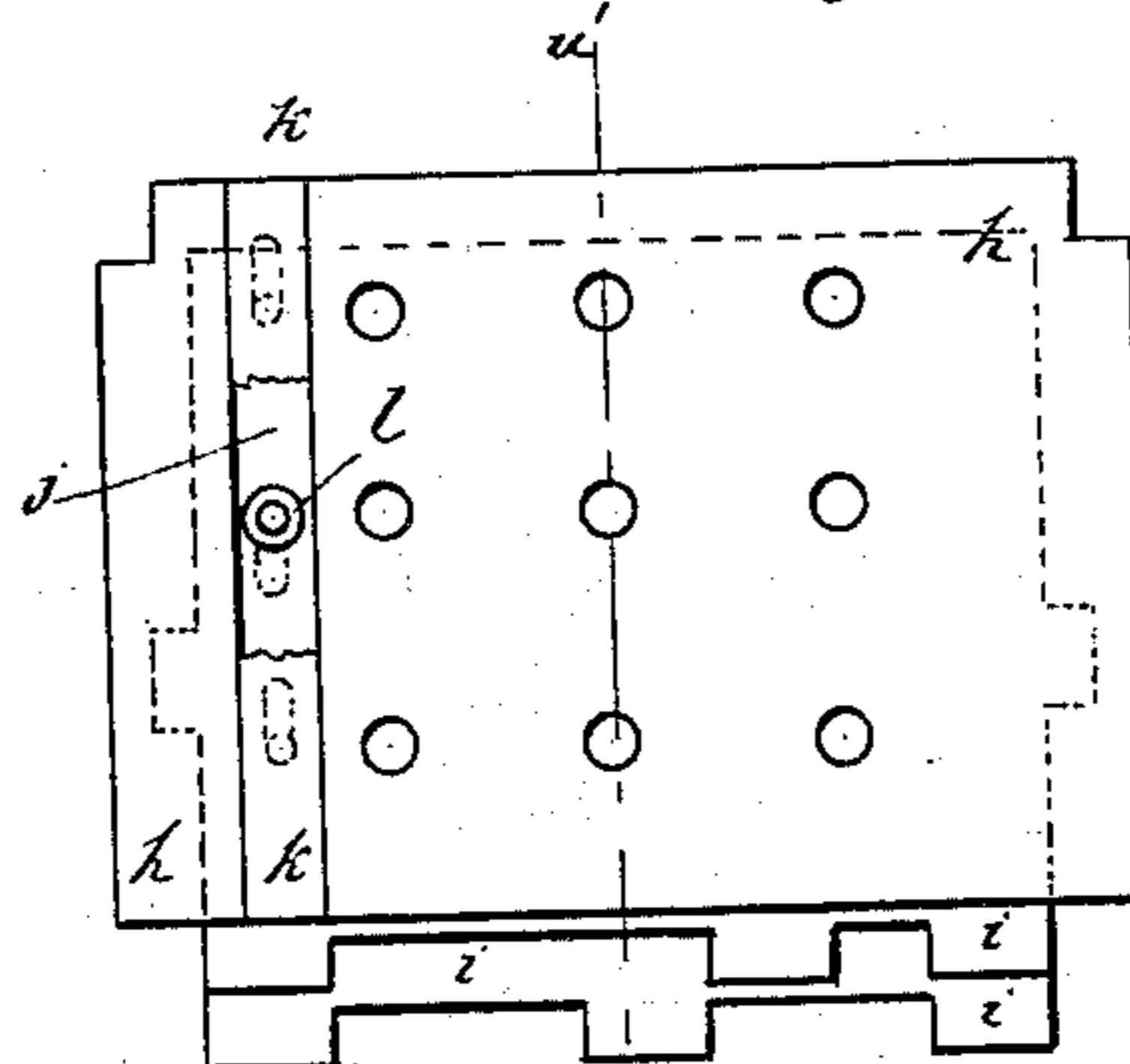
*Fig. 14.*



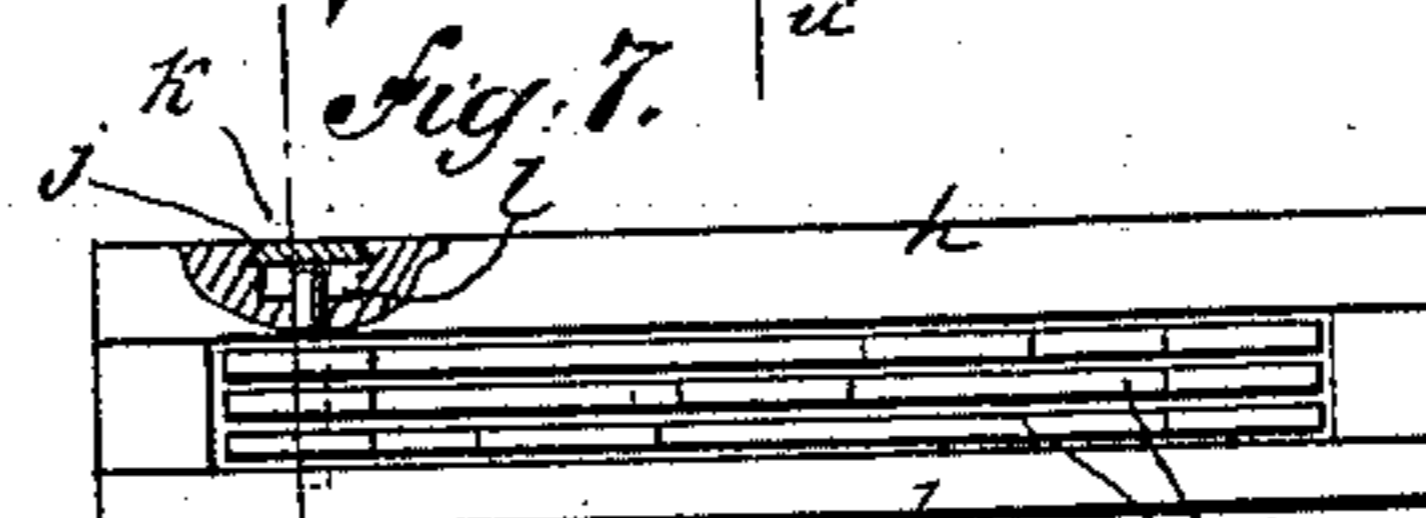
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*Fig. 6.*



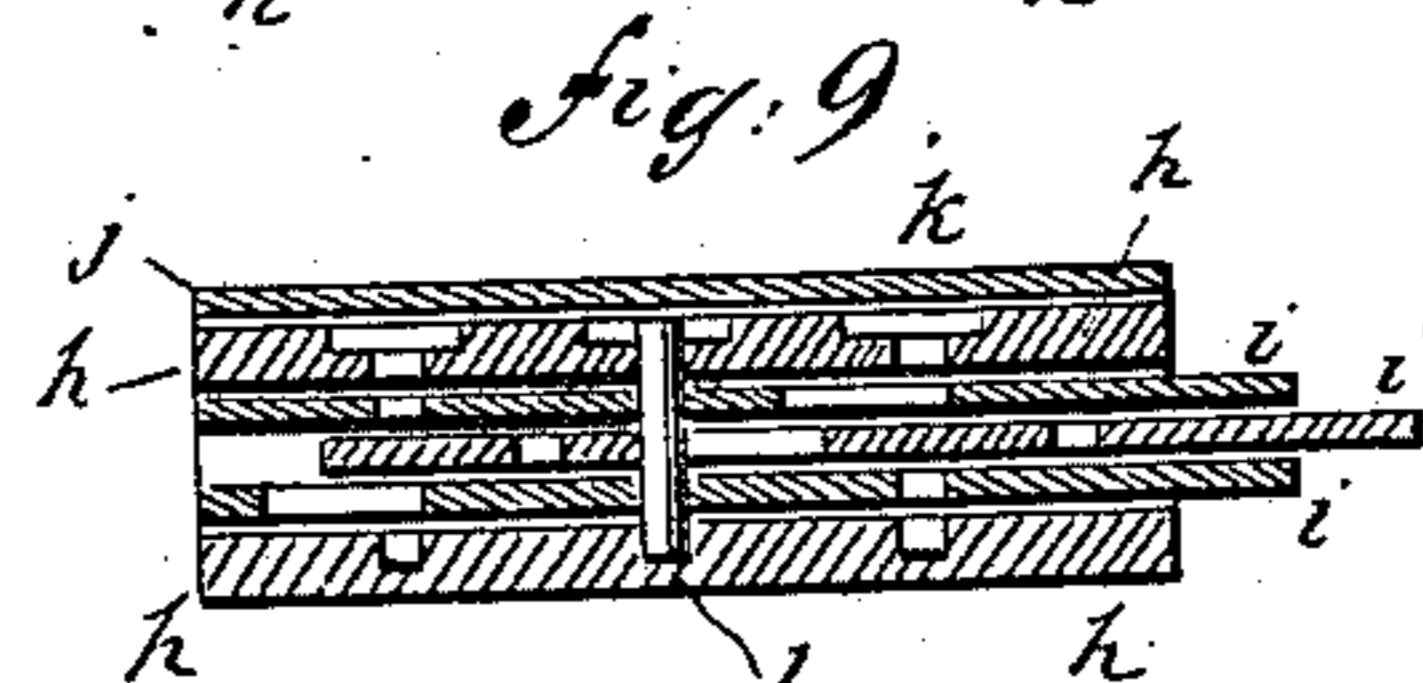
*Fig. 7.*



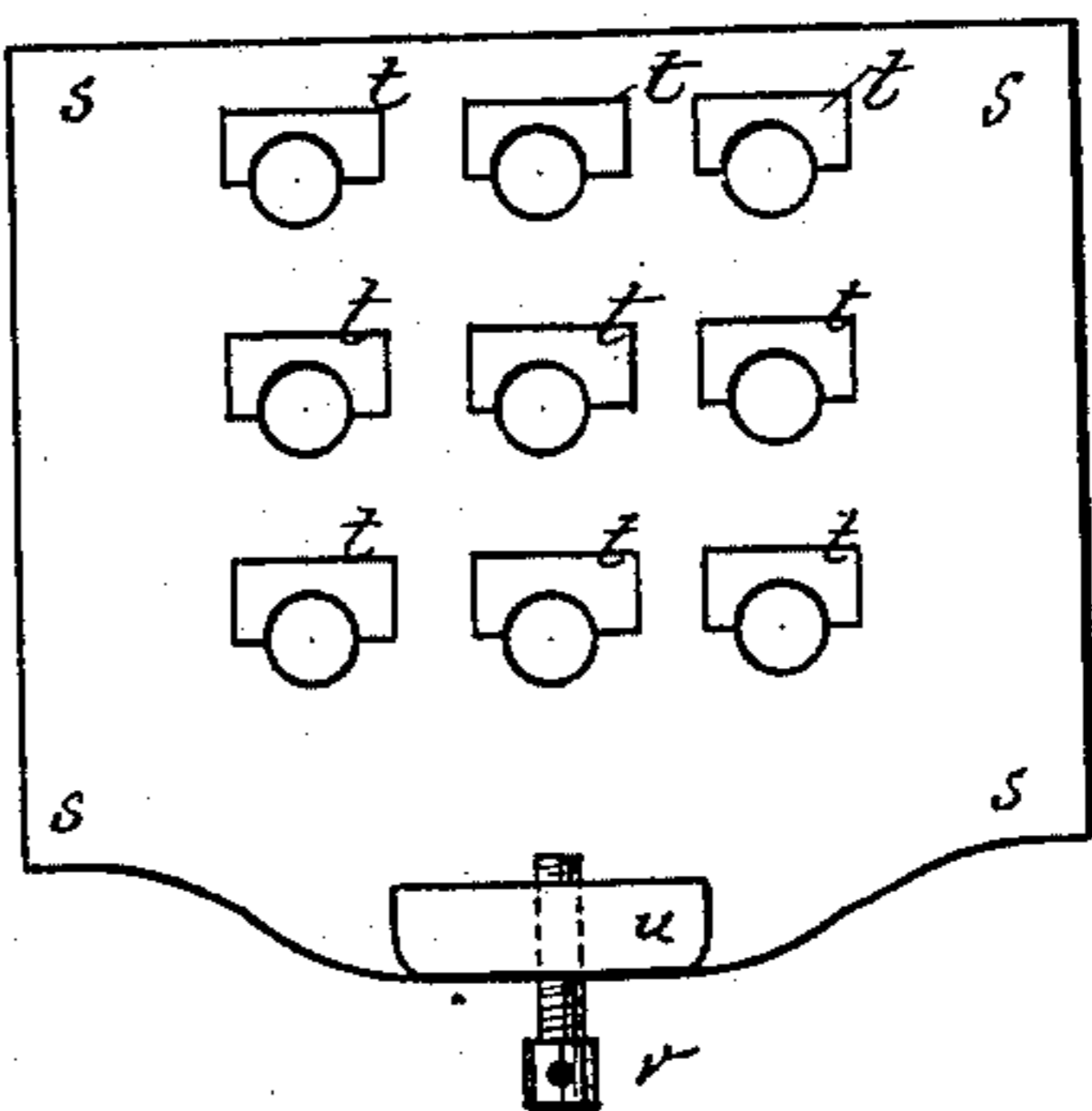
*Fig. 8.*



*Fig. 9.*



*Fig. 15.*



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BY

# UNITED STATES PATENT OFFICE.

OTTO A. MINCH, HERMANN MINCH, AND FRANK MINCH, OF NEWARK, N. J.

## APPARATUS FOR MAKING ROMAN CANDLES, &c.

SPECIFICATION forming part of Letters Patent No. 308,687, dated December 2, 1884.

Application filed March 4, 1884. (No model.)

*To all whom it may concern:*

Be it known that we, OTTO A. MINCH, HERMANN MINCH, and FRANK MINCH, all of Newark, in the county of Essex and State of New Jersey, have invented a new and Improved Apparatus for Making Roman Candles and other Fire-Works, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1, Sheet 1, is a front elevation of our improved apparatus partly in section, and parts being broken away. Fig. 2, Sheet 1, is a sectional side elevation of the same, taken through the line  $x'x'$ , Fig. 1. Fig. 3, Sheet 1, is a sectional plan view of the same, taken through the broken line  $y'y'$ , Fig. 1. Fig. 4, Sheet 2, is a plan view, partly in section, of the gage-plate for putting in the clay. Fig. 5, Sheet 2, is a sectional side elevation of the same, taken through the line  $z'z'$ , Fig. 4. Fig. 6, Sheet 2, is a plan view of an adjustable gage-slide for putting in the powder, part being broken away. Fig. 7, Sheet 2, is a front elevation of the same, part being broken away. Fig. 8, Sheet 2, is a sectional side elevation of the same, taken through the line  $u'u'$ , Fig. 6. Fig. 9, Sheet 2, is a sectional side elevation of the same, taken through the line  $v'v'$ , Fig. 7. Fig. 10, Sheet 2, is a sectional elevation of a guide-plate for putting in the stars. Fig. 11, Sheet 2, is a sectional side elevation of a gage-plate for putting in the combustible composition. Fig. 12, Sheet 2, is a perspective view of one of the stars. Fig. 13, Sheet 2, is a plan view of the mechanism for introducing the stars into the star guide-plate. Fig. 14, Sheet 2, is a sectional side elevation of the same, taken through the line  $w'w'$ , Fig. 13, and shown in position upon a star feed-plate. Fig. 15, Sheet 2, is a plan view of the clamping-plate of the mechanism shown in Fig. 13.

The object of this invention is to facilitate the manufacture of Roman candles and other fire-works.

The invention consists in an apparatus for making Roman candles and other fire-works, constructed with a detachable recessed plate

provided with nipples, and a detachable plate provided with countersunk perforations for holding the cases, a perforated guide-plate, and perforated clamping-plates and their operating mechanism for carrying and operating the rammers, and a series of slotted and perforated plates provided with sliding perforated plates for introducing the materials into the cases.

The invention further consists of various details of construction, as will be hereinafter fully described, and then pointed out in the claims.

The frame of the apparatus is formed of two vertical side plates, A, connected at their upper and lower ends by two plates, B.

For the cases to be charged, the lower ends of which fit into recesses G in the upper side of a plate, D. The plate D is made of such a length as to fit into the space between the sides A of the frame, and is secured to the bottom plate, B, of the said frame by pins E, passing through it and into the said bottom plate.

To the plate D, in the bottom of the case-receiving recesses G, are secured pins or nipples F, concentric with the said recesses, and of such a size as to fit into the interior of the lower ends of the cases C, and serve as stop-plugs to the lower ends of the said cases. The upper ends of the cases C fit into the countersunk lower ends of the perforations H through the plate I, which perforations are made of a diameter equal to the interior diameter of the cases C, as shown in Figs. 1 and 2. The upper ends of the perforations H are flared, so that the substances to be introduced into the cases C will readily enter and pass through the said perforations.

Upon the ends of the plate I are formed tongues J, which fit into and slide in grooves K, formed in the inner surfaces of the sides A. The plate I, when adjusted, is secured in place by a pin, L, passing through the side A and into the end of the said plate I. With this construction, when the cases C are to be inserted, the pins E L are withdrawn, the plates D I are removed from the frame A B, the lower ends of the cases C are inserted in the recesses G of the plate D, and the plate I is placed upon the upper ends of the cases C.

The plates D I and the interposed cases C are then inserted in the frames A B and secured in place by the pins E L. The charged cases are removed by taking out the plates D I, raising the plate I from the upper ends of the cases, and raising the cases from the plate D.

Upon the upper side of the plate D is placed a plate, M, having holes formed through it, corresponding in number, size, and position with the case-recesses and the pin-holes of the said plate D. After the lower ends of the cases C have been inserted through the holes in the plate M into the recesses G in the plate D, the plate M is raised upon the cases C, to bring the upper ends of the said cases C into position to enter the countersunk lower ends of the perforations H in the plate I. In case shorter or longer cases C are to be charged, blocks N are inserted or removed from between the plate D and the bottom plate, B, of the frame.

In charging the cases C, the separate materials as they are inserted are packed by rammers, the heads O of which are made of such a size as to exactly fit the interior of the cases C. The stems P of the rammers pass through guide-holes in the plate Q, placed at such a distance above the plate I as will allow the feed-plates (hereinafter described) to be inserted between the rammer-heads O and the plate I. The upper ends of the rammer-stems P pass through holes in the slotted plate R and in the plate S, placed in the slot of the said plate R. The plate S is made shorter than the slot in which it is placed, and to its end is swiveled the end of a hand-screw, T. The hand-screw T passes in through a screw-hole in the end of the slotted plate R, or in a nut secured to the said end, so that the stems P can be clamped and released by operating the said screw. With this construction, should the interior of any of the cases C be larger or smaller than that of the others, the screw T can be operated to release the stems P and allow the rammers to adjust themselves to the heights of the material in the various cases. The screw T can then be operated to cause the plates R S to clamp the rammer-stems P, and the rammers can then be operated to pack the material by the mechanism hereinafter described. The ends of the slotted plate R are recessed to receive the guide-cleats U, attached to the sides A of the frame, so that the said plate R will move up and down vertically.

To the upper sides of the ends of the slotted plate R are attached the lower ends of two rack-bars, V, the teeth of which mesh into the teeth of the gear-wheels W, attached to the shaft X. The shaft X revolves in bearings Y, attached to the top plate, B, of the frame.

To one end of the shaft X is attached a pulley, Z, around which passes a belt, *a*. The belt *a* also passes around a pulley, *b*, provided with a crank-handle, *c*, and journaled to the side A of the frame in such a position that it can be readily reached and operated to raise

and lower the clamping-plates R S and the rammers O P. The rack-bars V are held vertical against the push of the gear-wheels W by the rollers *d*, against which their outer edges rest, and which are pivoted to upright brackets *e*, attached to the top plate, B, of the frame.

*f* is a gage-plate for putting the clay packing in the lower parts of the cases C, and which has a slot formed in it near its lower side to receive the sliding plate *g*. The plates *f g* have holes formed through them corresponding in number and position with the holes in the plate I. The part of the plate *f* above the plate *g* is made of such a thickness that the holes in the said part, when the plate *g* is drawn forward to close their lower ends, will hold the amount of clay required to be put into the lower parts of the cases C. The clay is introduced into the cases by placing the filled gage-plate *f* upon the top of the plate I, pushing the plate *g* inward to bring its holes into line with the holes in the plates *f* I, and then running the rammers O P downward, packing the clay into the bottoms of the said cases.

*h* is the gage-plate for introducing the powder into the cases C. The plate *h* is made with holes corresponding in number and position with the holes in the plate I. The plate *h* is slotted to receive two or more sliding plates, *i*, so that larger or smaller amounts of powder can be introduced into the cases C at a time, as may be required. The sliding plates *i* are perforated to correspond with the perforations of the plate *h*. In the upper side of the plate *h*, near one end, is formed a dovetailed groove, *j*, which is closed by a slide, *k*. In the plate *h* at the bottom of the groove *j* are formed as many holes as the said plate has sliding plates *i*, to receive a locking-pin, *l*, and the said holes in the bottom of the groove *j* are continued through the plates *i*. One of the pin-holes in each plate *i* is elongated, so that when the pin *l* is inserted in the said hole that plate can be drawn forward, but the other plates will be locked in place. By this construction, by adjusting the pin *l*, the powder-receiving apertures can be made larger or smaller, as may be desired.

In supplying the cases C with powder the pin *l* is adjusted to cause the apertures in the plates *h i* to receive the desired amount of powder, the free plate *i* is drawn forward, and the said perforations are filled with powder. The filled plate *h* is then placed upon the plate I, and the free sliding plate *i* is pushed in to allow the powder to pass down into the cases C. The plate *h* is then removed, and the powder can then be packed by running down the rammers O P.

*m* is the plate for introducing the stars into the cases C, which plate is perforated to correspond with the perforations of the plate I, and is provided with a perforated slide, *n*. The plates *m n* are similar to the plates *f g*, except that the upper part of the said plate *m*

is thicker than that of the plate *f*, and the upper ends of the perforations are flared, as shown in Fig. 10, to cause the stars to pass into the said perforations readily.

5 *o* is the plate for putting in the combustible composition, which plate is made in the same manner as the plate *h* for putting in the powder, except that the upper part of the plate *o* is made thicker than the upper part of the  
10 said plate *h*. The plate *o* is provided with three (more or less) perforated slides, *p*, in the same manner as the plate *h*, the said slides being controlled by a stop-pin in the same manner as the slides *i* of the said plate *h*.

15 *q* is a plate which is provided with perforations corresponding in number, shape, and size with the perforations of the star feed-plate *m*.

To the lower side of the ends and rear edges of the plate *q* are attached cleats *r*, the lower parts  
20 of the inner edges of which are rabbeted to receive the star feed-plate *m*, as shown in Fig. 14. The upper parts of the inner edges of the end cleats, *r*, are rabbeted to receive tongues formed upon the upper parts of the end edges  
25 of the plate *s*, which is provided with perforations corresponding in number and position with the perforations of the plate *q*.

In the plate *s*, at the rear side of each perforation, is formed a recess in which is placed  
30 a rubber block, *t*, concaved upon its forward side to form the rear parts of the perforations through the said plate *s*. The middle part of the forward edge of the plate *s* has a projection, *u*, formed upon its upper side, and provided with a screw-hole or nut to receive the  
35 hand-screw *v*. The inner end of the hand-screw *v* rests against the forward edge of the plate *q*, so that the plate *s* will be drawn forward by turning the said screw inward.

40 To the upper side of the end parts of the plate *q* are attached pins *w*, the upper ends of which project to enter U-shaped slots *x* in the end parts of the plate *y*, placed upon the top of the said plate *q*.

45 In the plate *y* are formed as many slots *a'* as there are rows of perforations *b'* in the plate *q*, and in such positions as to be directly over the said rows of perforations *b'* when the  
50 pins *w* are in the right-hand arms of the U-slots *x*, and be over the spaces between the said rows of perforations when the pins *w* are in the left-hand arms of the said slots *x*, as shown in Fig. 13.

To the upper side of the plate *y*, and surrounding the slots *a'* through the said plate,  
55 are attached cleats *z*, to keep the stars in place upon the said plate.

To the edges of the plate *y* at the adjacent sides of the slots *a'*, and opposite the spaces  
60 between the holes of the rows, are secured or upon them are formed cleats or projections *1* to contract the said parts of the slots and cause the stars *c'* to tilt and take an erect position within the said slots *a'* at the ends of the said  
65 cleats *1*, so that when the said plate *y* is moved to the left, bringing the slots *a'* over the rows

of holes *b'* in the plate *q*, the said erect stars will drop into or through the said perforations.

In using the mechanism the plate *q* is placed  
70 over the star feed-plate *m*, and its perforations *b'* are closed by drawing the plate *s* outward. The plate *y* is then adjusted to bring the pins *w* into the left-hand arms of the slots *x*, a quantity of stars are placed upon the plate  
75 *y*, and the said plate *y* is agitated to cause the stars to take an erect position between the adjacent ends of the cleats *1*. The plate *s* is then pushed inward to allow the stars to drop through the perforations *b'* in the  
80 plate *q* into the perforations in the plate *m*. The plate *s* is then drawn forward and the plate *y* is again agitated to cause another set of stars to take an erect position and drop into the perforations *b'* in the plate *q*. The  
85 plate *s* is then pushed in, allowing the erect stars to drop through the holes in the said plate *s* and rest upon the ends of the stars in the plate *m*. The screw *v* is then operated to draw the plate *s* outward and clamp the stars  
90 *c'* in place in the holes *b'* in the plate *q*, the rubber blocks *t* preventing the said stars from being injured. The plates *y q s* can now be removed from the plate *m* without any of the  
95 stars falling out, and the stars in the plate *m* can be charged and primed, and the said plate can be placed in the machine to introduce the stars into the cases *C*. The plate *q* and its attachments can then be placed over the  
100 plate *m*, and the plate *s* can be slackened to allow the clamped stars to drop into the perforations of the said plate *m*, and the plate *y* can be again agitated to bring another set of stars into the perforations *b'*, where they can  
105 be clamped, as before described.

In using the apparatus the clay, powder, stars, and combustible composition can be introduced into the cases *C* in regular order,  
one, two, or more series of powder, stars, and combustible composition being introduced, as  
110 may be desired.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. An apparatus for making Roman candles  
115 and other fire-works, constructed substantially as herein shown and described, and consisting of the frame, a detachable recessed plate provided with nipples, and a detachable plate provided with countersunk perforations for hold-  
120 ing the cases, a perforated plate, and sliding perforated clamping-plates and their operating mechanism for carrying and operating the rammers, and a series of perforated and slotted plates provided with perforated sliding plates  
125 for introducing the materials into the cases, as set forth.

2. In an apparatus for making Roman candles and other fire-works, the combination,  
with the frame *A B*, of the recessed plate *D*,  
130 provided with the nipples *F*, and the plate *I*, having countersunk perforations, substan-

tially as herein shown and described, whereby the cases are securely held while being charged, as set forth.

3. In an apparatus for making Roman candles and other fire-works, the combination, with the recessed plate D, plate I, provided with perforations countersunk around their lower edges, and the cases C, of the perforated movable plate M, the perforations of which coincide with those of plates D I, substantially as herein shown and described, whereby the upper ends of the cases can be readily held in position to enter the countersunk perforations of the upper plate, as set forth.

4. In an apparatus for making Roman candles and other fire-works, the combination, with the frame A B and the rammers O P, of the perforated guide-plate Q, the perforated clamping-plates R S, and a driving mechanism, substantially as herein shown and described, whereby the said rammers can be readily adjusted and operated, as set forth.

5. In an apparatus for making Roman candles and other fire-works, the combination, with the frame A B and the movable clamping-plates R S, having coincident perforations, and the rammers P, adjustable in said apertures, of the rack-bars V, secured to the upper surface of the plate R, the gear-wheels W, mounted on a shaft, X, having its bearings on the top of the frame, and the pulleys and belt Z b a, substantially as herein shown and described, whereby the said clamping-plates can be readily moved up and down to operate the rammers, as set forth.

6. In an apparatus for making Roman can-

dles and other fire-works, the combination, with the perforated gage slotted horizontally and provided with a series of vertical pin-holes, and the series of perforated sliding plates, each one of which is provided with a series of pin-holes, one of the holes of each series being elongated, as shown, of the pins l, adapted to pass through the pin-holes of the gage and plates, whereby, when the pin is passed through the pin-holes in the gage and those of all of the perforated plates except one and through the elongated pin-hole of said remaining plate, said plate will be allowed to slide and the others locked in place, substantially as set forth.

7. In an apparatus for making Roman candles and other fire-works, the combination, with the perforated plate q, having cleats r at the end and rear edges of its lower side and pins w at its upper side, of the perforated plate s, provided with rubber blocks t and hand-screw v, and the transversely-slotted plate y, having cleats z around its slotted middle part, and provided with U-slots x, and with small cleats l at the opposite sides of its transverse slots a', substantially as herein shown and described, whereby the stars can be readily introduced into the star feed-plate, as set forth.

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Witnesses:

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