A. GODFREY.

CIGARETTE PACKET FORMING AND FILLING MACHINE.

APPLICATION FILED MAR. 26, 1918.

1,298,328.

Patented Mar. 25, 1919.

4 SHEETS—SHEET 1.

Fig. 1.

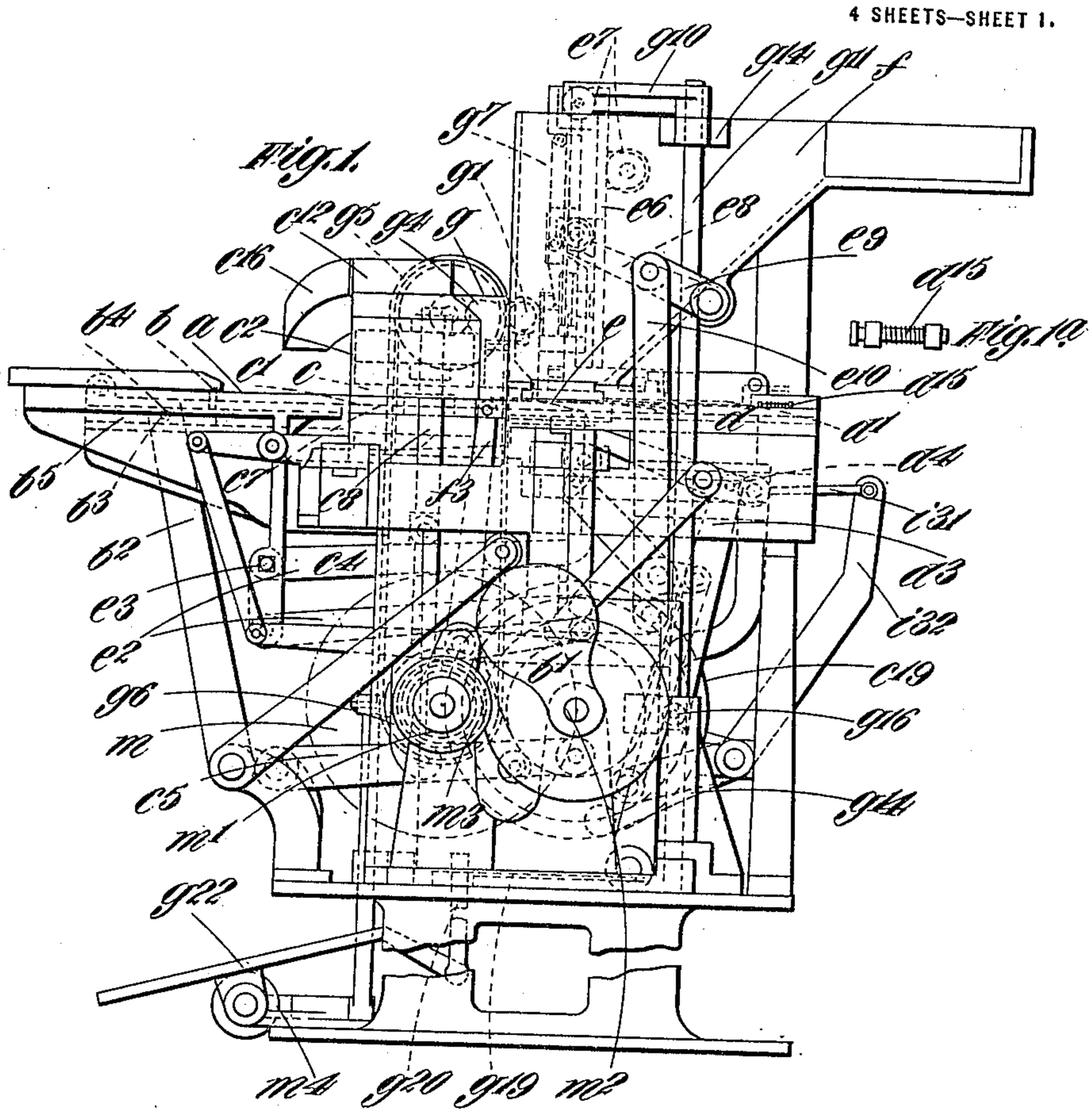


Fig. 1a.

Fig. 2.

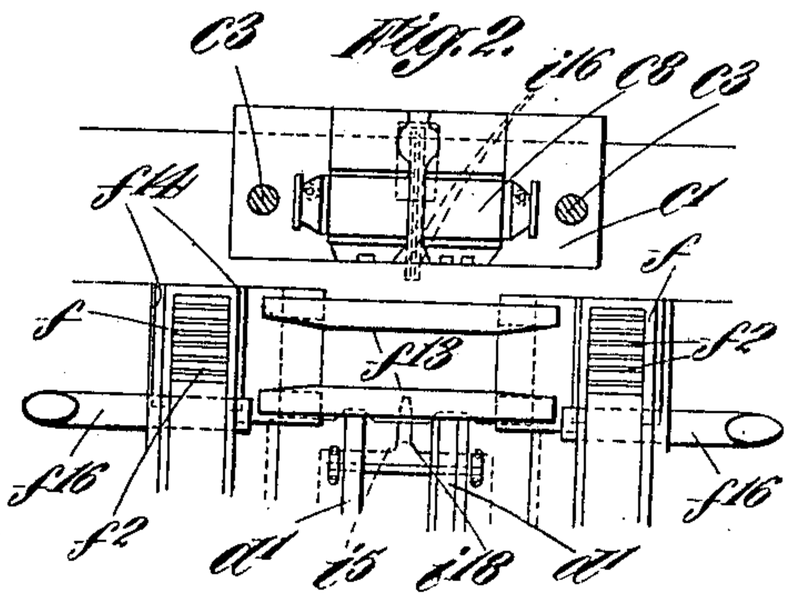
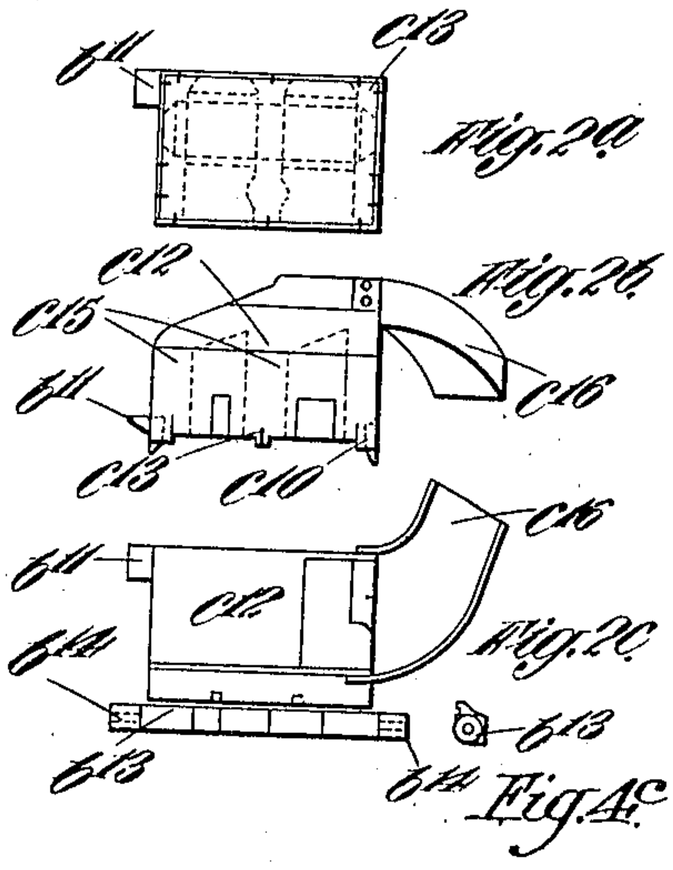


Fig. 2a.

Fig. 2b.

Fig. 2c.



WITNESSES

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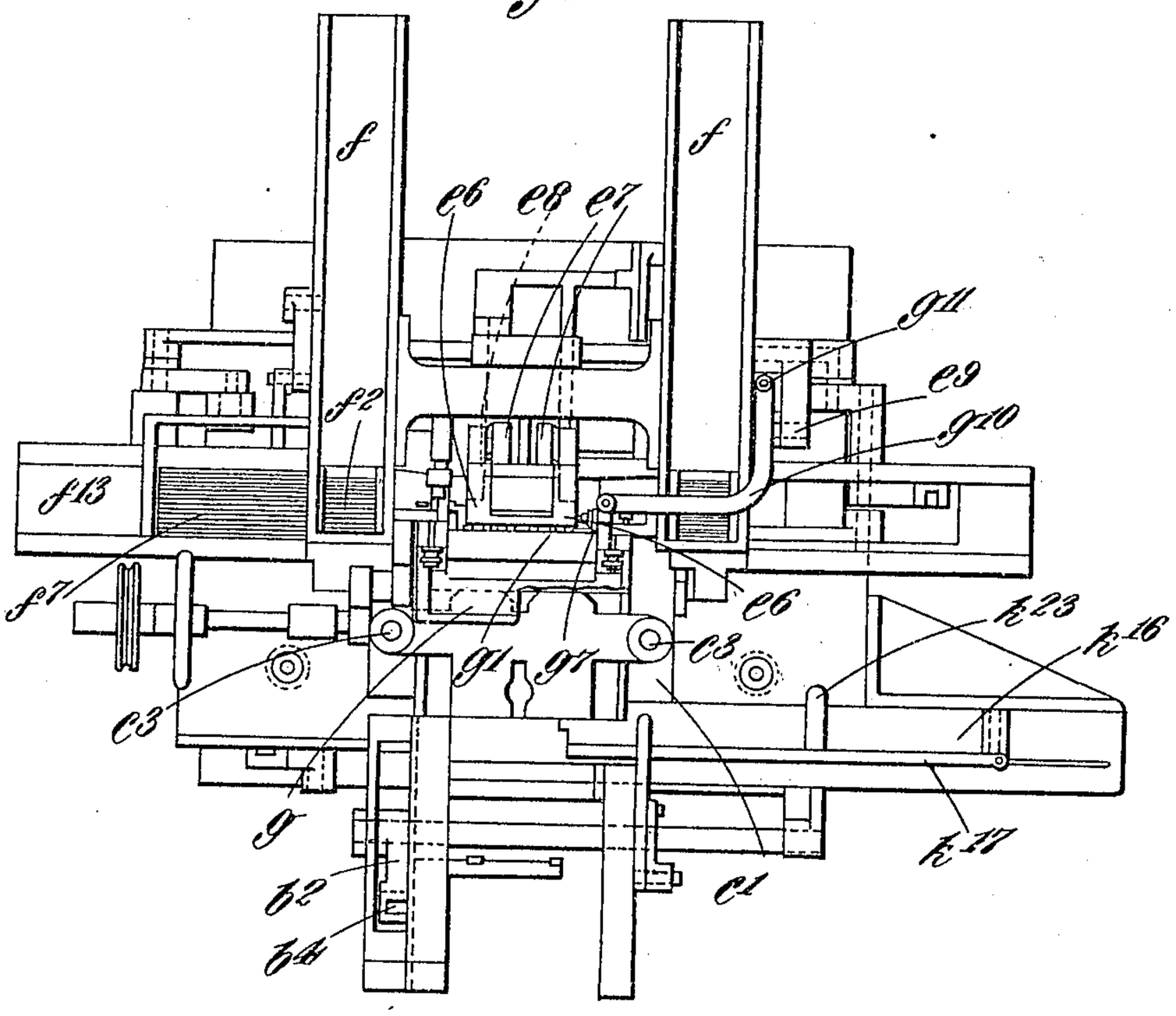
4 SHEETS—SHEET 2.

Fig. 1?



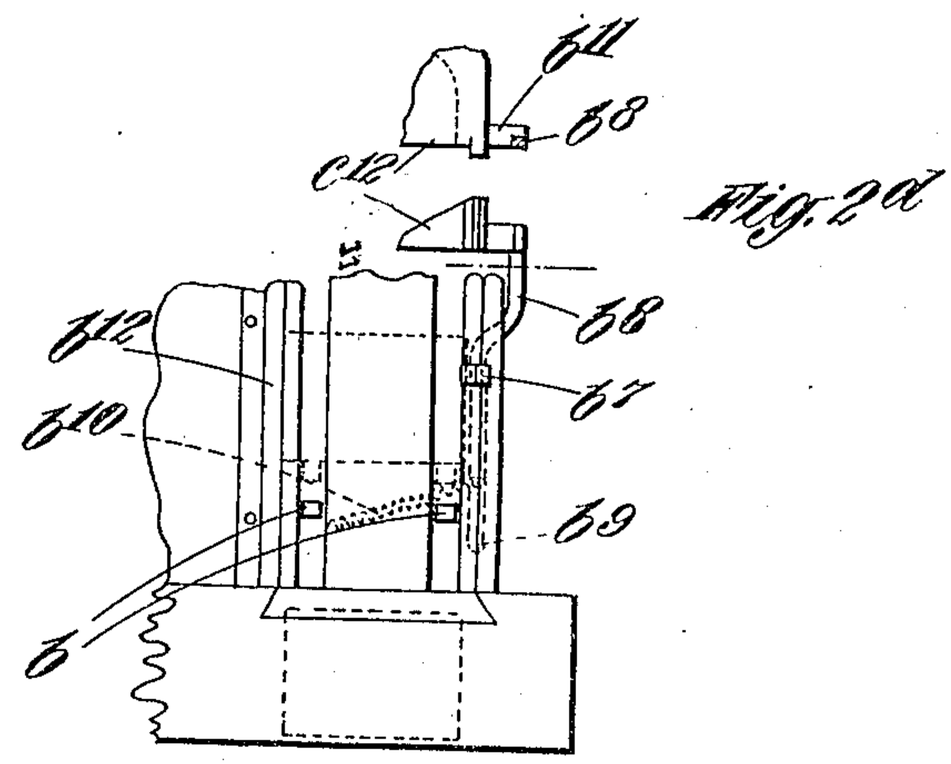


Fig. 2d

WITNESSES

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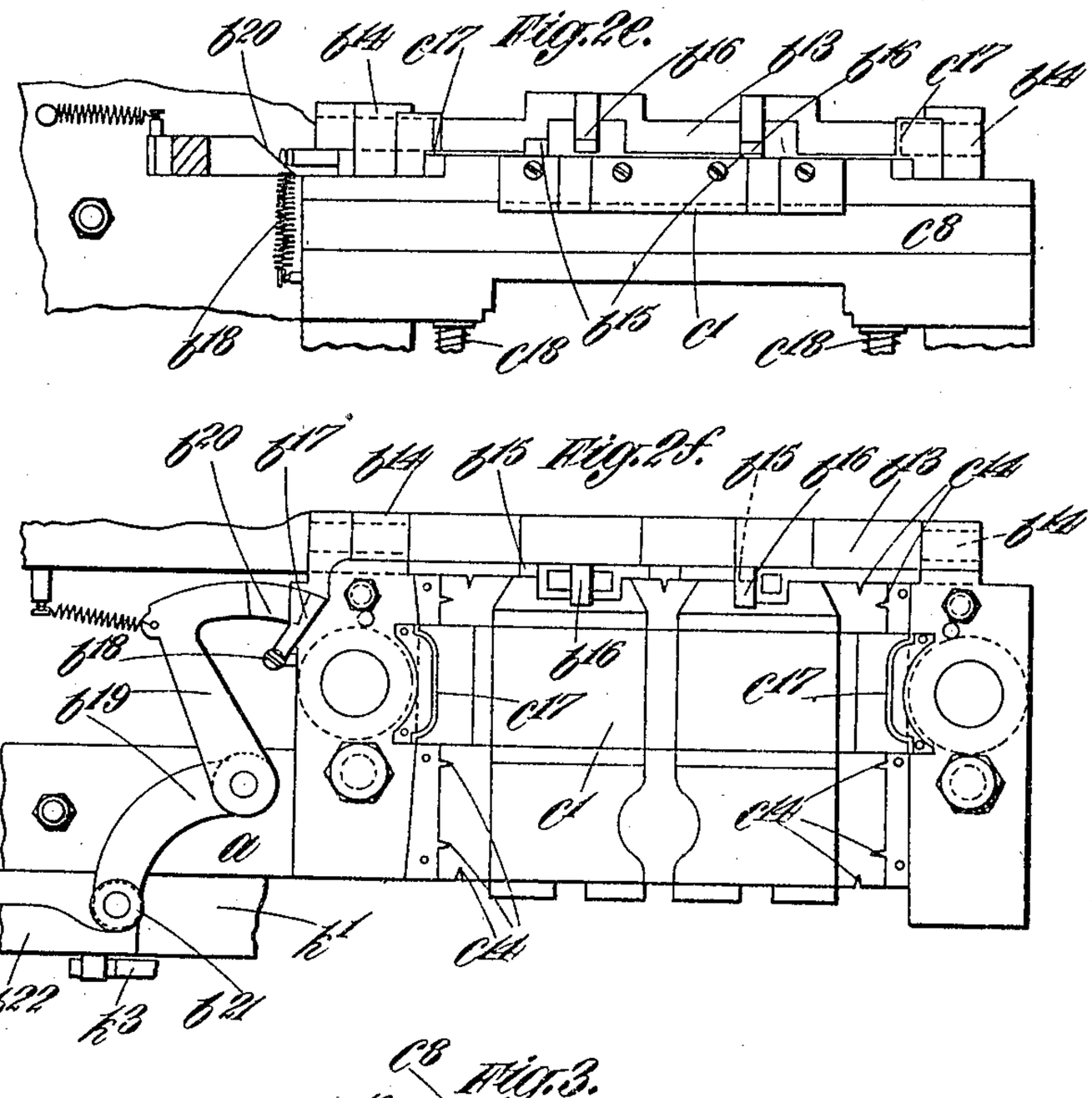
4 SHEETS—SHEET 3.



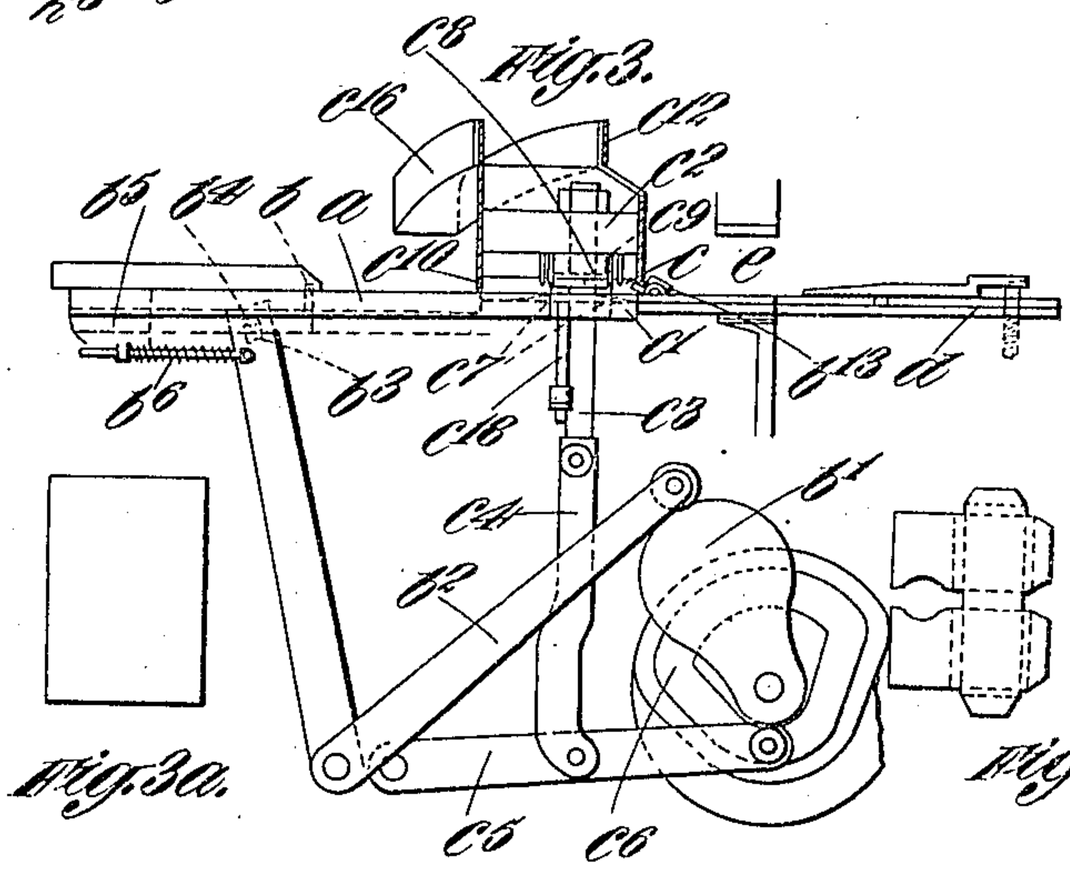


Fig. 3a.

Fig. 3b.

WITNESSES
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4 SHEETS—SHEET 4.

Fig. 4.

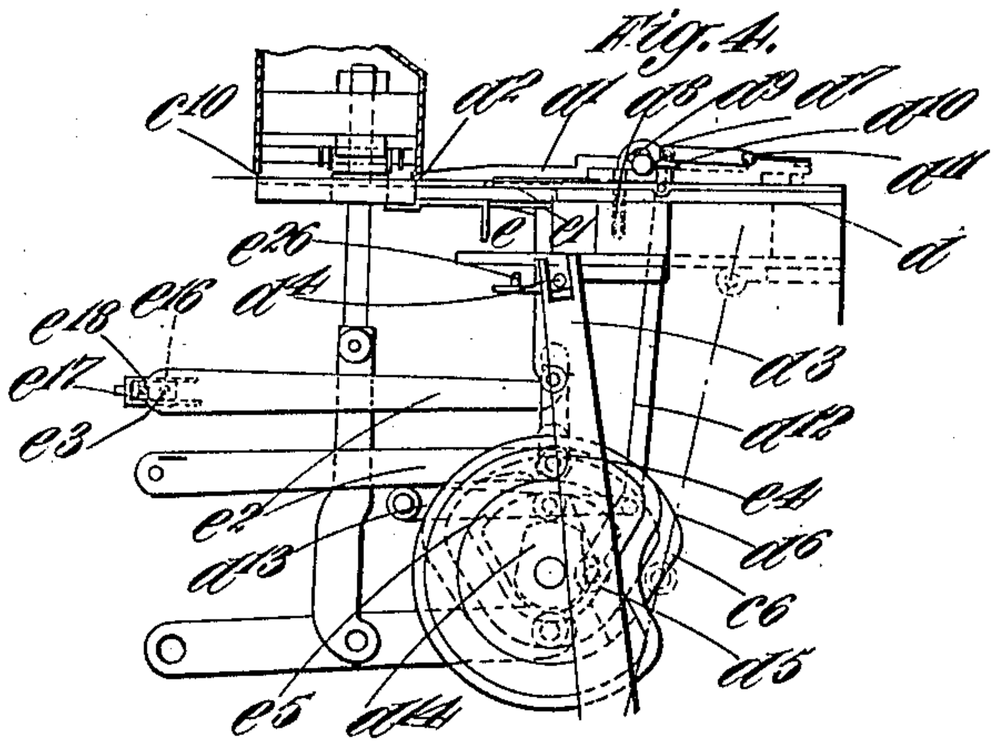


Fig. 4a.

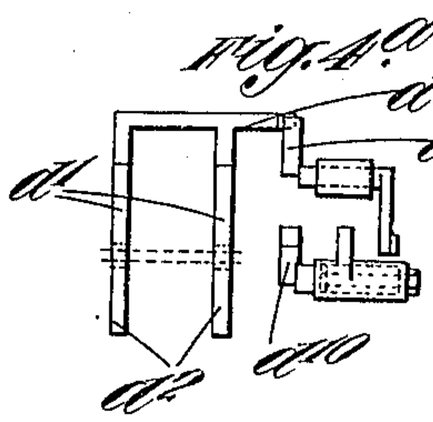


Fig. 4b

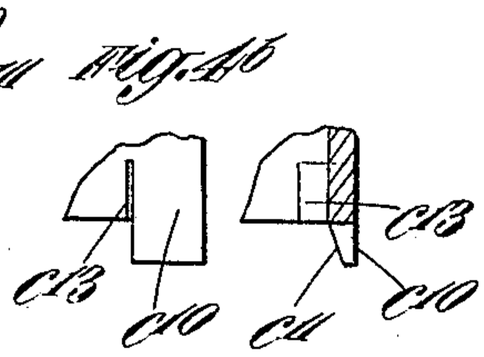


Fig. 5.

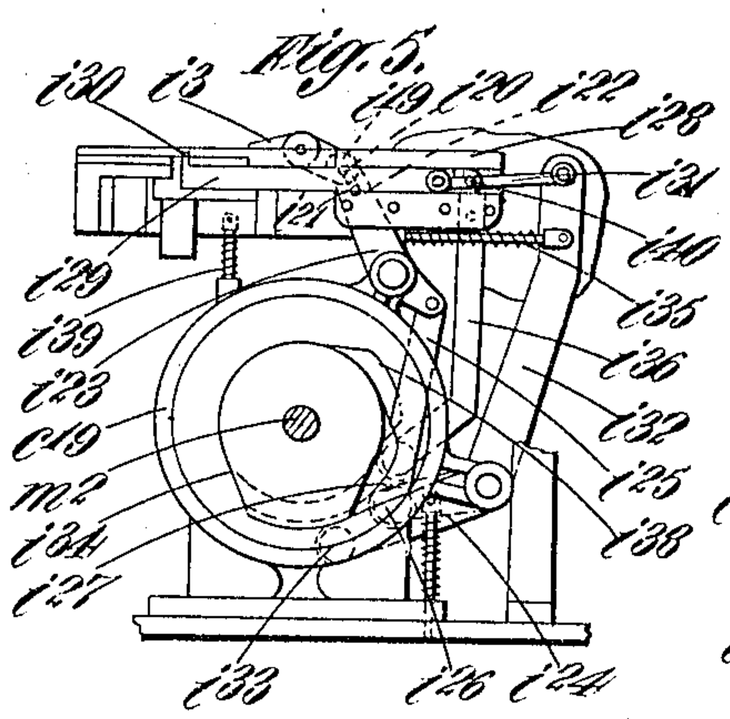
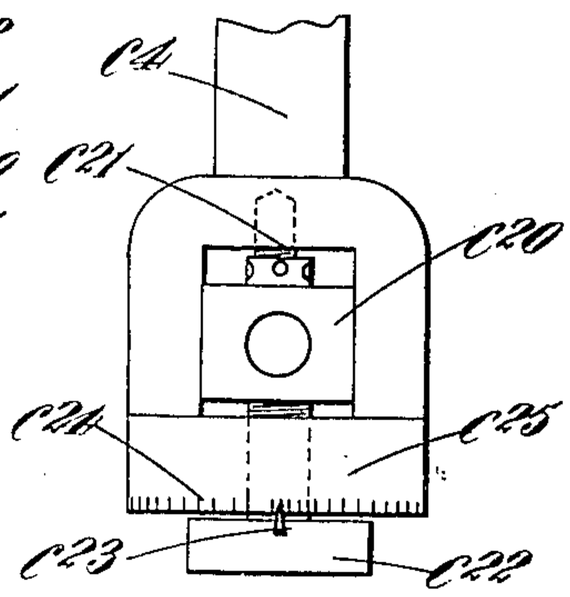


Fig. 6.



WITNESSES

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CIGARETTE-PACKET FORMING AND FILLING MACHINE.

1,298,328. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed March 26, 1918. Serial No. 224,805.

To all whom it may concern.

Be it known that I, ALFRED GODFREY, a subject of the King of Great Britain and Ireland, residing in Middlesex, England, have invented new and useful Improvements in Cigarette-Packet Forming and Filling Machines, of which the following is a specification.

This invention relates to improvements in cigarette packet forming and filling machines in which cases of paper, cardboard or other similar material are used and has for its object to provide improved means for cutting the paper or cardboard for these cases to the desired shape, the waste cuttings from the blank being held and discharged clear of the die, whereas the blank is creased at the folding edges.

The invention further consists in the improvements and constructive details of the above cutting and scoring means set forth more fully hereinafter.

The invention is illustrated by way of example in the accompanying drawings in which like reference letters refer to like parts in the various figures.

Figure 1 is a side elevation of a machine constructed in accordance with my invention.

Fig. 1^a is an elevational view of the spring bumper in detail.

Fig. 1^2 is a plan view of Fig. 1 with some portions removed to show parts beneath.

Fig. 2 is a part plan showing a section through the cutting die.

Figs. 2^a, 2^b, 2^c, show different views of the die casing for collecting the cuttings and discharging them clear of the die.

Fig. 2^d is a part plan of the paper feeding device showing an automatic side lay for registering the position of the paper blank when being fed under the cutting die.

Fig. 2^e is a front view of the die showing the stop bar.

Fig. 2^f is a plan of the same showing the retaining knife edges in the die casing and means for preventing the dust getting under the die.

Fig. 3 is a detail view of the paper feeding cutting and creasing mechanism.

Fig. 3^a is a view of a blank of cardboard or paper as fed into the machine and

Fig. 3^b is a view of the same blank as cut and creased before folding.

Fig. 4 is a detail view of the cut blank feeding mechanism.

Fig. 4^a is a plan of the grippers and operating gear of the cut blank feeding mechanism.

Fig. 4^b shows two views of the taper fingers carried by the die casing for registering the position of the blank before being gripped one view being a front elevation and the other view a side elevation in section.

Fig. 4^c is an end view of the stop bar shown in Figs. 2^c and 3.

Fig. 5 is a detail view of the supporting means for the main shaft to prevent distortion of same during the cutting and creasing operations.

Fig. 6 is a view showing a micrometer adjustment for the connecting rod ends of the pressure mechanism so as to insure a minute regulation of the pressure upon the cutting and creasing dies.

In carrying my invention into effect I arrange a feed table a on which the sheets of paper or cardboard can be fed by hand and in connection with such table I arrange advancing and retiring fingers b which have a reciprocating motion given to them by a cam b^1 operating the bell crank b^2 connected by means of a forked end b^3 with a pin b^4 carried by a slide b^5 to which the fingers b are rigidly attached; the motion of the bell crank b^2 in the opposite direction to that given it by the cam b^1 is effected by a spring b^6.

The definite register is effected by means of an automatic side lay b^7 shown in Fig. 2^d operated by a lever b^8 pivoted on the frame at b^9 and under the control of a spring b^{10} which draws the lay b^7 into its operative position. The lever b^8 is adapted to co-act with an inclined plane b^{11} shown in Fig. 2^b so that the lay b^7 is put into open position when the paper blank is fed forward between the fixed lay b^{12} and the automatic lay b^7.

The rising of the part c^{12} brings the in-

clined plane b^{11} out of contact with the arm b^8 and thus allows the lay b^7 to press the blank against the lay b^{12}.

The ends of the fingers b are adapted to engage with the edge of the paper or cardboard lying on the table a and feed it forward to a position of definite register and to retire again to engage the next piece of paper as the machine moves.

The definite end position of the paper or cardboard is effected by a rotary bar b^{13} mounted on bearings b^{14} on the feed table a and provided with stop projections b^{15} against which the edge of the paper can abut, the abutting surfaces being of circular formation struck from the axis of the bearings b^{14}. This stop bar b^{13} also carries gripping fingers b^{16} which are adapted to grip the paper upon the upper surface of the spring table c^8 when the latter is returning after the cutting and creasing operations so as to hold the cut and creased blank firmly in register until gripped by grippers d^2 hereinafter described. The bar b^{13} is operated by a lever b^{17} spring pressed by a spiral spring b^{18} in one direction and in the other by a bellcrank lever b^{19} pivoted on the frame a and having a beveled end b^{20} to engage under the arm b^{17} so as to lift the same sufficiently high to allow the paper to pass underneath to the next operation. The other end of the lever b^{19} is provided with a roller b^{21} adapted to co-act with a reciprocating inclined cam surface b^{22} carried upon a sliding part k^1 hereinafter described. As shown in Fig. 2^f the stops b^{15} are in position ready to receive the paper when it is held by the cutting die c^2. When the reverse motion of the part k^1, viz: from right to left takes place the roller b^{21} mounts the higher portion of b^{22}; the stops b^{15} and grippers b^{16} are turned right up into the position to allow the paper to pass underneath them, and then to drop back to the position when the stops b^{15} are ready to receive the next paper sheet. These parts are shown in detail in Figs. 2^e and 2^f, and as the blank is fed up by the fingers b against the stops b^{15} and as the surface b^{22} moves to the left it will be seen that the beveled end b^{20} retires from under the arm b^{17} and allows the fingers b^{16} to descend under the pressure of the spring b^{18} and thus cause the paper to be gripped by the table c^8.

When the paper is thus in its registered position in one direction as a blank, as shown in Fig. 3^a, and as described, it lies within the cutting and creasing die c, the lower portion c^1 of which is rigidly fixed on the bed of the machine while the upper portion c^2 is reciprocated by a tension rod c^3, connecting rod c^4 and pivoted lever c^5 one end of which engages with a grooved cam c^6. The lower portion c^1 of the die is provided with upstanding cutting edges c^7 within which slides a spring pressed table c^8 grooved on the face to correspond with the creasing rules c^9 on the upper portion c^2 of the die.

Under the part c^2 are mounted two or more pegs c^{10} (Figs. 3, 4, 4^b and 2^b) disposed on each side and having surfaces inclined to the direction of movement of the part c^2 so as to engage the edges of the blank and register it laterally in position while it is free and before the fingers b^{16} press upon it. After the paper is thus in its registered position laterally on the table c^8 and is held by the fingers b^{16} it is then gripped by the part c^2 which in its descent depresses the spring table c^8 through the cutting edges c^7 and produces the cut blank. On the upward stroke the table c^8 with its cut blank firmly held against the part c^2 returns to the normal level again when the part c^2 continues its upper movement and releases the blank. On the part c^2 is mounted a waste cutting box c^{12} provided with knife edges c^{13} disposed vertically around the sides thereof (Figs. 2^a, 2^b, and 4^b). Recesses c^{14} are provided on the die c^1 into which the knife edges enter after passing through the blank so as to hold the waste cuttings and prevent them falling on the die c^1. The box c^{12} is provided with guiding channels c^{15} so as to control and direct the waste cuttings from the bottom of the box in an upward direction to the chute c^{16} from which they can be discharged clear of the die c^1 and its associated mechanism. A limiting stop device c^{17} is arranged at each side of the die c^1 in order to form a definite abutment against which the table c^8 can be forced by its springs c^{18}. This device c^{17} oversails the sliding joint between the table c^8 and the die c^1 and thus prevents any dust or foreign matter getting between the under side of the table and the die c^1 so as to insure the table being in contact with the stops b^{15} at the end of its upward movement. The cutting and creasing operation having thus been completed the blank has the shape indicated in Fig. 3^b, the dotted lines indicating the lines of creasing along which the subsequent folding is to take place.

In order to prevent the shaft m^2, carrying the cam c^6, from distortion or bending under the load transmitted through the rod c^5 when the cutting and creasing operation is effected, it is formed with a circular periphery and is inclosed in a bearing or stay c^{19} (Figs. 1 and 5) fixedly mounted on the base of the machine.

If it is desired to emboss the paper with any suitable design, this operation can be done simultaneously with that of cutting and creasing, for which purpose embossing means are combined with the creasing means

in the same die. After the cutting and creasing operations the cut paper is seized by gripping means consisting of a slide d adapted to reciprocate on the bed of the machine and having at one end pivoted grippers d^1, the end d^2 of which holds the paper tightly upon the upper surface of the slide d. The slide d is reciprocated along the bed by means of a pivoted forked arm d^3 adapted to engage with a pin d^4 carried by a slide d and having a roller d^5 rotatably carried on the lever d^3 and engaging with a cam d^6.

The grippers d^1 are pressed into their operative position by means of a spring pressed plunger d^8 engaging on the underside of the rear arm of the grippers.

In order to open the grippers the rear arm has a lateral extension d^9 which contacts during the reciprocating movement with a spring pressed pivoted switching arm d^{10} so that on the forward movement the projection d^9 engages on the under inclined face of the arm d^{10} until nearing the end of the reciprocating stroke the extension d^9 trips past the lower end of the inclined surface so as to allow the spring pressed plunger d^8 to force the grippers into contact with the paper. On the return stroke, the extension d^9 rides over the upper inclined surface of the arm d^{10} which being spring pressed is forced in a downward direction against such spring and thus allows the extension d^9 to pass freely over it and when the said extension has passed the arm d^{10} the latter rises again under the action of its spring into position ready for the next forward stroke. The arm d^{10} is prevented from an upward movement above the position shown in Fig. 4 by a fixed stop d^7 against which it abuts.

As the grippers d^1 reach the forward end of their stroke so that the cut blank is disposed over the folding die e the lateral extension d^9 is disposed under a pivoted arm d^{11} operated by a connecting rod d^{12}, pivoted lever d^{13} and cam d^{14} so as to raise the end d^2 of the grippers d^1 from the paper and release it. In order to take up the momentum of the slide d at the end of the backward stroke a spring buffer d^{15} is arranged in the frame and shown on an enlarged scale in Fig. 1^a.

It is found to be desirable to provide simple means for finely adjusting the various parts of the mechanism so as to get the desired pressure and registration of position. In Fig. 6 is shown a method of micrometer adjustment to the connecting rod c^4 comprising a sliding block c^{20} engaging in a parallel recess, at the upper side is a jamming screw c^{21} bearing against the block c^{20} on the lower side an adjusting screw c^{22} on the head of which is an index c^{23} which can be moved in conjunction with graduations c^{24} on a circular part c^{25} of the rod c^4. The adjustment is effected by loosening the screw c^{21} and then turning the adjusting screw c^{22} through the proper number of graduations and finally locking it by tightening the jamming screw c^{21}.

What I claim is:—

1. In a cigarette packet forming and filling machine the combination of means for cutting and creasing a blank from which the packet is formed, means for successively feeding said blanks to said cutting and creasing means and means for subsequently effecting the lateral adjustment of each of said blanks prior to cutting and creasing.

2. In a cigarette packet forming and filling machine the combination of means for cutting and creasing a blank from which the packet is formed, means for successively feeding said blanks horizontally forward to said cutting and creasing means, means for subsequently effecting the adjustment in a lateral direction of said blank and means constituting a portion of said cutting and creasing means for further effecting the lateral adjustment of the blank.

3. In a cigarette packet forming and filling machine the combination of a rising and falling die for cutting and creasing a blank from which the packet is formed, means for successively feeding said blanks forward under said die, means for laterally adjusting each blank prior to engagement by said die and means carried by said die for registering the position of said blank immediately before the cutting operation.

4. In a cigarette packet forming and filling machine the combination of a rising and falling die for cutting and creasing blanks from which the packets are subsequently formed, means for successively feeding each blank horizontally forward under said die, means operated by said die for adjusting the position of said blank in a lateral direction and independent means carried by said die for adjusting the position of said blank immediately prior to its engagement by the die.

5. In a cigarette packet forming and filling machine the combination of means for cutting and creasing a blank from which each packet is subsequently formed, means for successively feeding each blank horizontally forward to said cutting and creasing means, means for arresting said forward feed of each blank and means for gripping said blank during cutting, and means for adjusting the lateral position of said blank prior to its being gripped.

6. In a cigarette forming and filling machine, the combination of a rising and falling upper cutting die portion coöperating with a fixed lower cutting die portion and a spring table, means for gripping a blank

from which the packet is subsequently formed upon said lower die portion and means carried by said upper portion for engaging the waste portions of the blank detached by the cutting action and removing said waste portions upward with said upper portion of the die.

7. In a cigarette forming and filling machine the combination of a rising and falling upper cutting die portion coöperating with a fixed lower cutting die portion and a spring table, means for gripping a blank from which the packet is subsequently formed upon said lower portion, means for stripping the completely cut and creased length from the cutting die, a box surrounding said upper portion and inwardly projecting knife edges on said box for engaging the waste portion of said blank detached by cutting.

8. In a cigarette packet forming and filling machine, the combination of a rising and falling upper cutting die portion, a box incasing said portion, a fixed lower cutting die portion, means for gripping said blank during cutting and creasing, knife edges provided in said box and adapted to enter recesses in the lower die portion during the cutting operation, thus lifting the waste cuttings after every cutting operation of the lower cutting die portion and collecting them in the form of columns in cavities of the upper die portion, and means for receiving and disposing of said waste cuttings.

9. In a cigarette forming and filling machine the combination of a rising and falling upper cutting die portion, a box incasing said portion, a fixed lower cutting die portion, means for gripping said blank during cutting and creasing, knife edges provided in said box and adapted to enter recesses in the lower die portion during the cutting operation, thus lifting the waste cuttings after every cutting operation of the lower cutting die portion and collecting them in the form of columns in cavities of the upper die portion, and guide channels on said box for controlling and directing the waste cuttings from the bottom of the box in an upward direction, and an inclined chute for receiving and discharging said waste cuttings.

10. In a cigarette forming and filling machine, the combination of an upper rising and falling cutting die portion coöperating with a fixed lower cutting die portion and a spring table, a stop bar for limiting the forward motion of the paper blanks, and gripping fingers provided on said bar for gripping the paper after the upper die portion has released the same so as to prevent the cut paper from losing its registered position until finally removed.

11. In a cigarette forming and filling machine, the combination of an upper rising and falling cutting die portion coöperating with a fixed lower cutting die portion and a spring table, a stop bar for limiting the forward motion of the paper blanks, and gripping fingers provided on said bar for gripping the paper after the upper die portion has released the same so as to prevent the cut paper from losing its registered position, and a reciprocating slide provided with pivoted grippers adapted to seize the cut blank while still held by the aforesaid gripper fingers on the stop bar, said stop bar fingers being adapted to then release the paper to allow of the removal of the cut paper blank from the die by the aforesaid pivoted grippers.

12. In a cigarette packet forming and filling machine the combination of an upper rising and falling cutting die portion coöperating with a fixed cutting die portion and a spring table equalizing projections provided on the stationary portion of the cutting and creasing die engaging with only a working clearance guides provided on the movable spring table, thus preventing dust and foreign matter from getting under the stops, and means for adjusting the length of the die operating connecting rods to maintain equal pressure of a predetermined amount on the cutting and creasing devices.

13. In a cigarette packet forming and filling machine the combination of an upper rising and falling cutting die portion coöperating with a fixed cutting die portion and a spring table equalizing projections provided on the stationary portion of the cutting and creasing die engaging with only a working clearance guides provided on the movable spring table, thus preventing dust and foreign matter from getting under the stops and forming guides for the uncut blanks to be moved centrally beneath the dies, and means for adjusting the length of the die operating connecting rods to maintain equal pressure of a predetermined amount on the cutting and creasing devices.

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