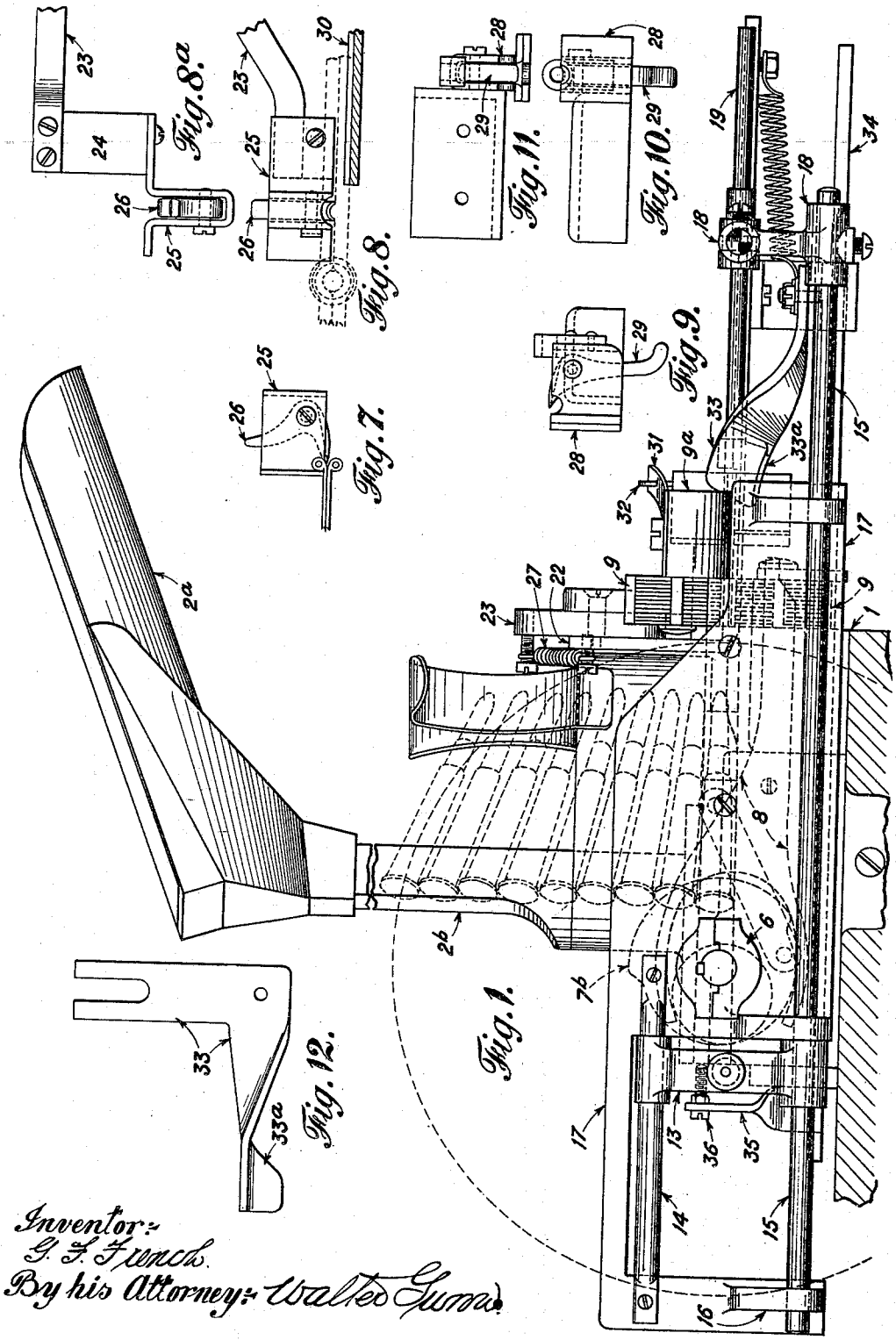
Sept. 6, 1932. G. F. FRENCH 1,876,217

CARTRIDGE BELT FILLING MACHINE

Filed April 30, 1931 4 Sheets-Sheet 1



Inventor:
G. F. French.
By his Attorney: Walter Gunn.

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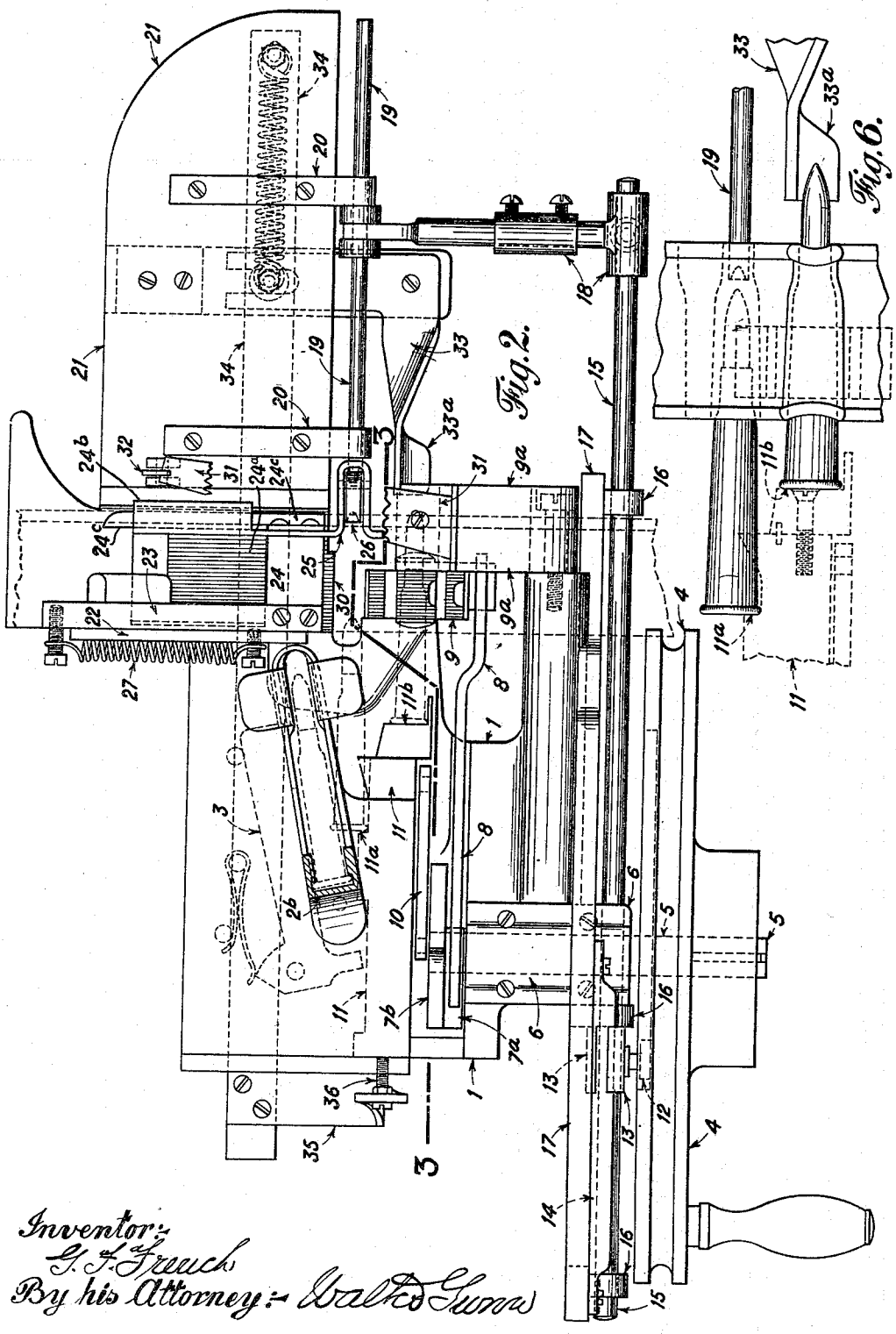
Filed April 30, 1931 4 Sheets-Sheet 2



Inventor:
G. F. French
By his Attorney:- Walter Gunn

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CARTRIDGE BELT FILLING MACHINE

Filed April 30, 1931 4 Sheets-Sheet 3

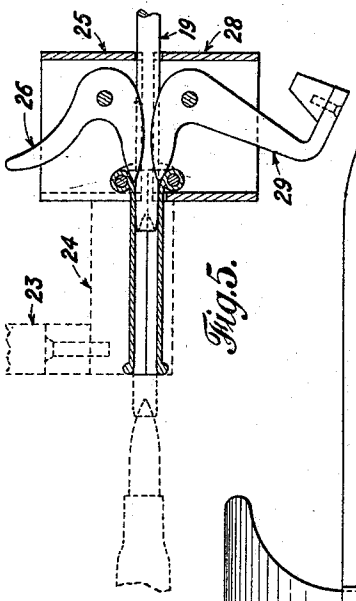

Fig. 5.

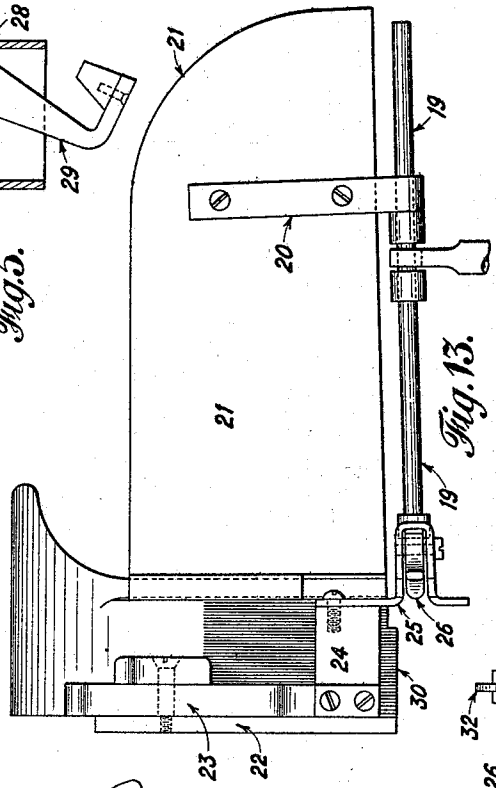

Fig. 13.

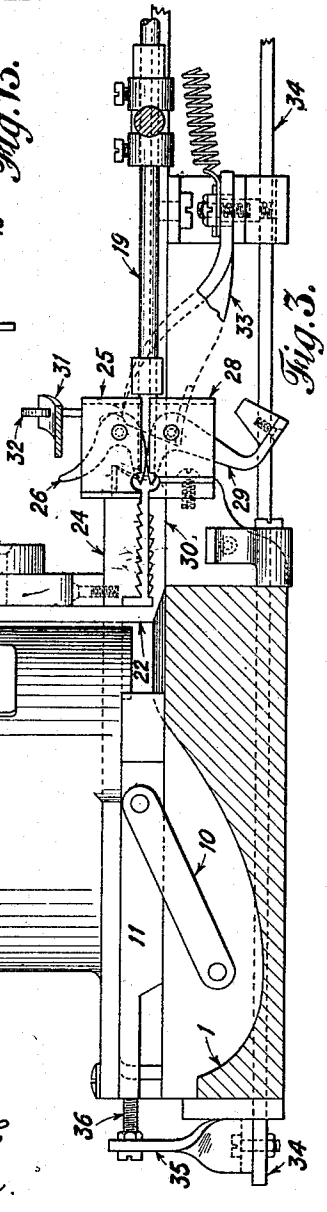

Fig. 3.

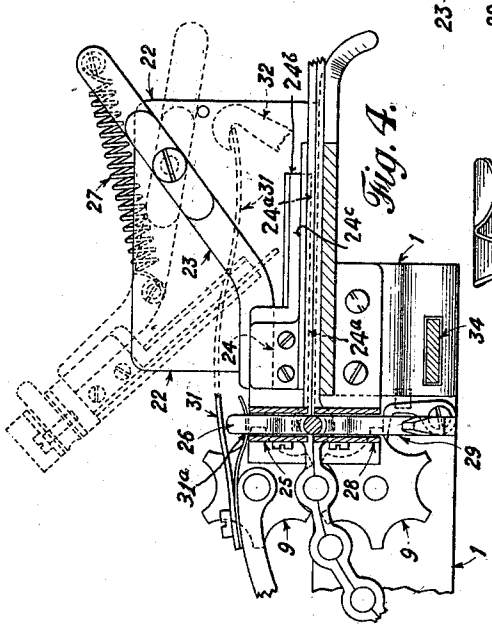

Fig. 4.

Inventor:—
G. F. French
By his Attorney:— Walter Gunn.

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CARTRIDGE BELT FILLING MACHINE

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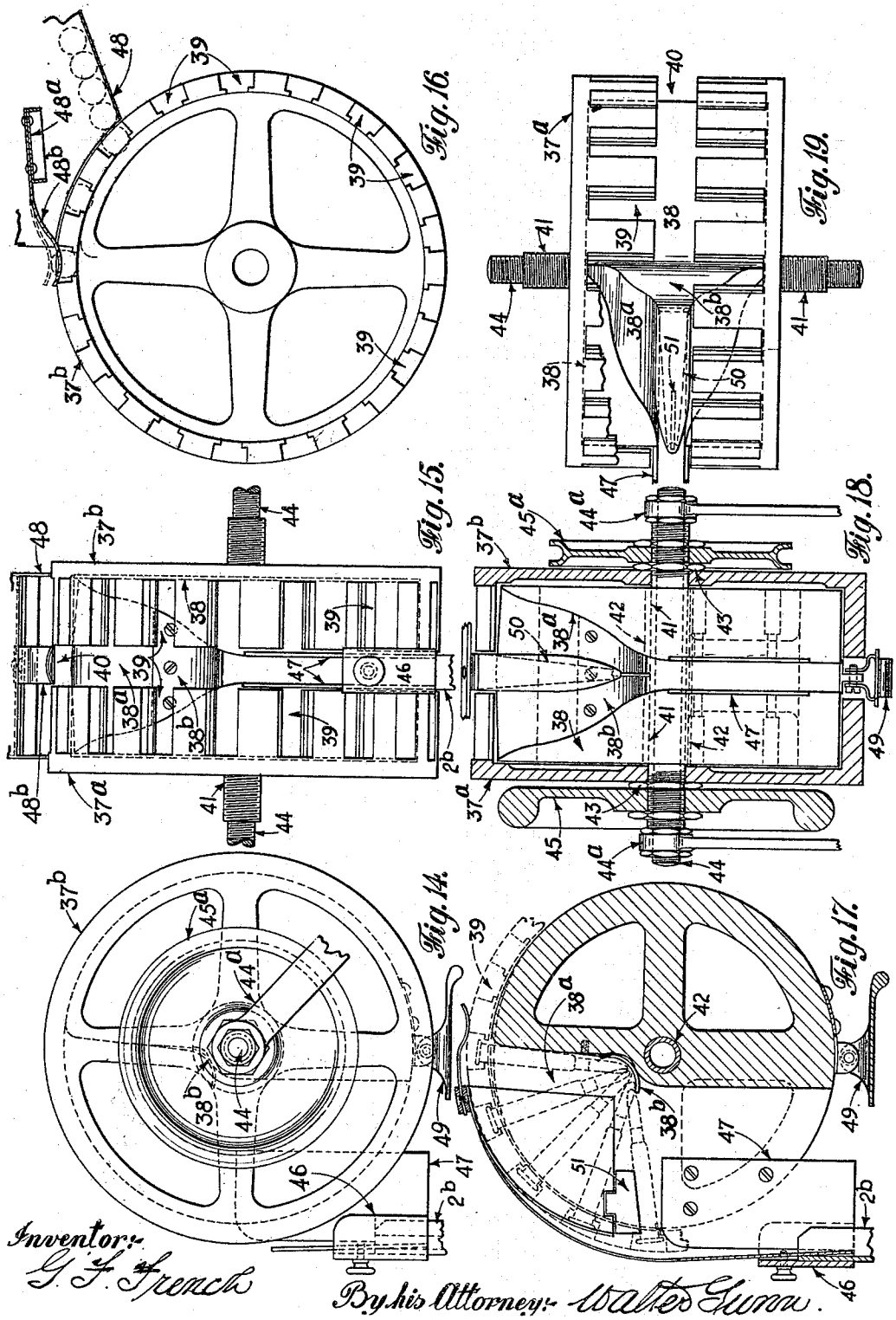

Inventor:-
G. F. French

By his Attorneys- Watts Gunn.

Patented Sept. 6, 1932 1,876,217

UNITED STATES PATENT OFFICE

GEORGE FREDERICK FRENCH, OF MANCHESTER, ENGLAND

CARTRIDGE BELT FILLING MACHINE

Application filed April 30, 1931, Serial No. 534,083, and in Great Britain May 6, 1930.

This invention refers to machines as used for filling cartridge belts, and in particular cartridge belt filling machines of the kind comprising a vertical feed chute, a reciprocating slide below such chute by which successive cartridges are pushed into the pockets of the belt, and notched wheels between which the belt passes and by which it is advanced step by step with the progressive filling of the pockets.

With such type of machine there has been no satisfactory means for opening the entrances of the pockets prior to forcing the cartridges into same, and as a consequence stoppages have been frequent. Further, with the known machine the means used for delivering cartridges to the feed chute are unsatisfactory in that they require the cartridges to be carefully arranged in one direction, if they are all to point in one direction in the feed chute, otherwise, the cartridges become jambed and thus prevented passing into the feed chute.

One of the objects of the invention is to provide means whereby the opening of the entrance of each pocket of the belt will be rendered more positive and reliable than heretofore.

Another object is to provide means for opening the pockets, which at the same time allows for any lag on that edge of the belt away from the edge into which the cartridges enter.

Another object is to feed or guide the belt through the machine with greater certainty, and with less likelihood of the belt pockets failing to register with the opening devices than heretofore.

Another object is to hold the belt firmly in position while a pocket is being opened and a cartridge being forced therein, and to hold the belt with less pressure, but sufficient to keep it in engagement with the guides, while the belt is moving forward.

A further object of the invention is to provide improved means for feeding cartridges to the machine, whereby no matter how the cartridges are placed in the feed hopper, they find their way one by one into the feed chute and to the machine proper with their pointed ends all pointing in the same direction.

A still further object of the invention is an improved general arrangement of the said machine.

According to the invention the machine comprises improved means for opening the pockets of the belt from the end furthest removed from the pusher which forces the cartridges into the belt, and guiding or leading the nose end of the cartridges into the pockets after opening same; improved means for compensating for (or allowing of) any lag on one edge of the belt; improved means for holding the belt against lateral displacement, while the cartridges are being placed in the belt; improved means for applying a stronger pressure upon the belt whilst the pockets are being opened and filled, and a less (but sufficient) pressure while the belt is moving forward, and improved means for delivering the cartridges to a feed chute, the several improvements resulting in a rapid and reliable working of the machine.

The invention will now be described with the aid of the accompanying drawings, in which:—

Fig. 1 illustrates a side elevation of a cartridge belt filling machine embodying the invention, the usual hand wheel for operating the machine being shown dotted in order that the mechanism behind such wheel may be more easily seen.

Fig. 2 illustrates a plan view of the machine.

Fig. 3 illustrates a longitudinal section of the machine on line 3—3 of Fig. 2.

Fig. 4 illustrates a cross section taken through a pocket of a cartridge belt, and a side view of the mechanism used for holding

open the narrower end of the pocket of the belt and admitting a pilot spindle.

Fig. 5 illustrates an edge view of a cartridge belt and a side view of the belt gripping and feeding mechanism shown in Fig. 3.

Fig. 6 illustrates a plan view of a portion of a belt and of two cartridges as they appear during their initial and final insertion into the belt.

Figs. 7 to 11 illustrate details hereinafter described.

Fig. 12 illustrates a plan of a further detail.

Fig. 13 illustrates a plan of a portion of the machine and showing a modification hereinafter described.

Fig. 14 illustrates a side view, and

Fig. 15 a front view of the mechanism for rectifying and feeding the cartridges to the machine.

Fig. 16 illustrates a side view of one half-part of such mechanism.

Fig. 17 illustrates a cross section of the central fixed block of said mechanism.

Fig. 18 illustrates a front view of the inner block and a cross section of the surrounding drum.

Fig. 19 illustrates a plan view of Fig. 16.

Referring to Figs. 1 to 12, the machine comprises the metal base 1, upon which is rigidly mounted the combined hopper 2^a and feed chute 2^b, down which the cartridges are fed by gravity until they enter one by one a swivel member 3, and by such member are moved to a position at right angles to the edge of the cartridge belt. Alongside the said base 1 is the hand wheel 4 by which the machine is worked, the wheel being mounted upon a spindle 5 journaled in a bearing 6 forming part of the base 1, and upon the other end of the spindle is a double disc cam, with one part 7^a of which the forked end of a lever 8 engages, the other end of said lever engaging the lower belt gripping and feeding wheel 9 to rotate same intermittently. The other part 7^b of the cam operates through a link 10, the slide 11, by which the cartridges are pushed into the pockets of the belt, a shoulder 11^a on the slide effecting the initial insertion of the cartridge and a shoulder 11^b effecting the final insertion, see Figs. 2 and 6.

On the rear face of the wheel 4 is a cam groove and engaging such groove is a bowl 12, carried by a cross bar 13 slidable at one end on a fixed rod 14, and at the other end connected to a long slide rod 15, mounted on the lugs 16 of a plate 17 fixed to the base 1.

By means of a bracket 18, one end of the rod 15 is connected to a spindle 19, hereinafter called the pilot rod. Such rod is slidably mounted in brackets 20 fixed to a stationary plate 21, which at one end abuts against the machine base 1 and forms a continuation of the surface over which the cartridge belt moves in passing through the machine.

Hinged to an upright flange 22 is a lever 23, provided at its lower end with a presser block 24 with serrated underface, and a metal plate 25 carrying a pivoted tongue 26, see Figs. 3, 4, 5, 7, 8 and 8*a*. By means of a spring 27 acting on the free end of said lever 23, the presser block 24 is held yieldingly down upon the cartridge belt, the manner of connecting the spring to the lever and to a fixed point, being such as to provide a "toggle" action to hold the presser block 24 and plate 25 raised, or lowered, as desired. As shown in Fig. 5, the presser block 24 may extend over a considerable length of the belt, or as shown in Fig. 8, it may be comparatively short. The presser block 24 has a serrated rearward extension 24*a* one edge of which is flanged upwardly and horizontally at 24*b*, and to the face presented by such upward flange, as also to the front of the plate 25, is a further flange 24*c* which serves as a guide for the upper beaded edge of the belt as the latter passes through the machine.

Below the tongue carrying plate 25 is a further and like plate 28 carrying a further pivoted tongue 29, see Figs. 3 and 4. And below the presser block 24 is a serrated plate 30, over whch the belt travels and by which plate and the block 24, the belt is firmly held against lateral and longitudinal movement during the time a cartridge is being forced in one of its pockets.

The upper feed wheel 9 is carried by a lever bearing 9^a so as to be free to turn up to admit a belt between the wheels, and when lowered to engage the belt, the free end of a spring blade 31 secured to the wheel bearing being caught and held by a hook 32. A further spring blade 31*a*, carried by the same support, bears upon the top of the upper tongue-carrying plate, and holds the same yieldingly against the belt so long as the feed wheels are in the belt-engaging position.

The cartridge belt which the improved machine is chiefly designed to fill, is that having corded edges and in which the edge of the belt furthest from the entrance end of a pocket is of Y section, and in which the larger cords are at such edge.

In proceeding to fill such a belt with cartridges by the improved machine, the belt is placed with its Y edge next the tongues 26, 29, and furthest from the swivel member 3, see Figs. 5 and 6. With the belt thus arranged the curved ends of the tongues 26, 29 project into the V recess formed by the Y section of the belt, and in such position operate in like manner to shoe horns. With the wheel 9 then rotated, the pilot rod 19 pushes its nose end between the said tongues, and separating them, thereby causes them to initially open the pocket. The edges of the

plates 25 lie alongside the beaded edges of the belt, and where the tongues 26, 29 require to engage the belt to open a pocket, they are slightly arched to allow of the opening of the pocket. As the tongues operate they grip or anchor the beaded edges between themselves and the said arched edges of the plates, thereby preventing the walls of the pocket being carried forward or dragged by the pilot rod as it enters the pocket. On the pilot rod continuing to move endwise between the tongues and through the pocket, it eventually meets the point of the cartridge presented to it by the swivel member 3, and pusher 11, whereupon the pilot rod and cartridge move back, the cartridge entering the belt pocket and being guided thereinto by the pilot rod, until it (the cartridge) reaches a position in the pocket about half way through said pocket, see top position in Fig. 6. On the pilot rod moving fully backwards, i. e., clear of the belt, the latter is moved forward by the wheels 9, 9, for a distance equal to the pitch of the wider ends of the pockets. The pilot rod is then again moved forward to again engage the tongues 26, 29 and enters the next pocket to engage the next cartridge, after which it again moves back and with it the new cartridge into the belt. At the same time, the shoulder 11^b of the pusher 11 acts upon the previously half-inserted cartridge to force it home in the belt pocket. In this way the cartridges are continuously fed into the belt.

Owing to the cartridge only entering part way into a pocket, the narrower end of the succeeding pocket lags behind, and to prevent this a compensator may be provided, such compensator consisting of a bell-crank lever 33, which at the free end of one of its arms lies in the path of the bullet ends of the cartridges projecting from the belt, and which when moved about its centre in the direction of the arrow, Fig. 2, presses on the said bullet ends and thereby advances the lagging edge of the belt. Alternatively, instead of compensating for the lag by the lever 33, the pilot rod 19 may be set at an acute angle, see Fig. 13, which can then enter the narrow end of the belt pocket even if slightly out of line with the centre of the wider end, and still meet the nose end of the bullet.

The compensator lever 33, when used, will be operated by a slide bar 34, below the plate 21, and passing through the base 1 where it is provided with a lateral extension 35, carrying a screw 36, the point of which bears against the rear end of the pusher bar 11. To prevent the bullet ends of the cartridges falling away from the end of the lever 33 when engaged thereby the lever has a small horizontal lip or flange 33^a, see Fig. 12.

The presser block 24 is rigidly connected to the lever 23 and the tongue carrying plate 25 is preferably pivoted to the block, see Fig. 8, so that when the upper part of a cartridge belt pocket is raised by the pivot rod 19, the plate 25 will yield upwards without leaving the belt at any point.

Referring now to Figs. 14 to 19, the feeding of the cartridges from the feed hopper 2^a to the feed chute 2^b is effected by means of a longitudinally slotted drum, composed of two-parts, 37^a, 37^b closely fitting and rotatable about a stationary cylindrical block 38. Each part of the drum consists of an end disc and a series of metal bars secured at intervals to the periphery of the disc to produce parallel slots 39, the bars being of such a length that when the two parts of the drum are assembled around the cylindrical block 38, which is slightly wider than the length of the cartridge, they leave a central annular space or slot 40 all round the drum in addition to the slots 39. The bars are of T shape in cross section see Fig. 16 with the wider part next the periphery of the block 38 and the width of the spaces between the wider parts of the bars is rather more than the diameter of a cartridge, just below its end flange so that when a cartridge is not otherwise supported, it will be suspended by its end flange engaging the wider parts of the drum bars.

The two parts 37^a, 37^b of the drum are rotatably connected together, preferably by means of a tube 41, passing through the cylindrical block 38, the drum parts being clamped as between themselves and a spacing tube 42 to the tube 41 by means of nuts 43. The two parts of the drum and the tube 41 are rotatably mounted upon a fixed through spindle 44 journaled in fixed bearings 44^a and furnished at one end with a hand wheel 45, and at the other end with a pulley 45^a.

The cylindrical block 38 is held stationary by a sleeve 46 and plates 47 connected to the feed chute 2^b, the weight of the block being carried mainly by the aforesaid drum spindle 44.

The lower end of an inclined feed hopper 48 lies near to the upper part of the drum, see Fig. 16, so that, on placing a supply of cartridges in the hopper, they will be fed by gravity to the drum.

The cylindrical block 38 is cut away at a point following its highest part, see Fig. 17, to produce a central V-shaped gap 38^a, the narrowest part of the gap coming immediately over the entrance to the feed chute 2^b, while the widest part of the gap lies directly below the uppermost part of the drum.

An inclined plate 48^a and flat spring 48^b lie in the outlet throat of the feed hopper 48, the spring ensuring of the fall of the nose end of the cartridge into the V-shaped gap 38^a of the block 38.

A step 38^b is formed near the centre of

the block 38 on which the nose or bullet end of the cartridge rests whilst its position is being changed from the vertical to the horizontal. And, immediately below the drum is a balanced lever-like plate 49 on to one end of which the bullet end of each cartridge falls and is momentarily delayed in its descent just before the cartridge is about to enter the feed chute 2^b, see Figs. 17 and 18.

Extending into the V-shaped gap 38^a and supported by the feed chute is a tapered segmental plate 50, which serves to prevent the cartridge heads leaving the slots 39 until they are ready to enter the feed chute $2b$, by which time the cartridges are horizontal, with the heads nearest the periphery of the drum as shown dotted in Figs. 17 and 19. Along the lower edge of the segmental plate 50 is a hinged flap 51 of thin sheet metal which further helps to guide the cartridges into the feed chute. In other words, the head of each cartridge as it moves towards the central gap 40 is prevented falling into said gap until as the drum rotates it reaches an almost horizontal position, otherwise, the cartridge would fall vertically into the bottom of the gap 38^a and fail to pass into the feed chute. Further, the hinged flap 51, as a cartridge passes down one side of the plate 50, closes the passage on the other side of the plate, and thereby prevents any two successive cartridges passing down to the chute simultaneously.

The operations of the parts are as follows:—The feed hopper 48 being supplied with cartridges, they gravitate into the nearby slots 39 of the two-part drum facing the open end of the feed hopper, see Fig. 16. The cartridges at this point rest on the inside cylindrical block 38. The two-part drum is then rotated, whereupon the said cartridges are carried round, and the succeeding cartridges fall into the succeeding drum slots 39. As the drum continues to rotate the cartridges come in contact with the flat spring 48^b, so that when they come over the wider part of the gap 38 in the block 38 their heavier bullet ends move down into the gap 38^a, the cartridges then being suspended by their flanged ends and the drum bars, see Fig. 17. As the drum revolves the nose or bullet ends of the cartridges come in contact with a stop plate 38^b fixed near the centre of the block 38, whilst its head is carried around by the cross bars of the drum, the sloping sides of the gap 38^a gradually bringing the cartridges one by one into a vertical plane coincident with that of the feed chute, when the cartridges are horizontal, and at which moment they leave the drum and fall into the feed chute $2b$, the heavier or bullet end of the cartridge being counterbalanced and checked as aforesaid, at the moment of leaving the drum by the plate 49 so that the cartridge shall enter the chute with its axis substantially at right angles to the chute, and thus more readily descend and accumulate, column fashion in the chute.

Owing to the slots in the two-part drum 37^a, 37^b and the plate 50 projecting into the space between the drum bars, the cartridges can be placed anyhow in the feed hopper parallel with the drum, the cartridges righting themselves before they reach the point of delivery. This part of the invention forms a species of "rectifier" and could be used with other constructions of belt filling machines.

To keep the hopper 48 supplied with cartridges an escalator type of conveyor may be used, driven from the wheel 45^a, or otherwise.

Where hand feeding only is required, the "rectifier" need not be used, the ordinary feed hopper being sufficient, although necessitating the placing of the cartridges the right way up.

Although preferring to use the tongues 26, 29, it will be understood that the pilot rod 19 only may be used to open the belt pockets, especially in connection with the presser plates, and the corded edges of the belt, which together help to resist any lateral movement of the belt under the push of the pilot rod.

Whilst chiefly for use in filling cartridge belts having a Y or V edge, the improved machine may be adapted for filling cartridge belts without such edge, the tongues 26, 29 then being adapted to engage the pockets of the belt only when opposite a pocket.

The invention may be used with either the ordinary flanged headed type of cartridge or the grooved headed type of cartridge, in the latter case the drum bars being adapted to engage the groove of the cartridge, which would be acted upon to release the cartridge on its passing around the block.

What I claim is:—

1. A cartridge belt filling machine comprising a pusher for feeding the cartridges to the belt pockets and means for opening each pocket at the narrow end prior to the insertion of the cartridge in the opposite end, said means comprising pivoted tongues and a reciprocatory pilot rod for actuating and cooperating with said tongues.

2. In a cartridge belt filling machine, the provision of a pair of pivoted tongues, one carried by a fixed support adjacent to the edge of the belt with which it is required to engage and the other carried by a support on a lever and presser, the points of the tongues being adapted to engage the entrances of the narrow ends of the belt pockets, and a pilot rod adapted to be moved endwise between the tongues and cause them to act like shoe horns to open the belt pockets as the pockets come opposite the rod, as set forth.

3. In a cartridge belt filling machine, and in means for opening the pockets of the belt to receive the cartridges as claimed in claim 2, a pair of pressers, each having a plate along

one side which extends along one edge slightly beyond the working face of the presser, and in such edge is formed with a slightly arched part to fit across a pocket of the belt, and said edge of the plate, in conjunction with the corded edges of the belt, and the pivoted tongues, serving to grip and firmly hold the said edges of the belt, when the pilot rod is forced between the tongues to open the belt pocket, as set forth.

4. In a cartridge belt filling machine according to claim 1, a presser block carried by a lever, and having a plate bent U-shape to carry a pocket-opening tongue, the plate being pivoted to the block so as to allow of the plate being free to adapt itself to any upward movements of the belt without leaving the belt at any point, as set forth.

5. In a cartridge belt filling machine according to claim 1 a pair of feed wheels for gripping and feeding the belt through the machine step by step, a spring blade for holding the wheels in engagement with the belt, and a further spring blade carried by the same support as the first spring blade and by which the upper tongue carrier is held yieldingly against the belt, as set forth.

6. A cartridge belt filling machine according to claim 1, wherein the pilot rod is slidably mounted in bearings and is adapted to enter each belt pocket from the end opposite to that into which a cartridge enters said pocket, and is also adapted to pass completely through the pocket until it meets the nose of the cartridge, its forward end being recessed or cupped to engage the cartridge nose, and the pilot rod making its return movement simultaneously with the advance of the cartridge, and thereby leading the cartridge into the belt pocket, the pilot rod leaving the cartridge when the latter has entered about two-thirds of the way into the pocket, and wherein feed wheels advance the belt after the pilot rod has left the pocket and the cartridge is driven fully into the belt pocket by the pusher, simultaneously with the insertion of a cartridge into the next succeeding pocket, as set forth.

7. In a cartridge belt filling machine according to claim 1, a wheel with cam groove, a bowl engaging the groove of the wheels, and said bowl carried by a sliding rod which through a bracket, engages the pilot rod, the latter being fitted with collars between which lies the end of the bracket, as set forth.

8. In a cartridge belt filling machine according to claim 1, an upper presser block carried by a lever, and said lever provided with a spring connected at one end to the machine, and at the other end connected to the lever and adapted to hold the lever either raised or lowered, according as the spring lies to right or left of the axis of the lever, as set forth.

9. In a cartridge belt filling machine according to claim 1, an upper presser block with rearward extension, said block and extension having a flange along one edge to act as a guide for the beaded edge of the belt as the latter moves below the presser block, and also to help to resist lateral movement of the belt, as set forth.

10. In a cartridge belt filling machine according to claim 1, a pusher for ramming the cartridges into the belt, means for reciprocating the pilot rod and pusher in sympathy with each other, and a compensator actuated by the same means to advance that edge of the belt furthest from the pusher, as set forth.

11. In a cartridge belt filling machine, a compensator in the form of a horizontally disposed bell-crank lever with one arm extending towards the cartridge belt and having a horizontal shoulder, and said lever moved about its pivot by a sliding bar passing through the base of the machine, the bell-crank lever engaging a pin on said bar by the forked extremity of its arm, and said bar being moved in one direction by a spring, and in the opposite direction by a "pusher" which forces the cartridges into the belt, as set forth.

12. In a cartridge belt filling machine, and in mechanism for automatically arranging the cartridge in the right position for entering the chute, the provision and use of a fixed cylindrical block, with a portion of its periphery cut away to form a V-shaped gap, a two-part rotary drum encircling said block, each part of the drum comprising an end disc and bars, the latter being of T-shape, with the wider part nearest the centre of the drum, and said bars of each part drum producing between them T-shaped grooves, into which a cartridge may fall in either of two positions, head nearest the end disc, or head furthest from the end disc, and on being carried around by the bars until they come over the said gap in the block, remain horizontal, but as soon as the gap is reached their nose ends fall into said gap, and with further movements of the drum are caused gradually to assume a horizontal position, the inclined sides of the gap moving the nose end of the cartridge sideways as the drum bars continue to rotate, and the head of the cartridge finally entering the space between the opposite ends of the drum bars, by which time the cartridge is horizontal and ready to fall into the chute, as set forth.

13. In a cartridge belt filling machine, and in mechanism for automatically arranging the cartridges in the right position for entering the chute, as claimed in claim 12, a central segmental plate within the gap of the stationary block, and having a hinged fin or like plate at its lower horizontal edge, whereby the cartridge cannot enter the space

between the ends of the drum bars until they are almost horizontal and whereby only one cartridge at a time can pass into the chute, as set forth.

14. A cartridge belt filling machine as claimed in claim 1, wherein the pilot rod is set at a slight (acute) angle to its carrier bracket, and thereby adapted to allow of any pocket lag on one edge of the belt, as set forth.

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

GEORGE FREDERICK FRENCH.