

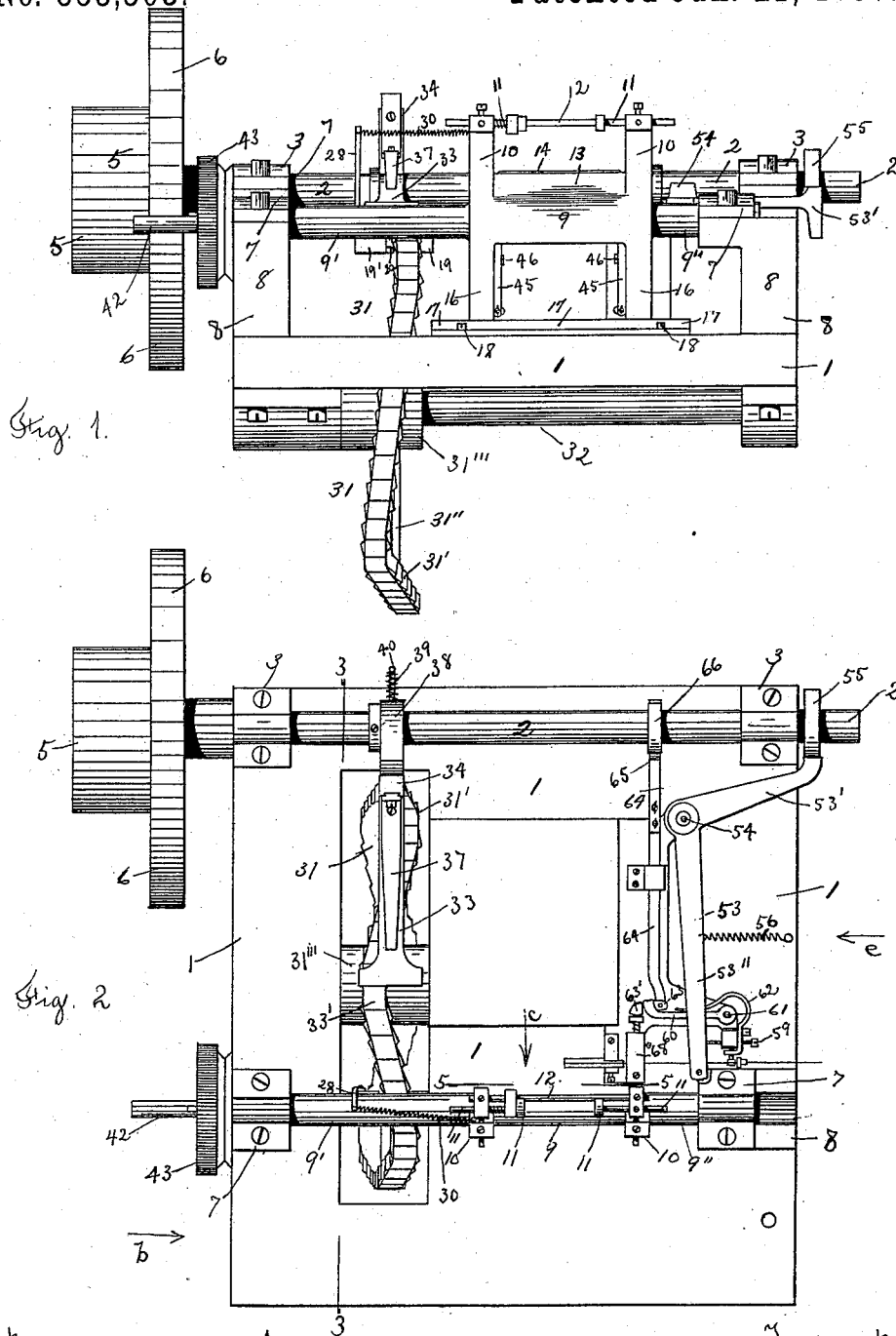
(No Model.)

3 Sheets—Sheet 1.

N. C. ESTES.  
CARD SETTING MACHINE.

No. 553,303.

Patented Jan. 21, 1896.



Witnesses  
*A. C. Whiting*  
*M. J. Galvin*

By his Attorney

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Inventor  
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(No Model.)

3 Sheets—Sheet 2.

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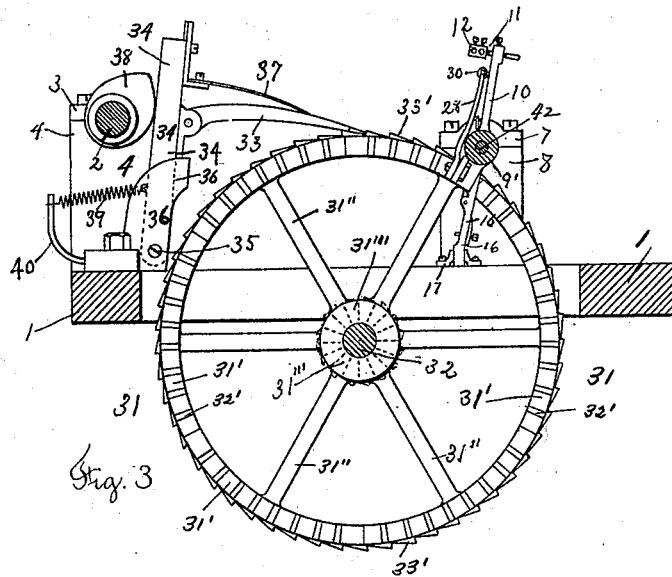


Fig. 3

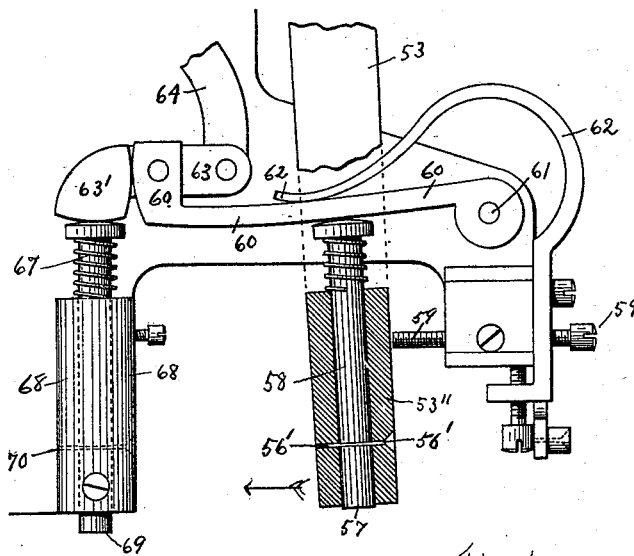


Fig. 4.

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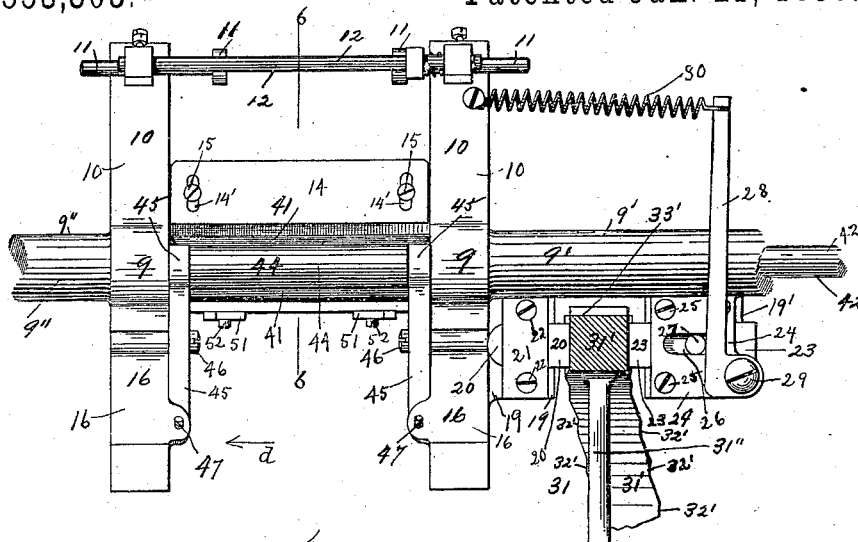


Fig. 5

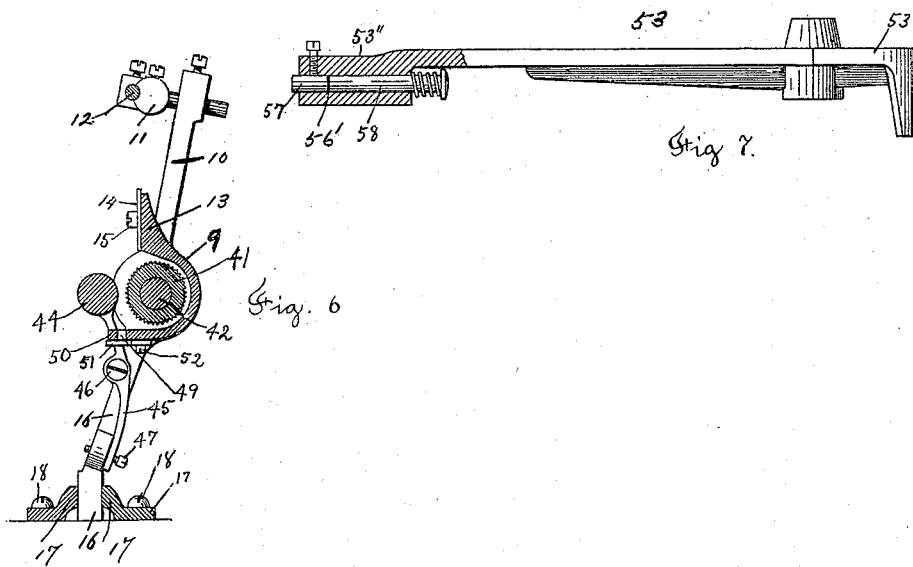


Fig. 7

Fig. 6

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# UNITED STATES PATENT OFFICE.

NATHAN C. ESTES, OF LEICESTER, ASSIGNOR TO THE AMERICAN CARD CLOTHING COMPANY, OF WORCESTER, MASSACHUSETTS.

## CARD-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 553,303, dated January 21, 1896.

Application filed April 22, 1895. Serial No. 542,679. (No model.)

*To all whom it may concern:*

Be it known that I, NATHAN C. ESTES, a citizen of the United States, residing at Leicester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Card-Setting Machines, of which the following is a specification.

My invention relates to card-setting machines used in the manufacture of card-clothing; and the object of my invention is to improve upon the construction of card-setting machines as now ordinarily made, and more particularly to improve upon the construction and manner of operating the carriage for carrying the fillet, in which are inserted the wires, and also the mechanism for drawing the wire into the machine.

My invention consists in certain novel features of construction and operation of the carriage for carrying the fillet, and of the mechanism for communicating to said carriage a lateral endwise intermittent motion, and also of the mechanism for drawing the wire into the machine, as will be hereinafter fully described, and the nature thereof indicated by the claims.

I have only shown in the drawings my improvements in card-setting machines. The other parts of the machine, which may all be of the ordinary and well-known construction, and form no part of my invention, are left off for the sake of clearness, and in order to simplify the description.

Referring to the drawings, Figure 1 is a front view of the bed of the machine, and my improvements applied thereto, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is a plan view of the parts shown in Fig. 1. Fig. 3 is a cross-section on line 3 3, Fig. 2, looking in the direction of arrow *b*, same figure. Fig. 4 is, on an enlarged scale, a detail, partly in section, of the wire gripping and drawing-in mechanism. Fig. 5 is, on an enlarged scale, a rear view of the laterally-moving carriage, taken at line 5 5, Fig. 2, looking in the direction of arrow *c*, same figure. Fig. 6 is a vertical cross-section on line 6 6, Fig. 5, looking in the direction of arrow *d*, same figure; and Fig. 7 is, on an enlarged scale, a side or edge view of the lever which draws

in the wire, looking in the direction of arrow *e*, Fig. 2.

In the accompanying drawings, 1 is the bed of the machine on which are supported the several parts of my improvements. 2 is the driving-shaft, mounted in bearings 3 on the upper ends of stands 4 on the rear of the bed. The shaft 2 has a driving-pulley 5 on one end thereof, and a balance-wheel 6. On the front part of the bed 1, mounted in bearings 7 on stands 8, are the arbors 9' and 9'' of the laterally-moving carriage 9, which carries the fillet in which are inserted the wires.

The carriage 9 has the two upwardly-extending posts 10, in the upper ends of which are mounted adjustable rods 11, between which the fillet extends in the ordinary way, and also the rod 12 which extends back of the fillet. The carriage 9 has in this instance the upwardly-projecting part 13 extending between the posts 10, to the back of which is adjustably secured the rest 14, by screws 15 extending through vertical slots 14' in said rest 14. (See Fig. 5.) The rest 14 consists of a piece of sheet-steel with a hardened edge, over which the wire is bent after it is thrust through the fillet.

Extending down from the carriage 9 are two legs 16, the lower ends of which extend into the slide or way 17, secured to the bed 1 by screws 18 and adjustable back and forth on the bed to vary the inclination of the back-rest 14, to obtain any desired angle for the wire to enter through the leather.

Connected with one arbor of the carriage 9—in this instance, the longer arbor, 9'—is a clamp device for connecting the arbor to the cam-wheel, which communicates endwise or lateral motion to said carriage.

The clamp connection between the carriage carrying the fillet and its operating cam-wheel, which prevents any endwise motion of said carriage, except that which is communicated to it by the operating cam-wheel, and holds said carriage rigidly while the wire is being inserted in the fillet, is an important feature of my improvements.

The clamp connection between the arbor of the movable carriage and its operating cam-wheel consists in this instance of a plate or piece of hardened steel 20, forming the

stationary lip or jaw of the clamp, and which in this instance is secured in the downward projection 19 on the arbor 9' by a plate 21 and screws 22, as shown in Fig. 5, and a second plate 23 forming the movable lip or jaw of the clamp, which in this instance is mounted and slides laterally in an arm 19', extending downwardly from the arbor 9', being retained in place by a plate 24 secured by screws 25 to the arm 19', and provided with a horizontal slot 26, into which a pin 27 on the movable plate 23 extends.

The rim of the cam-wheel which communicates motion to the carriage 9 extends between the jaws 20 and 23 of the clamp device on the arbor 9', and the movable jaw 23 is held in engagement with the cam-rim by a lever 28, pivoted on a screw 29 on the plate 24, and pressed against the pin 26 on said jaw 23 by a spring 30, secured to the upper end of the lever 28 and to the post 10. (See Fig. 5.)

To communicate a lateral or endwise motion to the carriage 9, I employ in this instance a combined cam-wheel and ratchet-wheel 31 of the shape and construction shown in the drawings. The cam-wheel 31 is fast on a shaft 32 located below the bed 1 and consists in this instance of an outer rim 31' divided into six cam-sections, each one of which will move the carriage 9 the full distance it travels in one direction. The cam-rim 31' is connected by spokes 31'' with the hub 31''', as shown in Fig. 3.

The rim 31' of the cam 31 is provided on each side with inclined surfaces, as shown, on which the ends of the lips 20 and 23 of the clamp travel to communicate endwise motion to the carriage 9, and after each movement of the carriage the lips rest upon the steps 32' (see Figs 3 and 5) at the end of the inclined surface, which steps are in a plane at right angles to the plane of movement of the carriage, so that the carriage will be held perfectly motionless while the wire is being inserted in the fillet. The cam-wheel 31 is operated in this instance by a pawl 33, which engages ratchet-teeth 33' on the periphery of said cam 31, to communicate a regular intermittent motion to said cam, and through said cam a regular intermittent endwise motion to the carriage 9, first in one direction and then in the other. The length of travel of the carriage is regulated by the length of the cam-sections (shown in Fig. 2) on the cam, according to the width of the fillet in which the wires are set.

By providing the periphery of the cam 31 with ratchet-teeth, I operate said cam by the actuating-pawl 33 without any intermediate mechanism. Said pawl 33 is pivoted on a swinging arm 34, pivotally hung at its lower end on a screw 35 secured in a stand 36 extending up from the bed 1. A spring 37, secured at one end to the upper end of the swinging arm 34, bears at its free end on the pawl 33 to hold the same in engagement with the teeth 33' on the cam 31. Motion is communicated to

the swinging arm 34 by a cam 38 fast on the driving-shaft 2. A spring 39, secured at one end to the swinging arm 34 and at its other end to the pin 40, acts to keep the swinging arm 34 in engagement with its operating-cam 38. It will thus be seen that very direct motion is communicated to the cam 31, and through said cam to the carriage 9 carrying the fillet, so that said carriage will have a very accurate motion, and the clamp connection between the cam and the carriage will hold the carriage very accurately and prevent any endwise motion when the cam stops and the wire is inserted in the fillet; and further, in my construction of the carriage carrying the fillet, and the mechanism for operating the same, I raise the bearing or point of contact between the carriage and its operating cam and thus bring the top of the back-rest, over which the wire is bent, nearer and almost in a line with said bearing, and thus overcome any vibration or movement of the rest independent of its movement with the carriage, so that the teeth are set much more accurately than in the old style machine, in which the distance between the top of the rest and the bearing or point of contact of the operating-cam of the carriage is much greater.

I prefer to arrange the ratchet-teeth on the periphery of the cam-rim 31, as shown in the drawings and above described, but, if preferred, the ratchet-teeth may be located on the periphery of the hub 31''', or on the end thereof, as indicated by dotted lines in Fig. 3, and driven by a pawl properly arranged and driven from the shaft 2.

It will be understood that the fillet into which the wires are to be inserted has to be fed upwardly at regular intervals, and in order to bring the several parts of my mechanisms into more compact form, and to occupy less space, I preferably core or cut out the carriage 9 between the posts 10 and the legs 16, just below the rests 14, as shown in Fig. 6, and arrange in said cut-out portion the toothed feed-roll 41, which is fast on a shaft 42, which in this instance extends loosely within one end of one arbor of the traveling carriage 9 and is adapted to have a regular intermittent rotary motion by means of a ratchet-wheel 43 splined to one end of the shaft 42 of the feed-roll 41, (see Fig. 2,) so that said shaft 42 may have a lateral or endwise motion with the carriage 9. The ratchet 43 is operated by a pawl. (Not shown.) In connection with the feed-roll 41 I provide a friction-roll 44, mounted to turn in the upper ends of arms 45, pivotally attached by screws 46 to the inner edges of the legs 16 of the carriage 9, as shown in Figs. 5 and 6. The lower ends of the arms 45 are adjustably secured by screws 47 to the legs 16, to vary the pressure of the roll 44 on the fillet passing between said roll 44 and the roll 41.

I may provide a longitudinal slot 49 in a rearwardly-extending lip 50 on the carriage 9, as shown in Fig. 6, through which slot the fillet passes up and extends between the rolls

41 and 44. The width of said slot 49 may be regulated by the plates 51, adjustably secured to the lower part of the carriage by screws 52. (See Figs. 5 and 6.)

5 I will now describe my improved construction of the lever which operates to draw the wire into the machine preparatory to its being bent and cut and inserted into the fillet.

In my improved construction of said lever  
10 I provide in the end of said lever a device for gripping the wire to draw the wire into the machine when the lever 53 is moved in one direction and to release the wire when the lever is moved in the opposite direction  
15 preparatory to again gripping and drawing in the wire instead of employing a separate slide carrying the gripping device, which slide is operated by said lever, as is customary.

20 Referring to Figs. 2 and 7, the lever 53 referred to is made of angular shape and is pivoted on a pin 54. The rear arm 53' of the lever 53 is adapted to be engaged at its end by a cam 55 on the driving-shaft 2, which  
25 cam communicates a positive motion to said lever in one direction to draw in the wire, and a spring 56, attached at one end to the arm 53'' of the lever and at its other end to the stationary part of the machine—in this  
30 instance to the bed—acts to move the lever 53 in the opposite direction. The arm 53'' of the lever 53 is made as shown in Figs. 4 and 7. The outer end of the arm 53'' is provided with a downwardly-projecting portion  
35 in which is arranged the mechanism for gripping the wire, which passes through a hole 56' in said downward-projecting portion and is gripped between a stationary pin 57, secured in the end of said arm, and a longitudinal-moving-spring-actuated pin 58, supported  
40 in the downwardly-projecting portion at the end of said arm.

When the arm 53 is moved back by the spring 56 into the position shown in Figs. 2  
45 and 4, it will engage a set-screw 59 to limit said motion. As the cam 55 revolves and engages the opposite end of the lever 53 to move it on its pivot-point 54 to draw in the wire, the outer end of the spring-actuated pin 58 will engage with a lever 60, pivoted at 61, and which is actuated by a spring  
50 62 to move in the free end of the lever 60, which is pivoted to a link 63, connected to one end of a sliding arm 64, provided with a strap 65 at its other end, into which extends  
55 a cam 66 on the drive-shaft 2 to communicate a regular reciprocating motion to said slide 64. The other end of the link 63 carries a head 63' thereon adapted to engage the  
60 head of a spring-actuated pin 67, which has a longitudinal motion in a stationary part 68, and acts in connection with a stationary pin 69 in the outer end of said part 68 to grip and hold the wire, passing through a hole 70  
65 in said part upon the return movement of the lever 53 in the ordinary way. It will thus be seen that as the lever 53 moves in

the direction of the arrow, Fig. 4, to draw in the wire the lever 60, engaging the head of the pin 58 and actuated by the spring 62, will  
70 force inwardly said pin 58 to grip the wire, and at the same time the sliding rod 64 moving inwardly will move the link 63 and release the pressure of the end 63' thereof on the pin 67 to allow the wire to pass freely  
75 through the hole 70 in the arm 68. After the lever 53 has reached the end of its travel the sliding rod 64 moves in the opposite direction and draws back the lever 60 to release the pressure thereof on the pin 58 and  
80 allow said pin to release the wire preparatory to the lever 53 returning to its first position. At the same time pressure is communicated to the pin 67 by the end 63' of the link 63 to grip and hold the wire upon the  
85 return movement of the lever 53.

By arranging the wire-gripping device in the end of the lever 53 I simplify the number of parts and do away with the transverse slide ordinarily employed to grip the wire. 90

The advantages of my improvements in card-setting machines will be readily appreciated by those skilled in the art. They simplify the construction of the machine and reduce the cost thereof, and the working parts  
95 are more on the outside of the machine, so that they are easily accessible to the operator, thereby saving much time and enabling one operator to care for a greater number of machines; and further the point of contact of the operating-cam is just below the plane of  
100 travel of the spindles or arbors of the carriage, while the top of the back-rest is just above the plane of travel of said spindles or arbors, and therefore the teeth must be inserted with great  
105 accuracy, which is very important.

It will be understood that the details of construction of the several parts of my improvements may be varied, if desired. The shaft of the feed-roll may be located under the  
110 carriage arbors, if preferred.

The operating cam-wheel 31 may have a continuous rotary motion, if preferred, instead of an intermittent motion, as above described, a continuous rotary motion being communicated to said wheel from the driving-shaft 2,  
115 through a system of gears, in any well-known way.

Having thus described my invention, what I claim as new, and desire to secure by Letters  
120 Patent, is—

1. In a card setting machine, a laterally moving carriage, having the back rest attached thereto, and provided with an arbor extending out from each side thereof and  
125 mounted loosely in bearings, and adapted to have an endwise motion therein, and also a rotary motion, to adjust the angle of inclination of the back rest, for the purpose stated, substantially as set forth. 130

2. In a card setting machine, a laterally moving carriage, having the back rest attached thereto, and provided with an arbor extending out from each side thereof, and

- mounted loosely in bearings, and adapted to have an endwise motion therein; and also a rotary motion, said carriage having legs extending into a track or way, which track may be adjusted to rotate the arbors of the carriage in their bearings, and vary the angle of inclination of the back rest, substantially as set forth.
3. In a card setting machine, a carriage having the back rest attached thereto, and adapted to have an endwise motion and also a rotary motion, to adjust the angle of inclination of said back rest, substantially as set forth.
4. In a card setting machine, the combination with a laterally moving carriage carrying the back rest with the top thereof extending in a plane just above the plane of travel of the supporting spindles or arbors of said carriage, of an operating cam having its contact point with the carriage spindle or arbor just below the plane of travel of said arbor, substantially as set forth.
5. In a card setting machine, the combination with a laterally moving carriage carrying the back rest with the top thereof extending in a plane just above the plane of travel of the supporting spindles or arbors of said carriage, of an operating cam having its contact point with the carriage spindle or arbor just below the plane of travel of said arbor, and provided with ratchet teeth integral therewith, and adapted to be engaged by an actuating pawl, substantially as set forth.
6. In a card setting machine, the combination with a laterally moving carriage, of a cam wheel for communicating lateral motion to said carriage, said cam wheel provided with ratchet teeth integral therewith which are engaged by an actuating pawl, substantially as set forth.
7. In a card setting machine, the combination with a laterally moving carriage, of a cam wheel for communicating lateral motion to said carriage, said cam wheel provided with ratchet teeth on its periphery integral therewith which are engaged by an actuating pawl, substantially as set forth.
8. A cam surface having ratchet teeth on its periphery integral therewith, said teeth following the shape of the cam, so that each successive tooth will occupy a different position relatively to a plane at right angles to the axis of said cam surface, substantially as set forth.
9. The combination with a cam surface, having ratchet teeth on its periphery integral therewith, said teeth following the shape of the cam, so that each successive tooth will occupy a different position relatively to a plane at right angles to the axis of said cam surface, of an actuating pawl, having a broad end to engage the ratchet teeth in their varying positions, substantially as set forth.
10. A cam wheel, having ratchet teeth on its periphery integral therewith, and extending in a zig zag line, and each successive tooth occupying a different position relative to a plane at right angles to the axis of said cam wheel, substantially as set forth.
11. In a card setting machine, the combination with the arbor or spindle of the laterally moving carriage, of a shaft extending within said arbor, and a toothed feed roll fast on said shaft, and located within the carriage, below the back rest, substantially as set forth.
12. In a card setting machine, the combination with the arbor or spindle of the laterally moving carriage, of a shaft extending within said arbor, and a toothed feed roll fast on said shaft, and located within the carriage, and a ratchet wheel for communicating motion to said shaft, and mounted thereon so that said shaft may have an endwise motion with the carriage, substantially as set forth.
13. The combination with the hollow arbor of the laterally moving carriage carrying the fillet, of a shaft extending in said hollow arbor, and having a rotary motion therein, and a longitudinal motion therewith, substantially as set forth.
14. In a card setting machine, the combination with the lever which operates to draw the wire into the machine, of the pinch pins located in the end of the lever, and means for operating said pins to cause them to grip, and to release the wire, substantially as set forth.

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