

F. C. FRANCISCO.
CORE MAKING MACHINE.
APPLICATION FILED NOV. 16, 1908.

927,848.

Patented July 13, 1909.
2 SHEETS—SHEET 1.

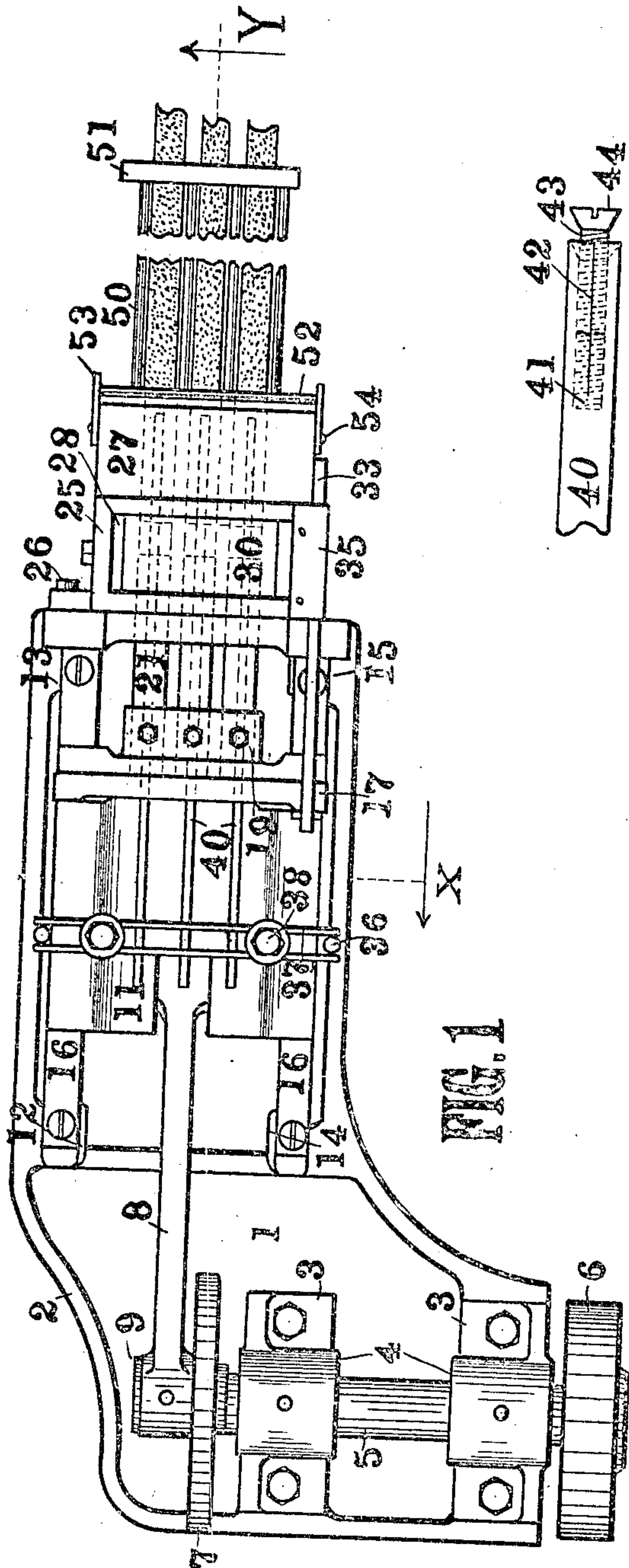


FIG. 1

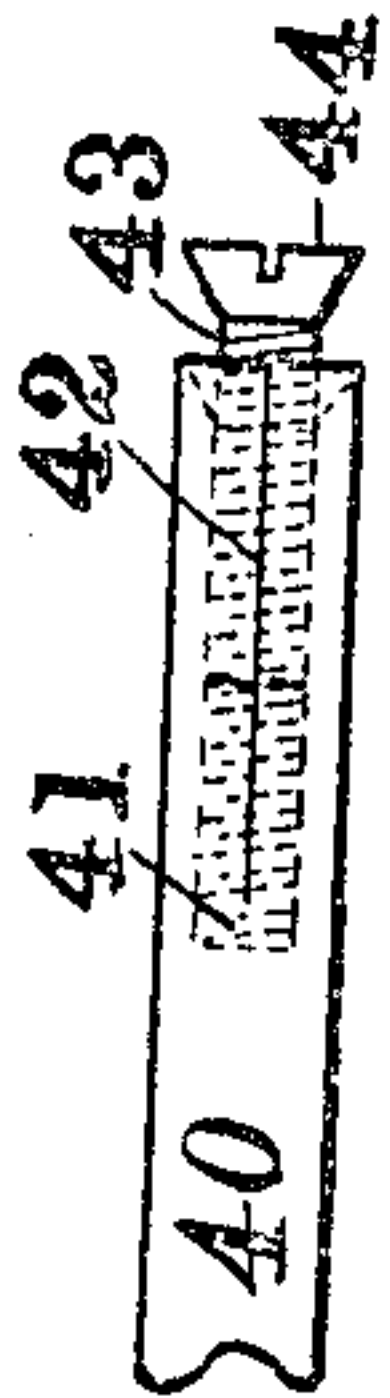


FIG. 3

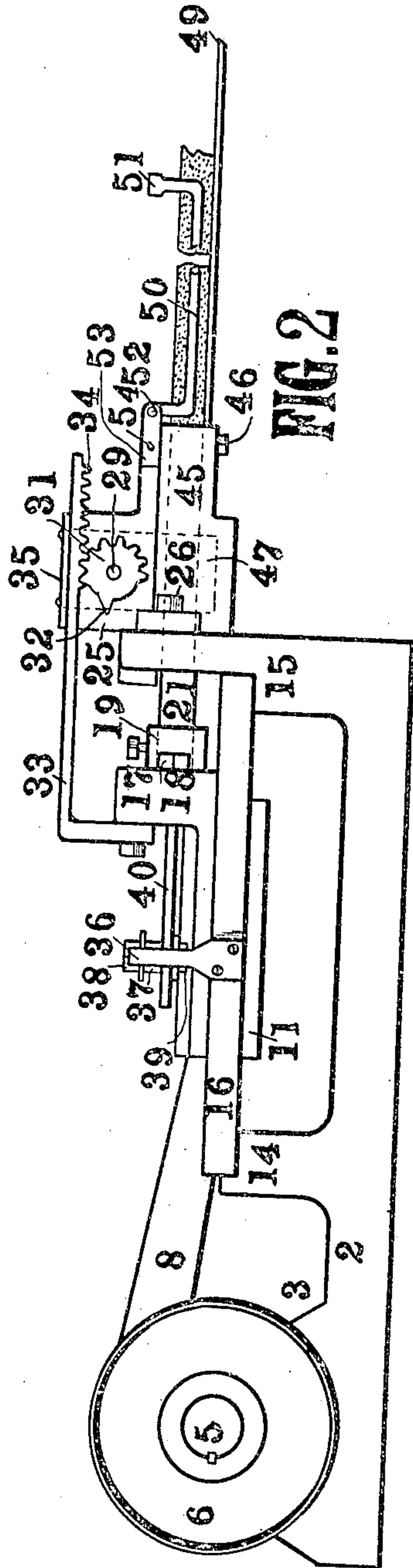


FIG. 2

WITNESSES

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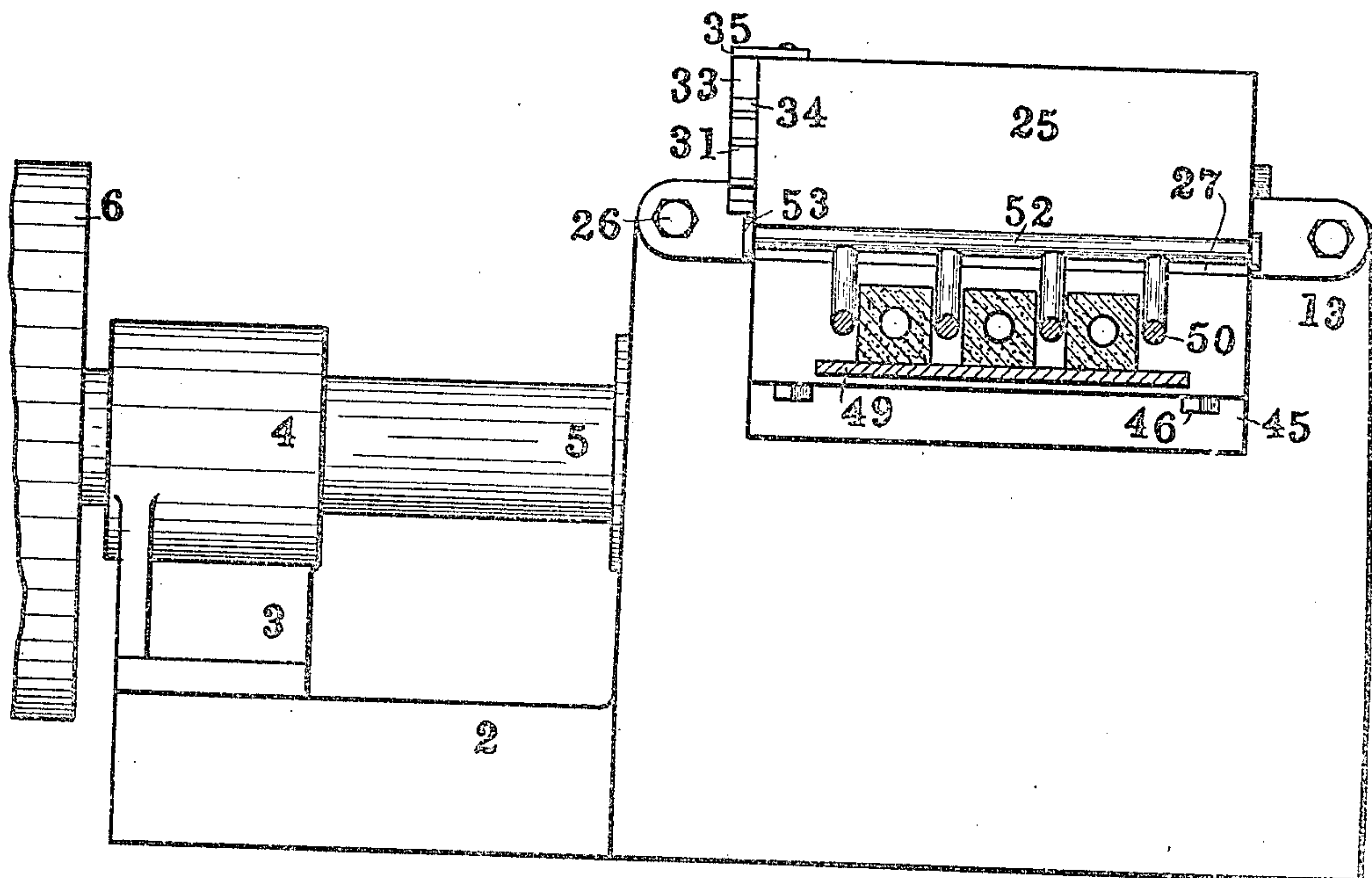


FIG. 4

FIG. 5

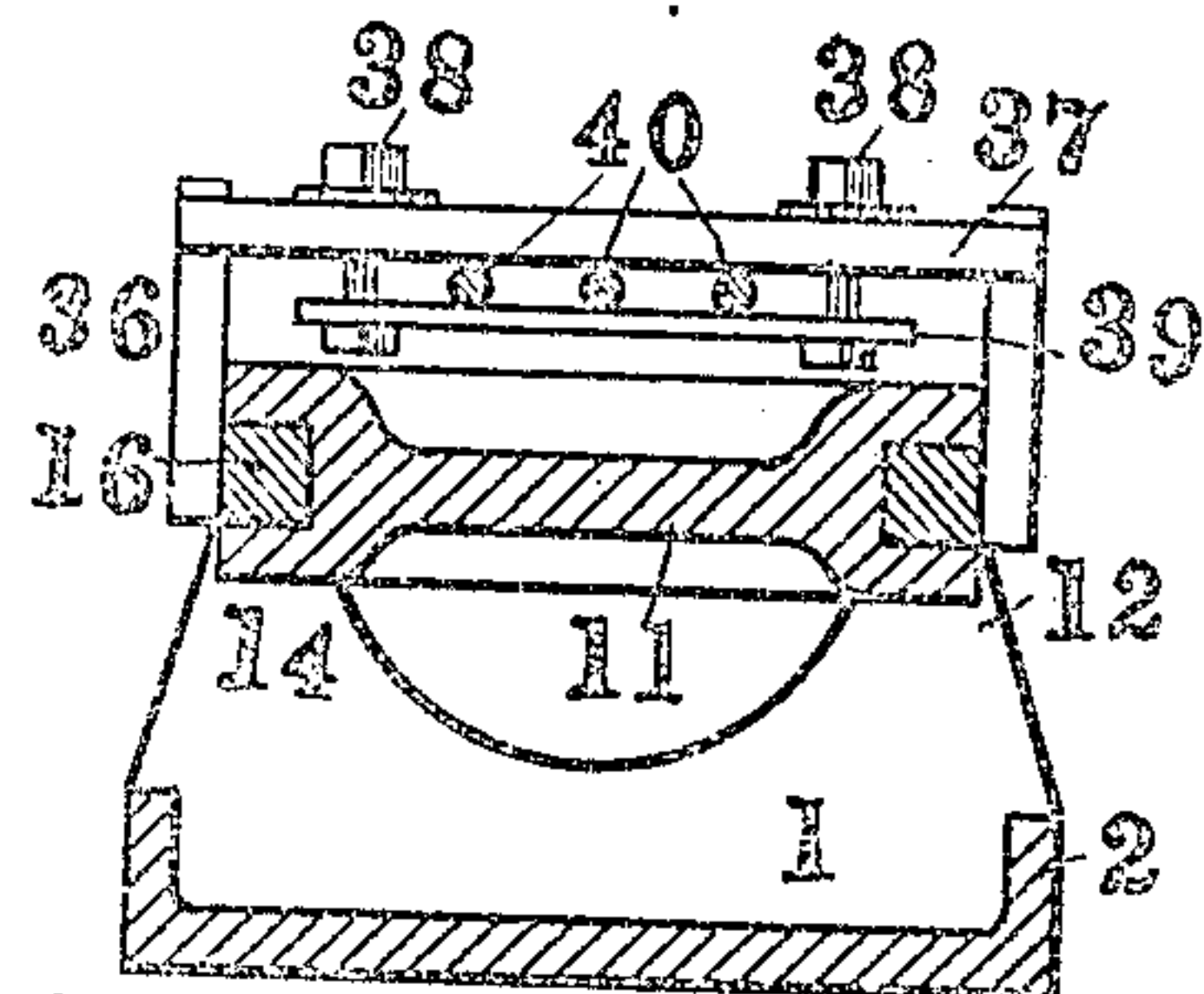
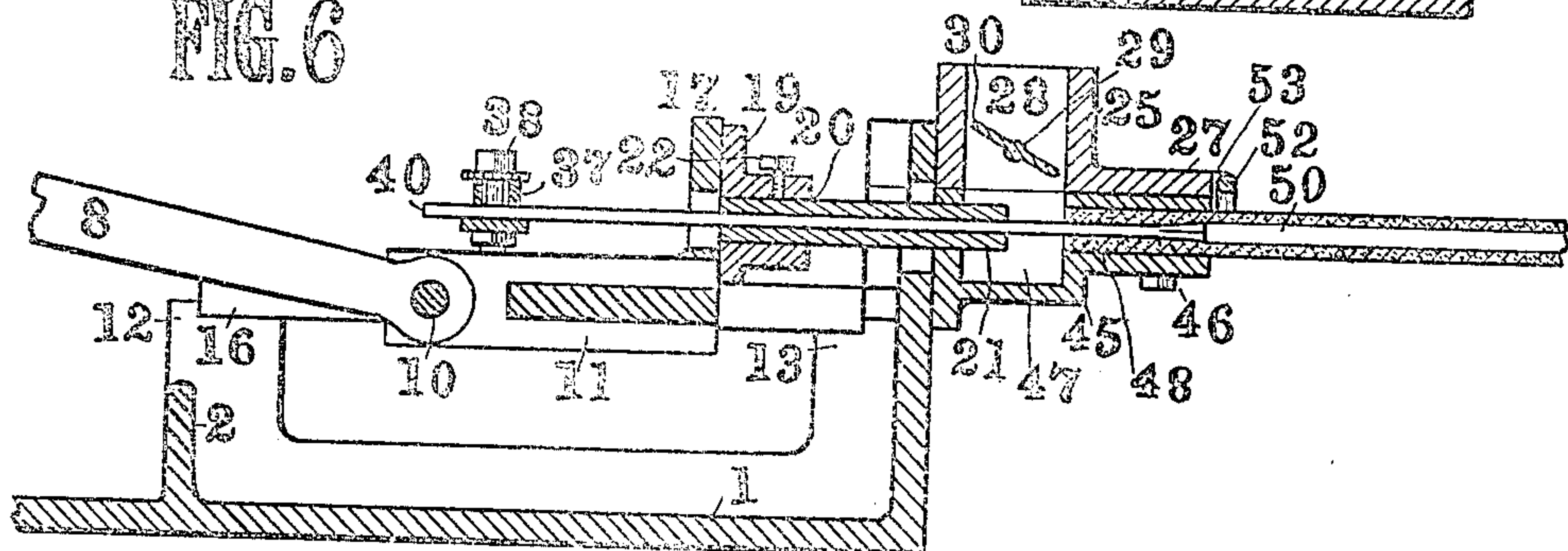


FIG. 6



WITNESSES

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CORE-MAKING MACHINE.

No. 927,848.

Specification of Letters Patent.

Patented July 13, 1909.

Application filed November 16, 1908. Serial No. 462,838.

To all whom it may concern:

Be it known that I, FRED C. FRANCISCO, a citizen of the United States, residing at Cuyahoga Falls, in the county of Summit and State of Ohio, have invented new and useful Improvements in Core-Making Machines, of which the following is a specification.

This invention relates to machines for manufacturing cores for metallic castings and the primary object thereof is to provide a machine which will form cores in continuous lengths of any desired cross sectional configuration, complete, ready for the baking oven.

A further object is to so construct the device that in the formation of cores suitable vent-opening may be provided therein to permit the escape of gases generated by the molten metal contained in the mold in which the cores are employed.

A further object is to provide the device with novel means for feeding the sand to the core-forming mechanism thereof, so constructed that it will hold the same in proper position to be acted upon by the plunger by which the cores are formed.

A further object of the invention is to provide suitable means for increasing the density of the product of the device by retarding the free escape thereof from the dies in which they are formed and a still further object is to provide a suitable rack for holding cores constructed with an angular cross-sectional configuration in such a manner that the corner edges thereof are not injured by the supporting medium onto which they are discharged.

With the foregoing and other objects in view, the invention consists in the novel construction, combination and arrangement of parts constituting the invention to be hereinafter referred to and illustrated in the accompanying drawings which form a part hereof wherein is shown the preferred embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In the drawings, in which similar reference numerals indicate like parts in the different figures, Figure 1 is a plan. Fig. 2 is a view in side elevation looking from the bottom of Fig. 1. Fig. 3 is a view in side elevation of the end of a vent wire embodying my inven-

tion for increasing the density of the core. Fig. 4 is a view in front elevation of the device shown in Fig. 1, looking from the right thereof. Fig. 5 is a sectional view on line X of Fig. 1; and, Fig. 6 is a sectional view on line Y of Fig. 1.

Referring to the drawings in detail, 1 denotes a base provided with an upwardly-extending marginal flange 2. Mounted on the base 1 are a pair of upwardly-extending brackets 3 provided at their upper ends with journal bearings 4 in which is mounted a rotatable shaft 5 having on one end thereof a pulley 6 designed to receive a belt by which motion is communicated to the shaft. To the opposite end of the shaft 5 is fixedly-secured a crank 7 provided with an ordinary wrist-pin on which is journaled one end of a connecting rod 8 held against lateral movement thereon by means of a head 9. The opposite end of the connecting rod 8 is pivotally-mounted on a shaft 10 in a carriage 11. The base 1 is also provided with a plurality of upwardly-extending integral posts 12, 13, 14 and 15 arranged in pairs on opposite sides thereof. Extending between the posts 12 and 13 and also between the posts 14 and 15 are guide bars 16 parallel with each other and constituting ways on which the carriage 11 is adapted to slide. The carriage 11 has a rabbet or longitudinal groove cut in both side edges thereof to receive the bars 16, whereby said carriage is mounted for reciprocal movement thereon. The carriage 11 is also provided with an upwardly-extending flange 17 to which is secured by means of bolts 18 a member 19 provided with a plurality of openings 20 adapted to receive the rear ends of plungers 21 adjustably secured therein by means of set screws 22.

Secured to the outer face of the posts 12 and 15 of the base 1 by means of bolts 26 is a hopper 25 provided with a horizontally-extending flange 27. The hopper 25 is preferably provided with an opening 28 extending vertically therethrough into which the material to form the cores is placed. Mounted in suitable apertures in the lateral walls of the hopper 25 is a transversely-extending horizontal shaft 29, mounted on which within the hopper is a rotatable gate 30. This shaft 29 also bears on one end thereof outside of the hopper 25 a fixed member 31 provided with gear teeth on a portion of its outer periphery and further provided with an enlarged projecting stop 32. Secured to the flange por-

tion 17 of the carriage 11 is an arm 33 the outer end of which is provided with gear teeth 34 on its under face arranged to intermesh with the teeth on the member 31. Secured to the upper face of the hopper 25 is a guide plate 35 arranged to engage the upper face of the arm 33 and hold it in engaging relation with the teeth on the member 31.

Secured to the outer face of the guide bars 16 are a pair of upwardly-extending posts 36 adapted to constitute guides for a pair of vertically-movable cross bars 37 which are held from lateral movement thereby. Extending downwardly between the cross bars 37 are a plurality of bolts 38 the lower ends of which are adapted to sustain a cross bar 39 held approximately parallel with the bars 37. The bars 37 and 39 are adapted to constitute clamping means for adjustably holding the rear ends of vent-forming wires 40 which extend through the flange 17 of the carriage and through suitable openings in the plungers 21 adjustably held in the member 19 and projecting forwardly therefrom. These vent-forming wires 40 are preferably cylindrical irrespective of the exterior conformation which is to be imparted to the core itself, for the reason that the only function performed by the openings formed thereby is to permit the ready drying thereof and to allow the escape of the gases due to the molding of metal. I preferably provide the outer ends of these vent-forming wires 40 with a threaded recess 41 having a beveled opening and a plurality of inwardly-extending cuts 42. Mounted in the threaded recess 41 of each of the wires 40 is a screw 43 with a conically-formed head 44 which when screwed to place will force the portions of the ends of the wire 40 between the cuts 42 outwardly to enlarge the ends thereof, for a purpose to be later described.

Detachably secured to the under face of the forwardly-extending flange 27 by means of bolts 46 is a die 45 having a recess 47 corresponding in contour to the opening 28 of the hopper and forming substantially a continuation thereof. The die 45 is provided with one or more openings 48 arranged in alignment with and adapted to receive the plungers 21 and also adapted to receive the material driven forward by said plungers in the process of forming a core.

If it is desired to form a core having a cylindrical or curvilinearly-formed surface a suitable receiving table is placed in front of the die 45 onto which the cores may slide and this receiving table is preferably provided with rounded corrugations into which the completed cores are received and guided as they issue from the die. If the cores to be formed are square or have an angular configuration, the receiving table 49 is formed as shown in the drawings with a flat upper face and in order to guide the cores on such a table suitable means must be employed which

will not injure the corner edges of the cores as they issue from the device and hence guiding means which engage the cores at some point between the corners thereof must necessarily be employed and a guide of this character is shown in connection with the device and it consists of parallel rods 50 the outer ends of which are upturned and united to a cross bar 51 so that the cores in issuing from the device will pass between and be guided by the spaced rods 50 and under the outer cross bar 51. The inner ends of the rods 50 are united to a second cross bar 52, the ends of which are pivotally-mounted in suitable apertures in plates 53 detachably-secured to the sides of the flange 27 by means of hold-fast devices 54.

The operation of the device is as follows: Power being communicated by means of a belt or otherwise to the pulley 6, a simultaneous rotation of the shaft 5 is produced, causing a reciprocal movement of the connecting rod 8 and a corresponding shiftable movement of the carriage 11 carrying the plungers 21. This movement of the carriage 11 causes the forward ends of the plungers 21 to reciprocate through the recess 47 of the die 45 and from thence into the die openings 48 in said last named member. The movement of the carriage 11 is such that the plungers 21 never completely leave the recess 47 and when drawn backward to their fullest extent their front faces will be approximately flush with the rear inner face of said recess. Material for making cores is constantly fed into the hopper 25 and is from thence driven by the successive action of the plungers 21 into the die openings 48 in the member 45 from whence it escapes or is driven in a continuous uninterrupted stream, being packed tightly together within the die openings by the action of the plunger. If the die openings in the member 45 are angular in cross section, a guiding device such as is shown in the drawings for directing the issuing cores therefrom is employed and when a sufficient length of core has been fed over the surface of the receiving table 49 the guide is raised or swung upwardly on its pivoting supports 53 and the sections of core are severed close to the forward end of the die by means of a proper tool and are then removed to a suitable drying oven, after which the guide is restored to its former position.

Experience has demonstrated that in the molding of metal, various materials for the manufacture of cores are necessarily employed and as these differ greatly with respect to their inherent adhesive qualities, greater force is required for forming a core from one composition than would be required for forming a core from another composition. For instance, it has been found that some materials are so low in adhesive

quality that the frictional engagement of the core, while being formed, against the inner surface of the die does not offer enough resistance to the passage thereof to enable the material to be packed into a self-sustaining mass by the action of the plungers and hence other means must be employed to cause increased resistance to the passage of the core through the die which will retard the progressive movement thereof so that the action of the plungers in driving the mass forward in the die will compact it with sufficient force to unite it into a homogeneous mass capable of being subsequently handled without disintegration. The means which I consider best for this purpose is illustrated in Fig. 3 and is accomplished by spreading the ends of the vent wires 40 by turning the screws 43 until the conical heads 44 thereof engage the inner beveled edges of the recesses 41 sufficiently to spread the split ends of the wire apart and enlarge the diameter thereof, thereby increasing the normal resistance to the passage of material through the die and increasing the compacting action of the plungers 21. It will be further noted that if the enlarged end of a vent-forming wire is positioned near the outlet of the die, the greatest possible resistance will be imposed on the issuing core, but if it is moved inwardly away from the outlet, the resistance to the passage of material through the die is reduced, thereby giving considerable adjustability with respect to the resistance to be imparted to the passage of material therethrough. It will be further apparent that the position of the plungers in the member 19 may be varied so that the plungers may project a greater distance into the die openings in the member 41 when used in connection with one kind of material than for others, thereby making the operation of the plungers adjustable with respect to the quality of material to be employed in the device.

Experience has further demonstrated that some materials for the manufacture of cores are fed with greater ease than others and in some cases the feeding of material of which the cores are manufactured is attended with considerable difficulty to insure that a sufficient quantity of the same is deposited in the recess 47, to receive the action of the plungers 21. In order to effectually feed the material into a position to be acted upon by the plungers 21 and also hold the same firmly against being driven upwardly into the hopper instead of into the die openings, the gate 30 is employed and its operation is as follows: As the plungers are withdrawn from the recess 47 through the medium of the carriage 11, the outer end of the arm 33, which is provided with the gear teeth 34, will engage the teeth on the member 31 and cause it to rotate the gate 30 to a substantially ver-

tical position, thereby allowing the material for the core to pass on either side thereof into the recess 47. This movement or partial rotation of the gate 30 also serves to loosen any clogged material existing in the hopper, which then freely passes into said recess. As the carriage 11 makes its return stroke, the engagement between the teeth 34 with the teeth on the member 31 will partially swing the gate 30 into substantially a horizontal position and also swing the stop 32 upward toward the under face of the bar 33 and as soon as the teeth on the bar 33 have passed from engaging relation with the teeth on the member 31, the stop 32 will engage the under face of the bar 33 and prevent further rotary movement of the shaft 29, thereby holding the gate 30 immovable in a horizontal position, after which the balance of the bar 33 will slip over or along the upper face of the stop 32 freely, without further rotation of the shaft 29. The gate 30 when in a horizontal position closes the recess 47 and prevents the forcing upward of the material contained therein by the action of the plungers, thus enabling the plungers to perform their functions of driving the material into the die openings much more effectually than would be possible if the gate 30 was not employed. It will be apparent that at each movement of the carriage 11 the gate 30 is given a semi-rotation to permit the feed of the material to the recess 47 and is again closed on the return stroke of the carriage to close the recess, for the purpose just described.

What I claim and desire to secure by Letters Patent, is:—

1. A device for manufacturing cores comprising a base, a hopper mounted thereon provided with a die having a core-forming opening, guide bars supported by said base, a reciprocally-movable carriage on said guide bars, a plunger mounted on said carriage adapted to enter and compact material within said core-forming opening, a vent-forming wire extending through said plunger and into said core-forming opening and means for expanding the free end of said wire.

2. A device for manufacturing cores comprising a base, a hopper adapted to receive material for making cores mounted on said base provided with a die having a core-forming opening, guide bars supported by said base, a reciprocally movable carriage mounted on said guide bars, a plunger mounted on said carriage adapted to compact material within said core-forming opening, a vent-forming wire extending through said plunger and into the opening in said die, means for expanding the free end of said wire for increasing the resistance to the passage of a core through said opening and means for adjustably supporting said wire

whereby the longitudinal position thereof with respect to said opening may be varied.

3. A device for manufacturing cores comprising a base, a hopper adapted to receive
5 material for manufacturing cores mounted thereon provided with a die having a core-forming opening, guide bars supported by said base, a reciprocally-movable carriage mounted on said guide bars, a plunger
10 mounted on said carriage adapted to compact material within said core-forming opening, a rotatable gate mounted in said hopper adapted to close the outlet thereof and means mounted on said carriage for imparting a ro-
15 tary movement to said gate.

4. A device for manufacturing cores comprising a base, a hopper adapted to receive material for the making of cores mounted thereon, a die united with said hopper pro-
20 vided with a core-forming opening, guide bars supported by said base, a reciprocally-movable carriage mounted on said guide bars, a plunger mounted on said carriage adapted to compact material within said
25 core-forming opening and a guiding member pivotally-secured to said device comprising spaced rods adapted to direct the movement of a core issuing from said core-forming opening.

30 5. A device of the class described comprising in combination a base provided with upwardly-extending posts, parallel guide bars mounted on said posts, a hopper mounted on one end of said base, a die provided with a
35 core-forming opening adapted to receive a plunger secured to the lower face of said hopper, a reciprocally-movable carriage mounted on said guide bars, a member provided with an aperture arranged to enter said core-
40 forming opening, a pair of upwardly-extending posts suitably-mounted, a vertically-shiftable, horizontal clamping device extended between said last-named posts and guided thereby, a vent-forming wire held by
45 said clamping device extended through said plunger and into the opening in said die, means for expanding the extended end of said wire and means for reciprocating said carriage.

50 6. A device of the class described comprising in combination a base provided with upwardly-extending posts, parallel guide bars mounted on said posts, a device for re-
55 ceiving material for cores secured to one end of said base, said device provided with a core-forming opening adapted to receive a plunger, a reciprocally-movable carriage mounted on said guide bars, a member provided with an aperture secured to said carriage, a plun-
60 ger secured in said aperture arranged to enter said core-forming opening, two posts suitably mounted, a vertically-shiftable, horizontal clamping device extended between said last named posts and guided thereby, a vent-
65 forming wire held by said clamping device

extending through said plunger and into said core-forming opening, means capable of adjustment for expanding the end of said wire and means for reciprocating said carriage.

7. A device of the class described com- 70
prising in combination a base provided with upwardly-extending posts, parallel guide bars mounted on said posts, a device for re-
ceiving material for cores secured to one end of said base, said device provided with a core- 75
forming opening adapted to receive a plunger, a rotatable gate mounted in said device, a reciprocally-movable carriage mounted on said guide bars, a member provided with an aperture secured to the front end of said car- 80
riage, means connected with said carriage for causing a partial rotation of said gate, a plunger secured in said aperture arranged to enter said core-forming opening, a pair of up-
wardly-extending posts suitably mounted, a 85
vertically - shiftable, horizontal clamping means extended between said latter posts and guided thereby, a vent-forming wire held by said clamping means extending
through said plunger and into said core- 90
forming opening and means for reciprocating said carriage.

8. A device of the class described comprising in combination a base provided with
95 upwardly-extending posts, parallel guide bars mounted in said posts, a device for receiving material for cores secured to one end of said base, said device provided with a core-forming opening, a pivoted guide se-
cured to said device for controlling the move- 100
ment of said cores issuing from said opening, a reciprocally-movable carriage mounted on said guide bars, a member provided with an aperture secured to the front end of said car-
riage, a plunger secured in said aperture ar- 105
ranged to enter said core-forming opening, a pair of upwardly-extending fixed posts suitably-mounted, a vertically-shiftable, horizontal clamping device mounted between said
last-named posts and guided thereby, a vent- 110
forming wire held by said clamping device extending through said plunger and into the core-forming opening and means for reciprocating said carriage.

9. A device of the class described com- 115
prising in combination a base provided with upwardly-extending posts, parallel guide bars mounted on said posts, a device for re-
ceiving material for cores secured to one end of said base, said device provided with a 120
core-forming opening adapted to receive a plunger, a guiding member pivotally-secured to said device comprising spaced rods adapted to direct the movement of a core issuing
from said opening, a reciprocal carriage 125
mounted on said guide bars, a member provided with an aperture secured to the front end of said carriage, a plunger secured in said aperture arranged to enter said core-forming
opening, a pair of upwardly-extending fixed 130

posts suitably mounted, a vertically-shift-
able horizontal clamping device extended be-
tween said last-named posts and guided
thereby, a vent-forming wire held by said
5 clamping device extending through said
plunger and into said core-forming opening
and means for reciprocating said carriage.

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit-
nesses.

FRED C. FRANCISCO.

Witnesses:

C. E. HUMPHREY,

A. E. KLING.