No. 648,037. Patented Apr. 24, 1900.

C. LEFFLER.

CAN SEAMING MACHINE.

(Application filed Aug. 19, 1899.)

(No Model.) 4 Sheets—Sheet 1.

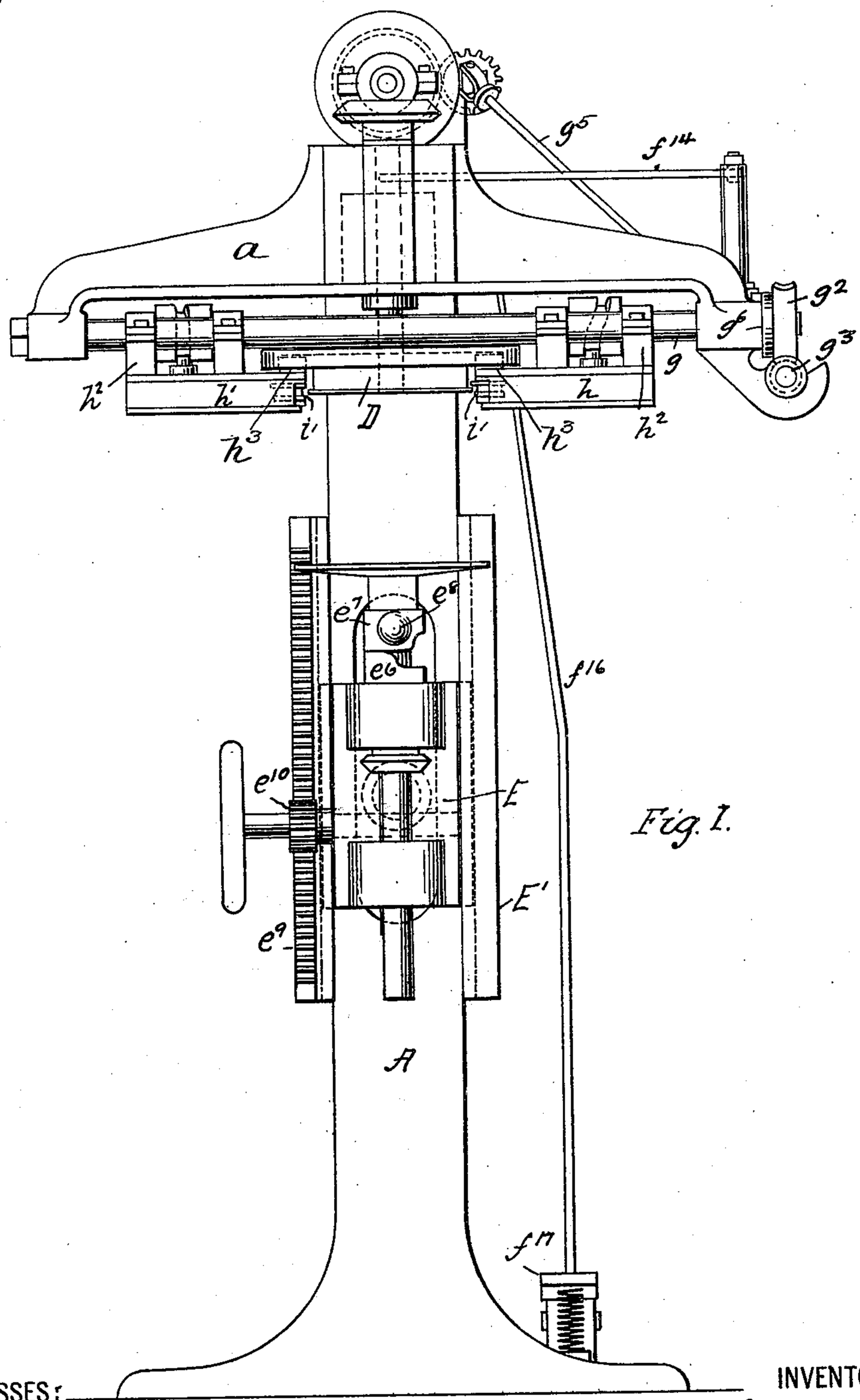

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

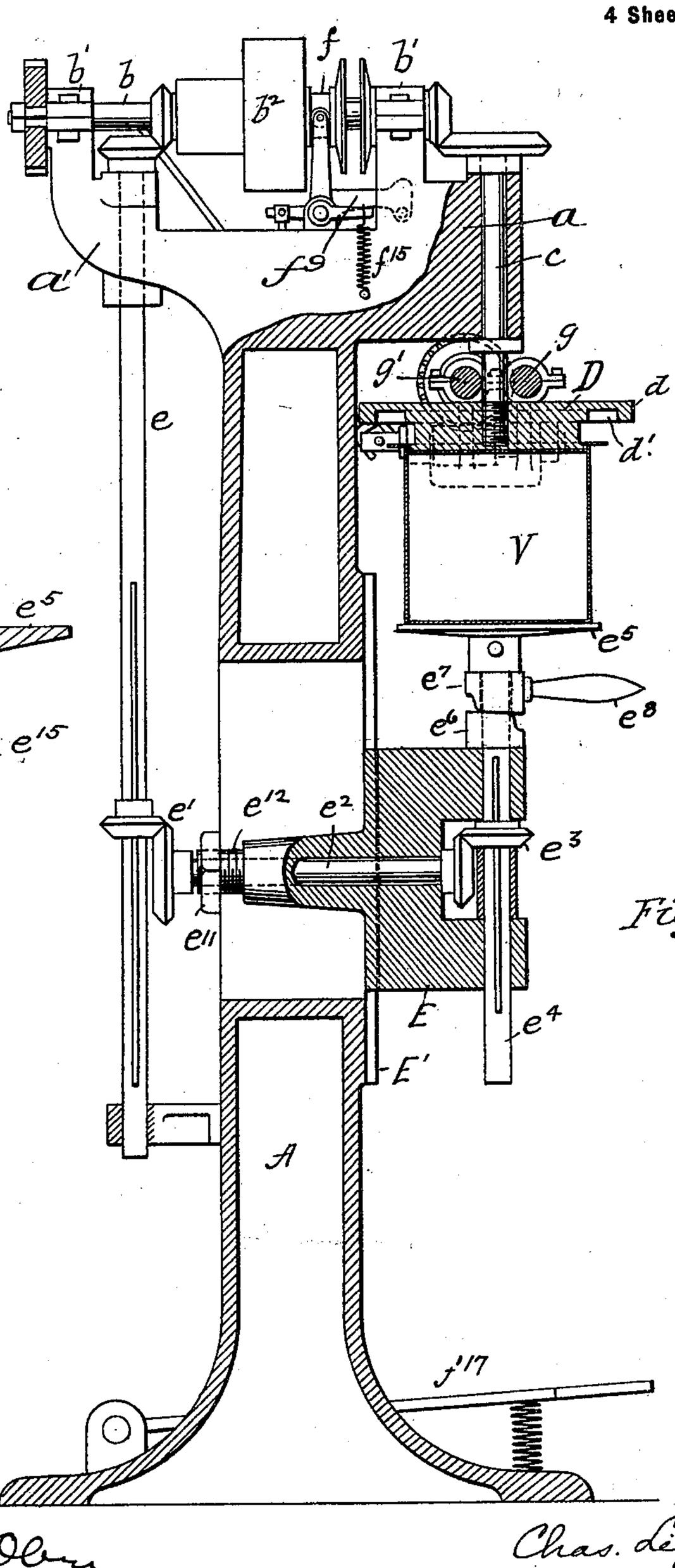

Fig. 12.

Fig. 2.

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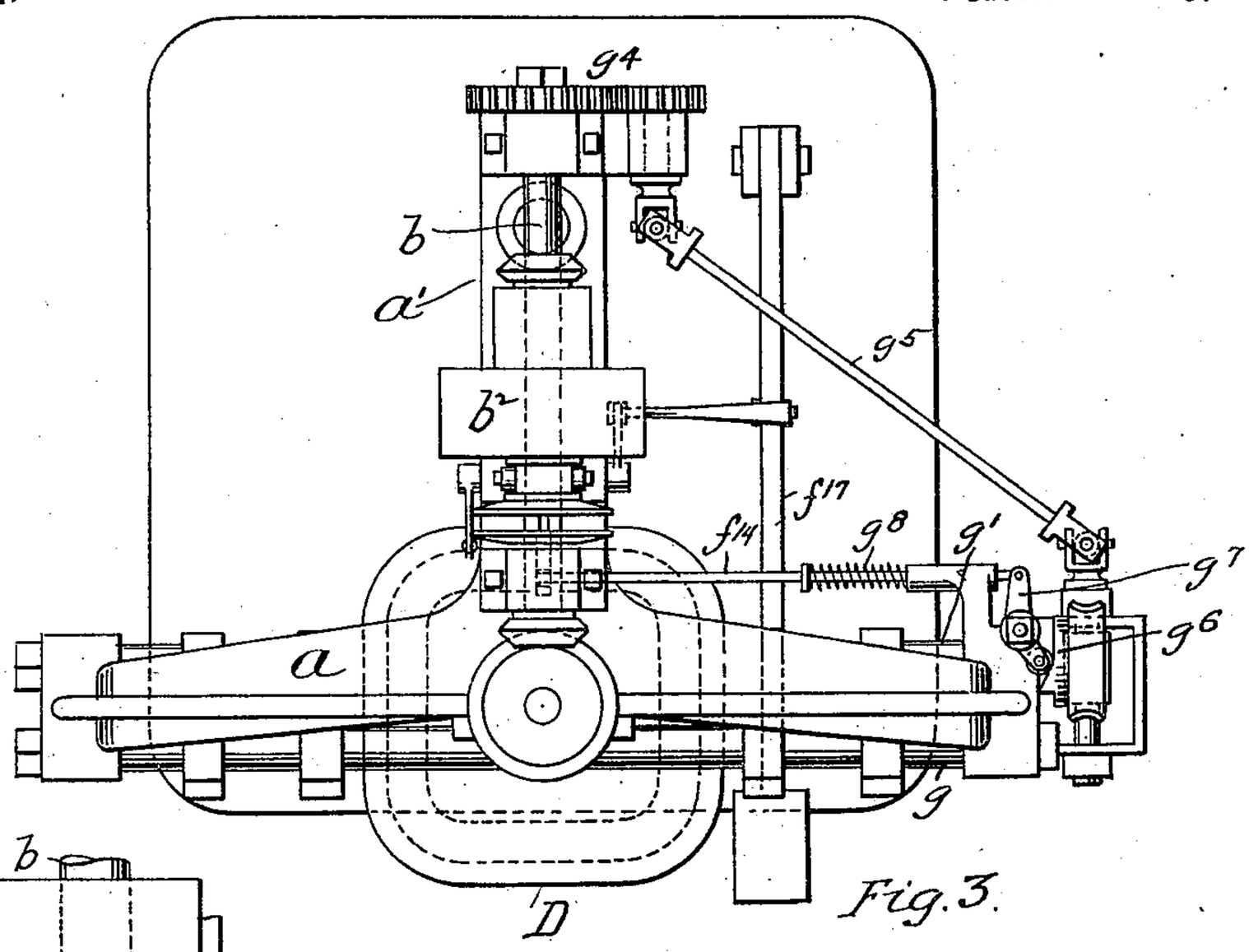


Fig. 3.

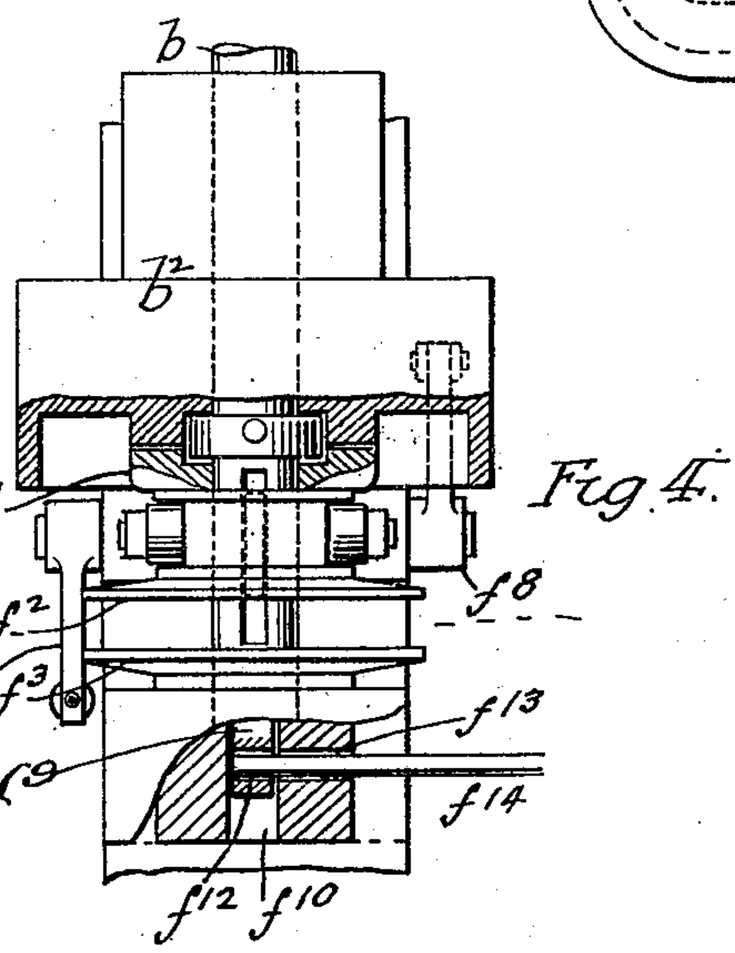


Fig. 4.

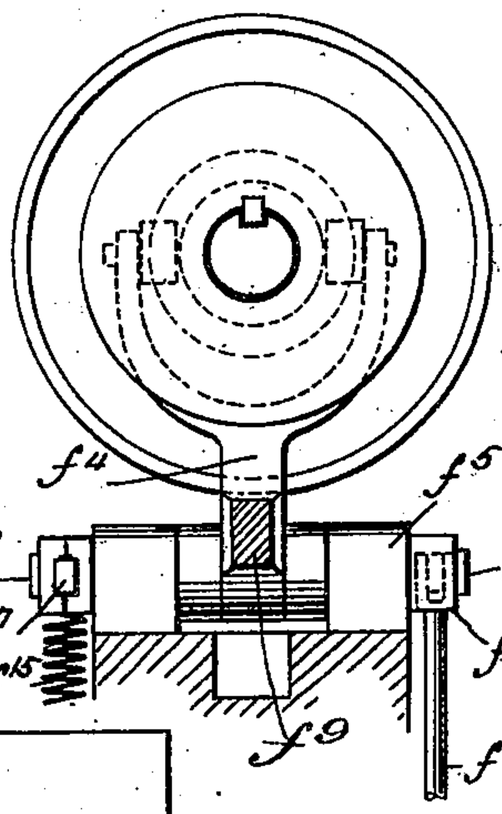
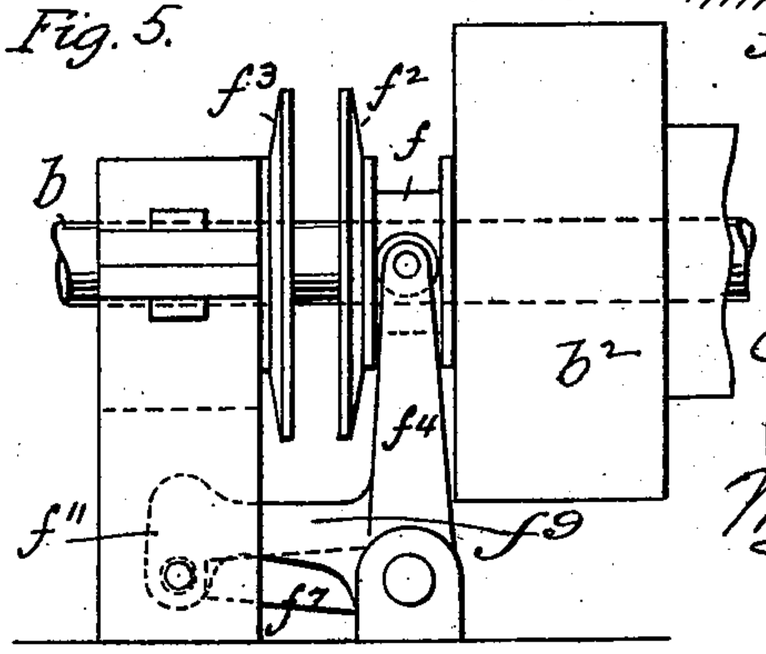


Fig. 6.

Fig. 5.



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CAN SEAMING MACHINE.

(Application filed Aug. 19, 1899.)

(No Model.) 4 Sheets—Sheet 4.

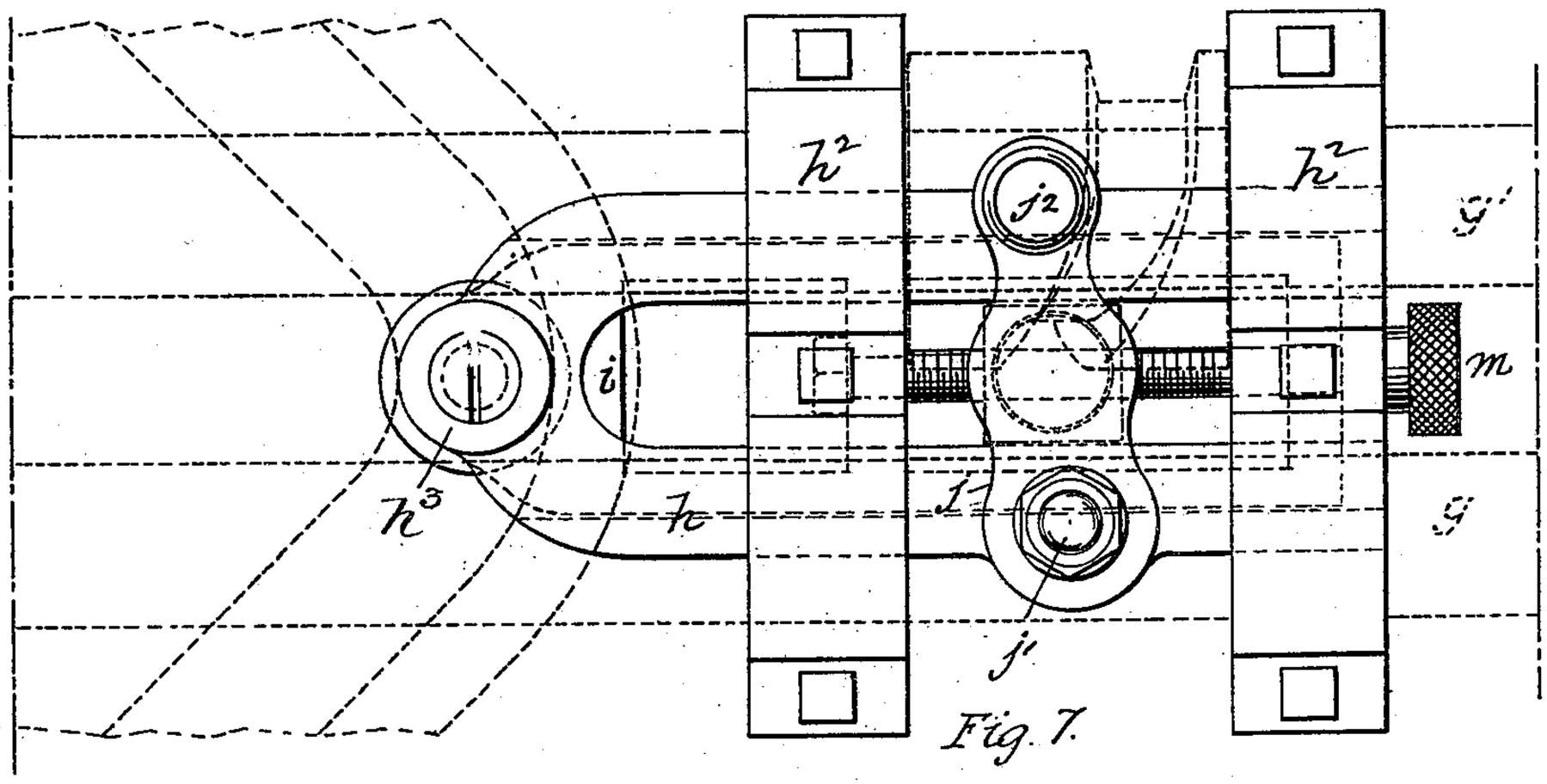

Fig. 7.

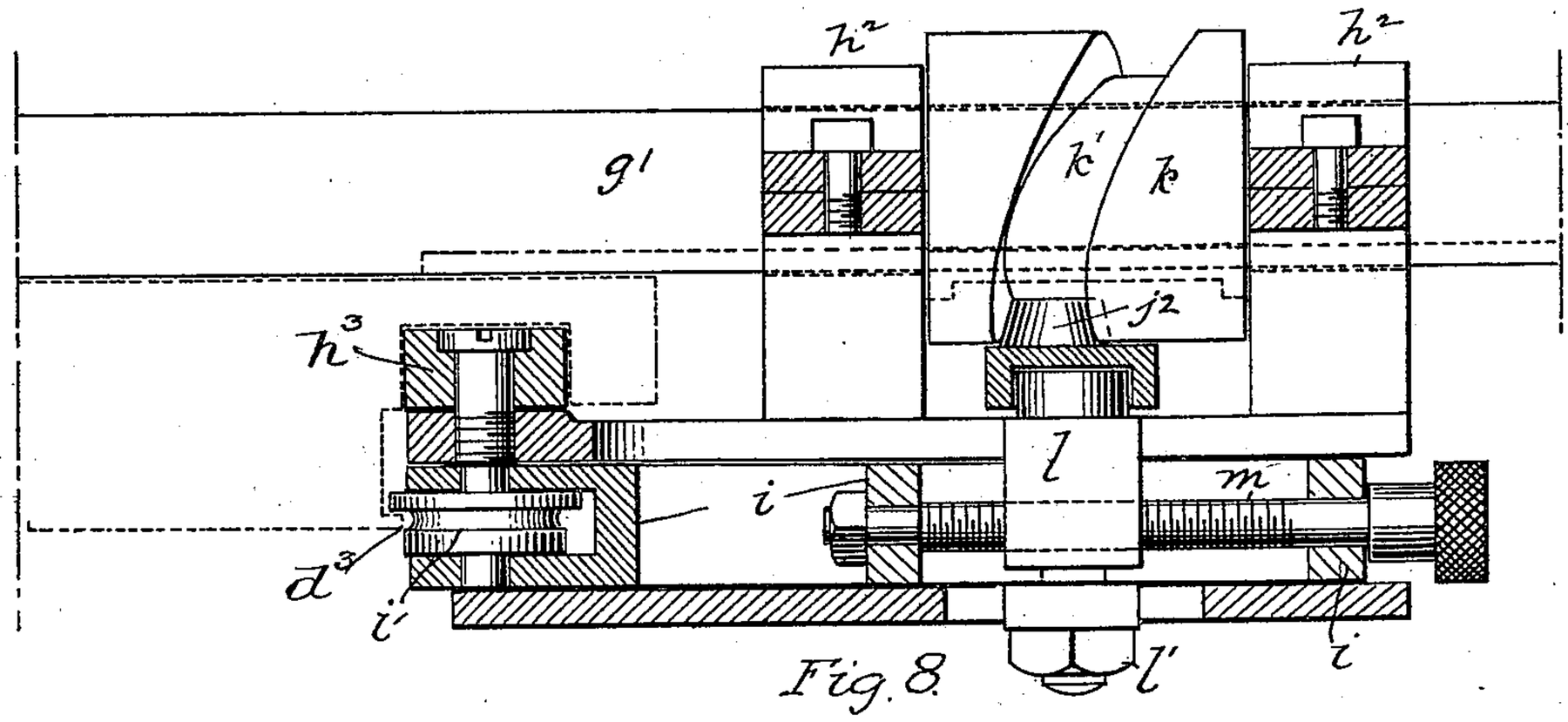

Fig. 8.

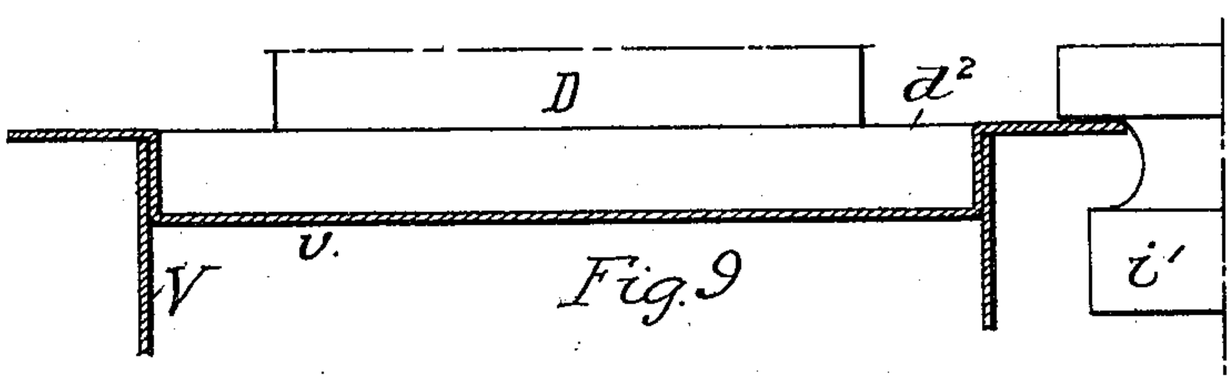

Fig. 9.

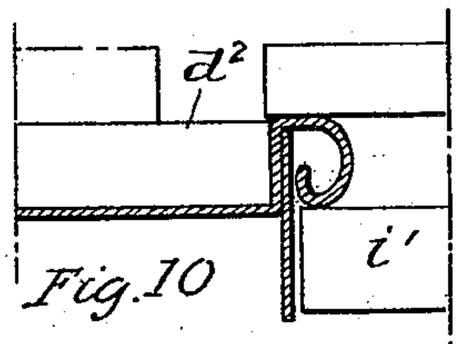

Fig. 10.

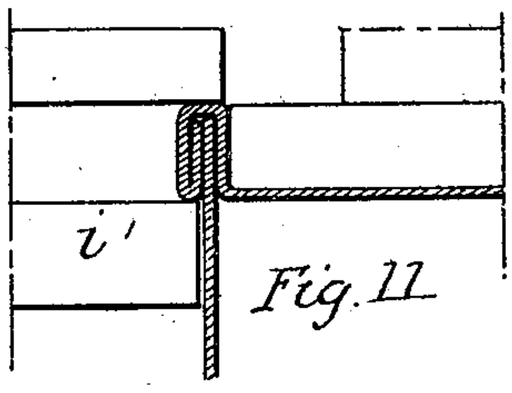

Fig. 11.

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UNITED STATES PATENT OFFICE.

CHARLES LEFFLER, OF NEW YORK, N. Y.

CAN-SEAMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 648,037, dated April 24, 1900.

Application filed August 19, 1899. Serial No. 727,732. (No model.)

To all whom it may concern:

Be it known that I, CHARLES LEFFLER, a citizen of the United States, residing at the city of New York, borough of Brooklyn, in the State of New York, have invented certain new and useful Improvements in Can-Seaming Machines, of which the following is a full, clear, and exact description.

This invention relates to machines for uniting the body and ends of metal cans or vessels by means of a double seam, and especially to machines for forming such seams in vessels or cans of other than cylindrical shape—such, for instance, as rectangular or triangular vessels.

The object of my invention is to produce a machine which shall be, as far as possible, automatic in its workings, simple in construction, and capable of good and rapid work.

My invention belongs to that general class of machines in which the edge of the can is acted upon by forming and sealing dies which by means of a suitable pattern-cam are caused to follow the irregular contour of the can and press the seam into shape; but my invention embodies several improvements over others in this class, all of which will be hereinafter fully described, and particularly pointed out in the claims.

With reference to the accompanying drawings, Figure 1 is a front elevation of my machine. Fig. 2 is a side elevation of the same with parts in section. Fig. 3 is a plan of the machine. Fig. 4 is a partial plan with parts in section and on an enlarged scale. Figs. 5 and 6 are details of the brake. Fig. 7 is a plan, on an enlarged scale, of a portion of the feeding mechanism of the die. Fig. 8 is another view, partially in section, of the mechanism shown in Fig. 7. Figs. 9, 10, and 11 illustrate the successive steps in the formation of the seam, and Fig. 12 is a sectional detail of a modification of the chuck upon which the can rests in the machine.

The main frame of the machine consists of a standard A, having a yoke-shaped bracket a extending across the front at its upper end, and a rearward and upward projection a' at the back. The driving-shaft of the machine (indicated by b) is arranged horizontally in suitable bearings b' at the top of the frame. It carries a loose cone-pulley b^2, to which a rotary motion is given by a suitable belt. At its front end this shaft connects by bevel-gearing with a vertical shaft c, having its bearings along the middle of the yoke-frame a. It projects below said frame and carries a block D, combining a pattern-cam and die, against the lower side of which the head of the can is to be adjusted, as will hereinafter appear. The shaft b also drives another shaft e at the rear of the machine, from which motion is transmitted by bevel-gearing e' to a horizontal shaft e^2 and thence by other bevel-gearing e^3 to another vertical shaft e^4 in line with the vertical shaft e in front of the machine. The upper end of shaft e^4 carries a circular plate e^5, upon which the can or vessel rests while being acted upon. For the purpose of raising and lowering the disk e^5 to clamp the can the shaft is surrounded by two cam-collars e^6 e^7, the latter having a handle e^8, by which it may be rotated to raise and lower the disk and shaft, as will be readily understood, the bevel-gear on shaft e^4 being feathered to allow the shaft to slide through it in its movements. For the purpose of adapting the machine for action upon cans or vessels of various lengths I mount the two shafts e^2 and e^4 in a vertically-traveling block E. To obtain this movement, the block is mounted in suitable guides E′ on the standard, one of which carries a rack e^9, which is engaged by a pinion e^{10}, carried by the block E. By rotating the pinion the block may be adjusted to any elevation, and when properly placed may be secured by means of the nut e^{11}, acting against the back of the standard A and threaded upon a projection e^{12} from the block E. To accommodate itself to this adjustment, the bevel-gear e' is feathered to the vertical shaft e, as shown. The several sets of gears in the system just described are so proportioned that the shafts c and e^4 will be driven at the same speed from the one driving-shaft b. In some machines it will be preferable not to drive the shaft e^4 at all, but to allow the circular disk e^5 to rotate upon the upper end of said shaft by power transmitted through the can or vessel from the upper shaft c. When this plan is adopted, it is preferred to mount the disk e^5, in the manner shown in Fig. 12, upon ball-bearings, there being one center ball e^{13} in the top of the shaft

and a number of balls e^{14} arranged in a lateral groove around the shaft and adjustable for wear by screws e^{15}.

The loose pulley b^2 is supposed to be constantly running, and for connecting it and disconnecting it with the shaft b for the purpose of starting and stopping the machine there is provided a spool-shaped part f on the shaft, which is feathered thereto, one face of which, f', forms half of a clutch the other half of which is on the hub of the pulley b^2, as indicated in Fig. 4. The other face, f^2, of the part f is a friction-disk adapted to engage with a similar disk f^3, fixed to the frame. When these two disks are brought into contact, which they are when the clutch is thrown out, a braking action is obtained upon the shaft which quickly stops it. The part f is embraced midway by a forked lever f^4, pivoted to the frame at f^5 upon a pair of trunnions f^6, each of which carries a crank f^7 and f^8, respectively, extending in opposite directions. This lever also carries a projection f^9 at right angles, which extends into a cavity f^{10} in the frame and is there provided with an enlarged flat head f^{11}, having in one portion an eye f^{12}, which stands in line with a perforation f^{13} in the frame when the pulley is locked to the shaft by the clutch, and when in this position the clutch is locked by means of a bolt f^{14}, extending through the perforation in the frame and the eye f^{12}. The operation of this bolt will be referred to hereinafter. The crank-arm f^7 on the trunnion of the forked lever is acted upon by a spring f^{15}, which tends to open the clutch, while the crank f^8 of the other trunnion connects by means of a link f^{16} with a treadle f^{17} at the base of the machine for throwing the clutch into engagement.

Having described the power transmitting and controlling devices, we now refer to the can-seaming mechanism proper. Arranged across the front of the machine and supported between the extremities of the two arms of the yoke-shaped frame a are two cylindrical rods g and g', the former of which is stationary and the latter adapted to rotate, it being for this purpose provided with a worm-gear g^2, engaging with a worm g^3, which is driven from the shaft b by means of gears g^4 and the link g^5, with its universal joints at each end. The nature of this gearing is such that the shaft g' makes but one rotation while the shaft c is making twelve rotations. Upon each end of this pair of rods a carriage h h' slides, the rods passing through suitable brackets h^2 for this purpose, there being two brackets for each carriage. The carriages stand on opposite sides of the block D on the lower end of the shaft c. Said block is provided with a horizontal flange d, having a cam-groove d' on its under side conforming in shape to the end of the can or vessel upon which the cover is to be secured by the machine. In this cam-groove rollers h^3 on the inner ends of the carriages travel, and as the block rotates the carriages are caused to move positively back and forth upon the rods, according to the shape of the cam-groove in which the respective rollers are confined. Each of the carriages is provided with a slide i, which is located between the top and bottom plates of the carriage, as shown in Fig. 8. This slide is adapted to move longitudinally in the carriage and carries at its inner end a forming roller or die i', which is arranged opposite the lower flange or anvil d^2 on the block D. This anvil is also of the same shape as the can, and it is adapted to pass into a depression in the face of the cover of the can, as shown in Figs. 2 and 9, to act in conjunction with the forming-rollers i' in making the seam. The slide i, carrying the forming-roller, receives its independent motion in the following manner: Pivoted to the carriage h at j' is a short lever j, carrying at its free end a roller j^2, which stands in a cam-groove k' of a sleeve k. Between its pivotal point and its roller the said lever is connected to the slide i by means of a block l and a clamping-nut l', which occupies a slot in the bottom plate of the carriage h, permitting it to traverse the carriage. The sleeve k is feathered upon the rotating guide-rod g' and between the two bearings h^2, so that when the carriage travels the sleeve moves with it and slides upon the rod; but the sleeve being feathered to the rod partakes of its rotary motion, and thus causes the free end of the lever j to slowly oscillate, and thus cause the slide i to move toward and away from the block D. This motion, however, is very slow.

In forming a seam on a can the shaft g' makes one complete rotation, at the end of which the machine should automatically stop. For this purpose the worm-gear g^2 carries on one side a cam-track g^6, having a projection or tooth. (Shown in Fig. 3.) Against this cam a roller carried by a pivoted lever g^7 bears, and the opposite end of the lever is attached to the bolt f^{14}. A spring g^8 tends to keep the roller against the cam and the bolt in its extreme position to the left, as shown in Fig. 4. The thrust imparted to the slide i by the oscillating lever j is adjustable by means of a threaded bolt m, fixed in the slide and threaded through the block l. By rotating this bolt the slide may be set forward or backward with respect to the block D, and thus alter the approach of the roller i' to the can.

The operation is as follows: The pulley b^2 is supposed to be constantly running and is normally disconnected from the shaft b', the clutch f' being open. Shaft e^4 is in the lowest position afforded by the cam-sleeves e^6 and e^7. A can or vessel V, with its cover v, is then placed upon the disk e^5 in such position that the depression in the cover will fit over the lower flange or anvil on block D. Handle e^8 is then manipulated to lift the can until said anvil enters the cover and the can is clamped between the disk and block.

The operator then presses upon the treadle f^{17}. This swings the forked lever f^4 and closes the clutch f', thus communicating rotary motion to shafts b, c, e, e^2, e^4, g^5, and g'. Spring g^8 on bolt f^{14} forces said bolt into the eye in the end of lever f^{11}, and thus locks the clutch in its closed position. Before the machine starts the forming-rollers i' are slightly withdrawn from the edge of the can, as shown in Fig. 1; but as soon as the parts begin to rotate the cam-sleeves k begin to set up the forming-rollers, and one of them finally strikes the edge of the cover, as shown in Fig. 9, and begins to curl said edge to the shape shown in Fig. 10, a number of revolutions of the can being utilized to bring the edge to this shape. When the seam has been thus far formed by one of the rollers i', the other roller (whose slide had been previously set so that it would not come into action until the seam had been thus partially formed) comes into contact with the seam and gradually presses it into the finished shape and condition shown in Fig. 11. While this second forming-roller is at work upon the can the first forming-roller is being retired to its original position by its cam k, and is therefore ready when the can is finished to act upon the next can. In completing the can shaft g' makes one rotation, at the end of which the cam g^6 moves the lever g^7 and withdraws the bolt f^{14} from lever f^{11}, thus unlocking the clutch and allowing spring f^{15} to open the clutch and cut off the power and bring the friction-disks f^2 and f^3 into contact to quickly stop the rotation of the can, so that it may be removed and another put in its place. When the machine comes to a stop, the roller on lever g^7 has passed the tooth on the can and accordingly the bolt presses against the solid portion of lever f^{11} and is ready to be pushed through the eye of said lever the moment the clutch is again closed by the treadle.

My machine is an improvement on other well-known can-seaming machines, in that the dies are carried in guides which permit them to reciprocate in a straight line, and they always act against the edge of the can in a direction toward the center of the can, whereas in other machines the dies are carried at the end of pivoted levers and must of necessity move in arcs of circles, so that their pressure upon the can is not always directed toward the center of the can and the best results are not obtained. Furthermore, in my improved machines the die-carriage is moved positively in both directions by the pattern-cam, whereas weights or springs are used in other machines.

Having described my invention, I claim—

1. In a can-seaming machine, a clutch adapted to connect the power-shaft with the can-rotating shaft, means for locking said clutch in its closed position, means for automatically unlocking the clutch when the can is finished and means for automatically opening said clutch when thus unlocked, substantially as described.

2. In a can-seaming machine, the combination of a clutch for starting and stopping the machine, a lever by which the clutch is closed and opened, an extension from said lever, a frame provided with a cavity into which said extension projects, said frame being also perforated, a bolt entering said perforation to engage with said extension, a forming-die moved by power transmitted through the clutch, and means whereby said bolt is thrown at the completion of the motion of the die, substantially as described.

3. In a can-seaming machine, the combination of a rotating cam, an anvil of the shape of the can, a sliding carriage moved by said cam and carrying an independently-moving slide, a rotating rod upon which said carriage slides, a cam on said rod and connections between the cam and the slide whereby the latter will be given a movement independent of that of the carriage, substantially as described.

4. In a can-seaming machine, the combination of the cam and anvil-block D, two rods extending across the same, two carriages sliding upon said rods, means for rotating one of said rods, and a sleeve on said rotating rod provided with a cam-groove and adapted to slide on the rod with the carriage, a pivoted lever engaging with the groove in said sleeve, a slide carried by said carriage and moved by said lever, a forming-die carried by said slide and connections between the carriage and the cam in the part D whereby said carriage will be caused to maintain a fixed position with respect to the anvil and the forming-die will be gradually moved against the edge of the cam, substantially as described.

5. In a can-seaming machine, the combination of a reciprocating carriage, a slide carried thereby to which is attached the forming-dies, a guide for the reciprocating carriage consisting of a rotating rod or shaft, and means for transmitting motion from said rod or shaft to the slide in the carriage, for the purpose set forth.

In witness whereof I subscribe my signature in presence of two witnesses.

CHAS. LEFFLER.

Witnesses:
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GEO. S. KENNEDY.