(No Model.) 5 Sheets—Sheet 1.

E. NORTON & J. G. HODGSON.

DOUBLE SEAMING MACHINE.

No. 300,002. Patented June 10, 1884.

Fig. 1

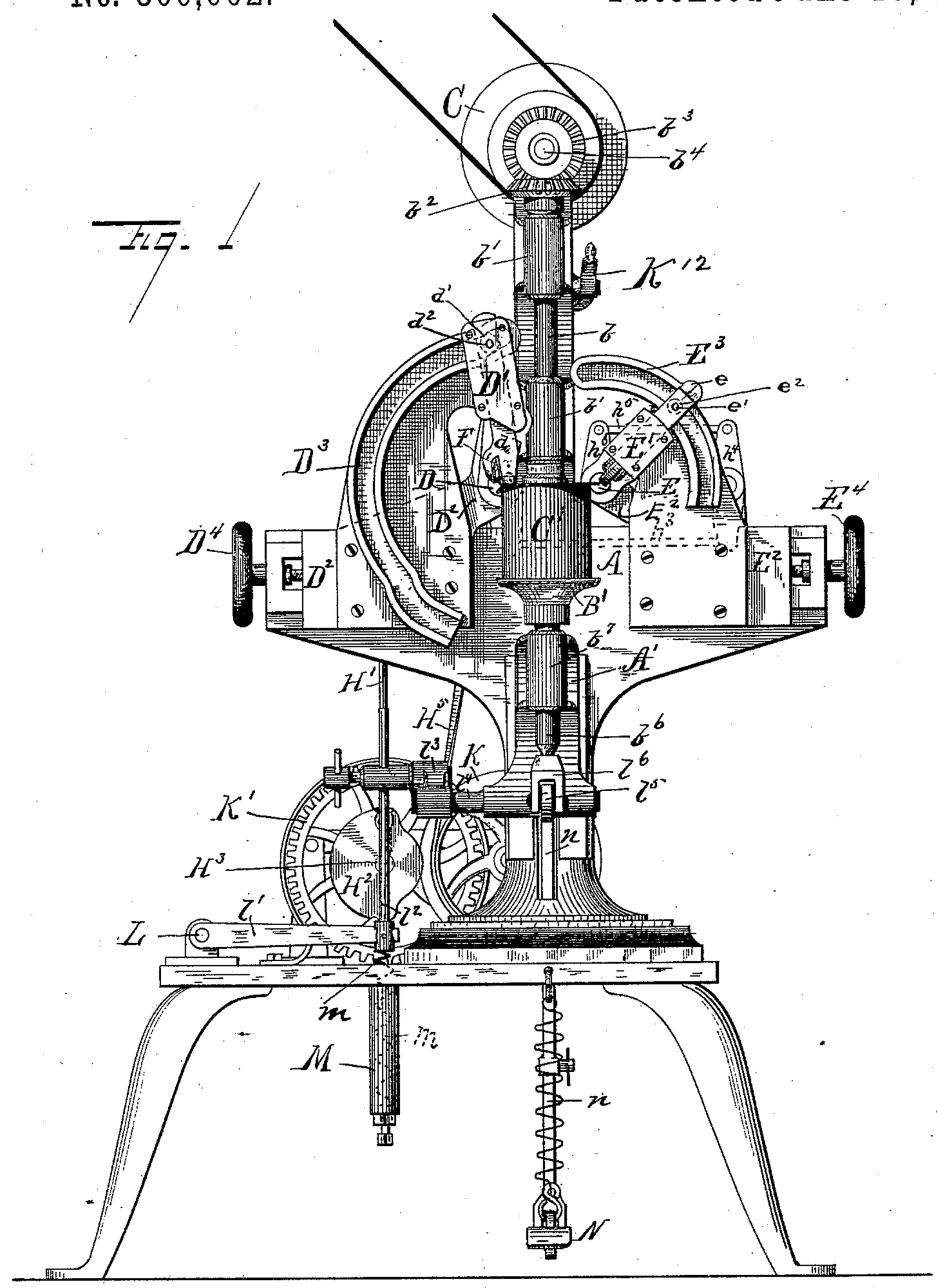

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Fig. 2.

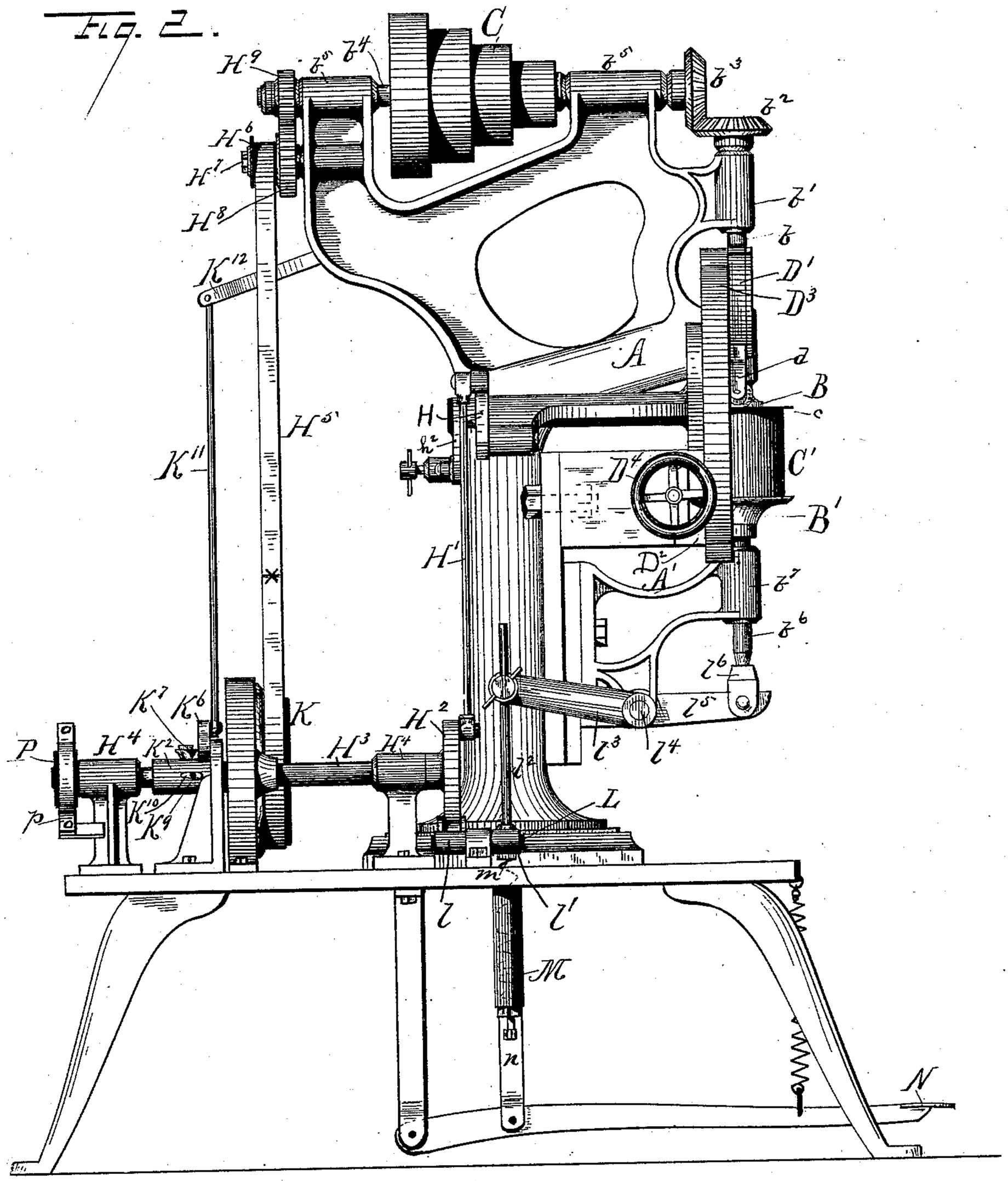

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Fig. 4.

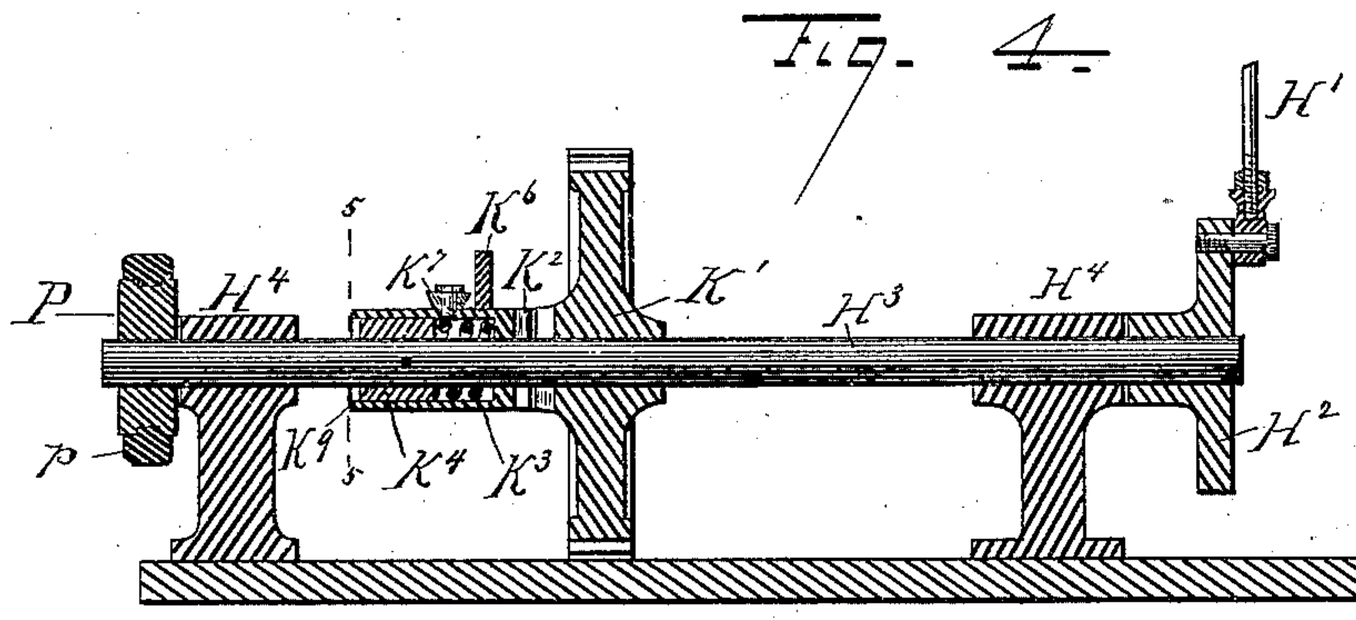


Fig. 5.

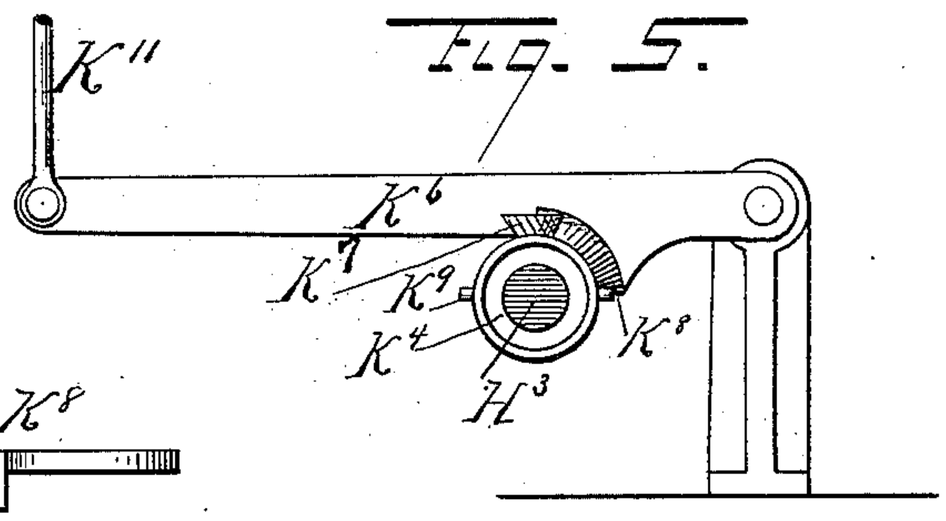


Fig. 6.

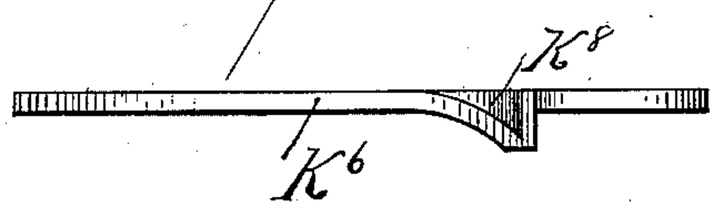


Fig. 3.

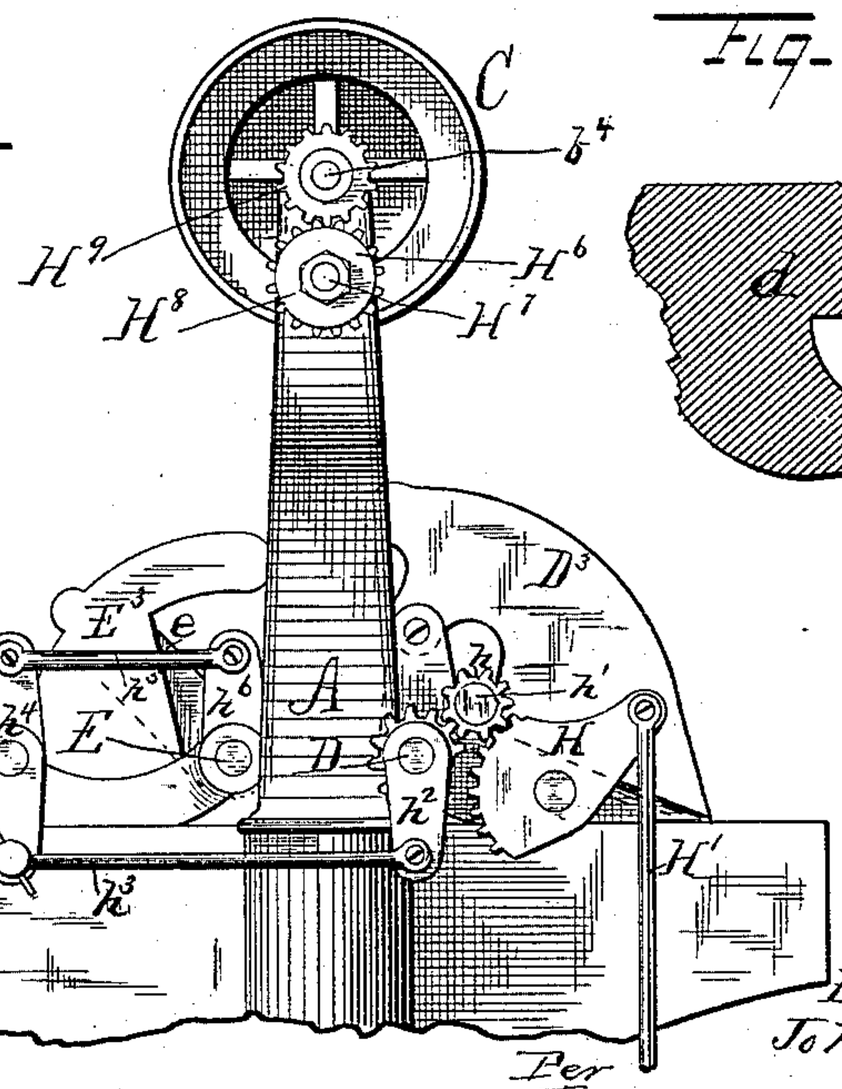


Fig. 12.

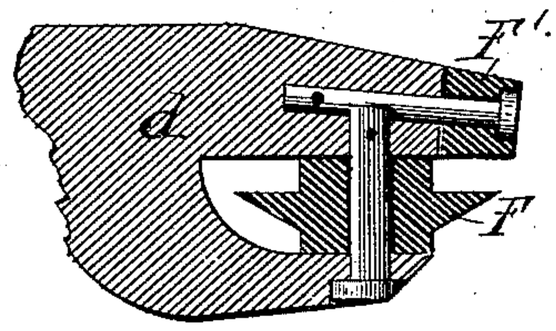
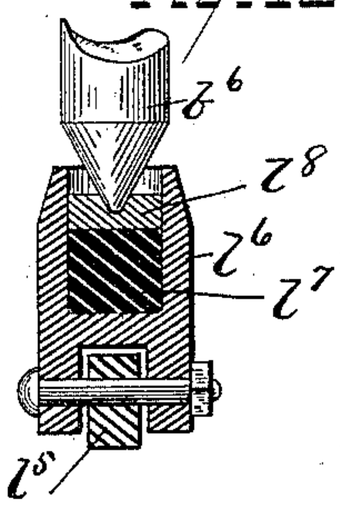


Fig. 13.



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E. NORTON & J. G. HODGSON.

DOUBLE SEAMING MACHINE.

No. 300,002. Patented June 10, 1884.

Fig. 7

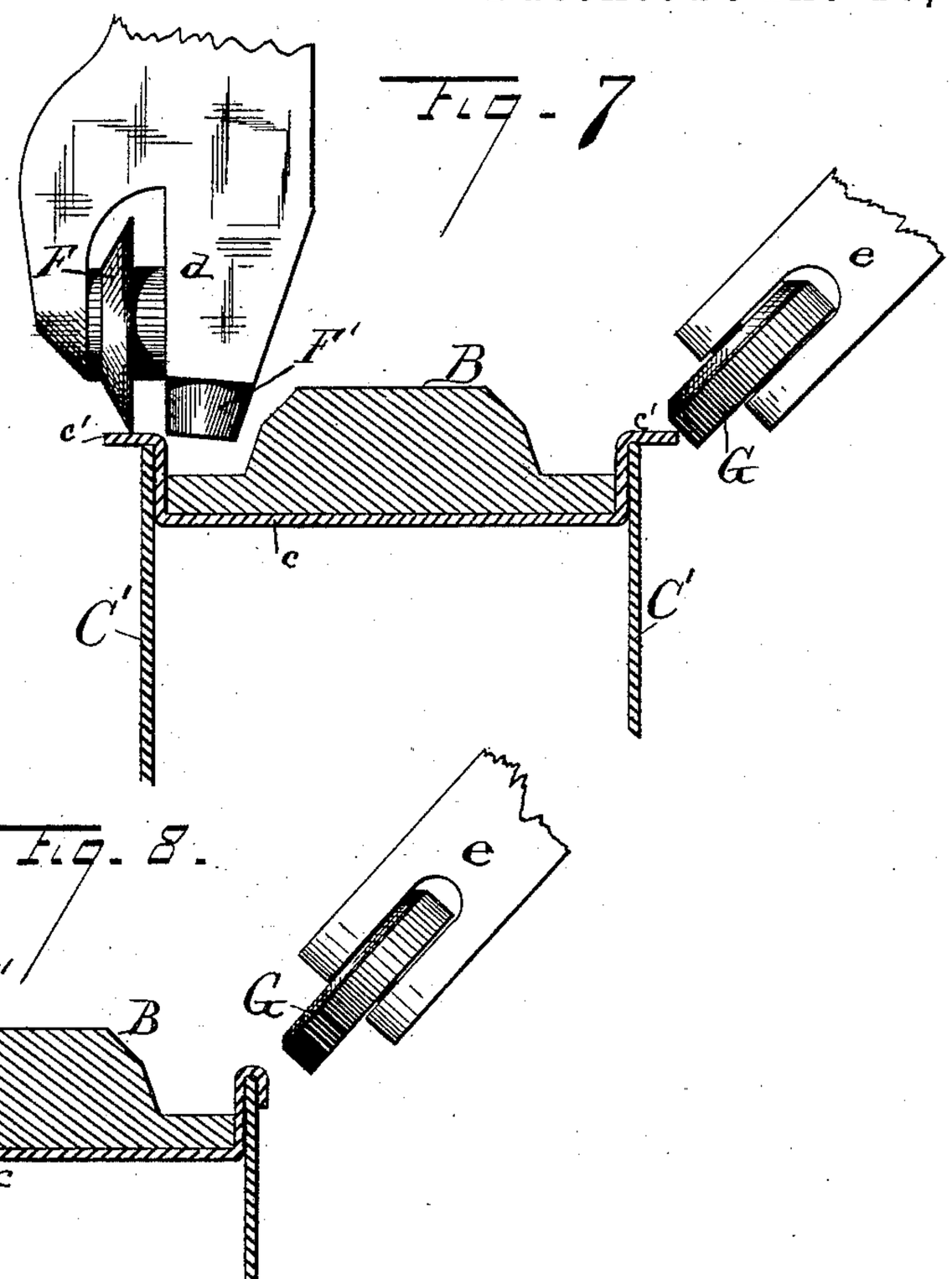


Fig. 8.

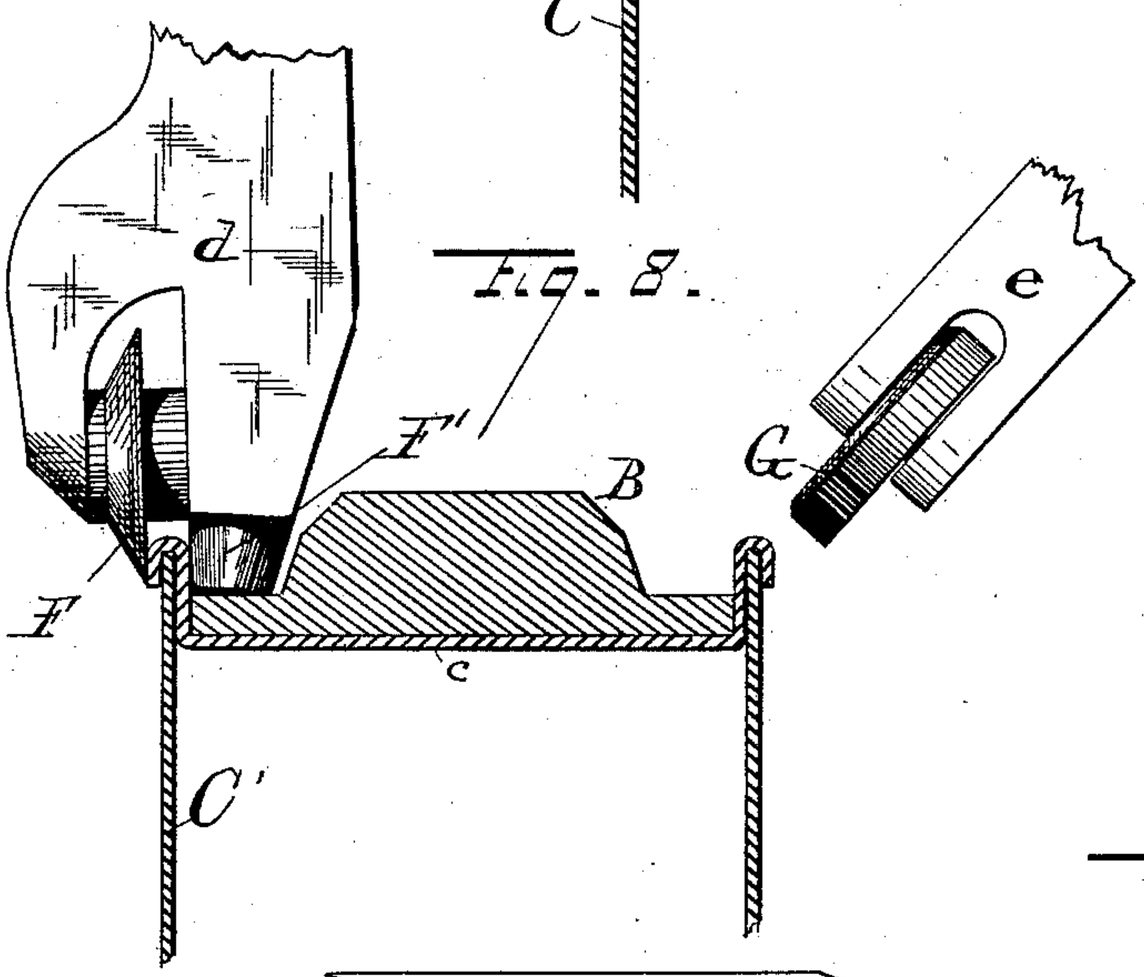
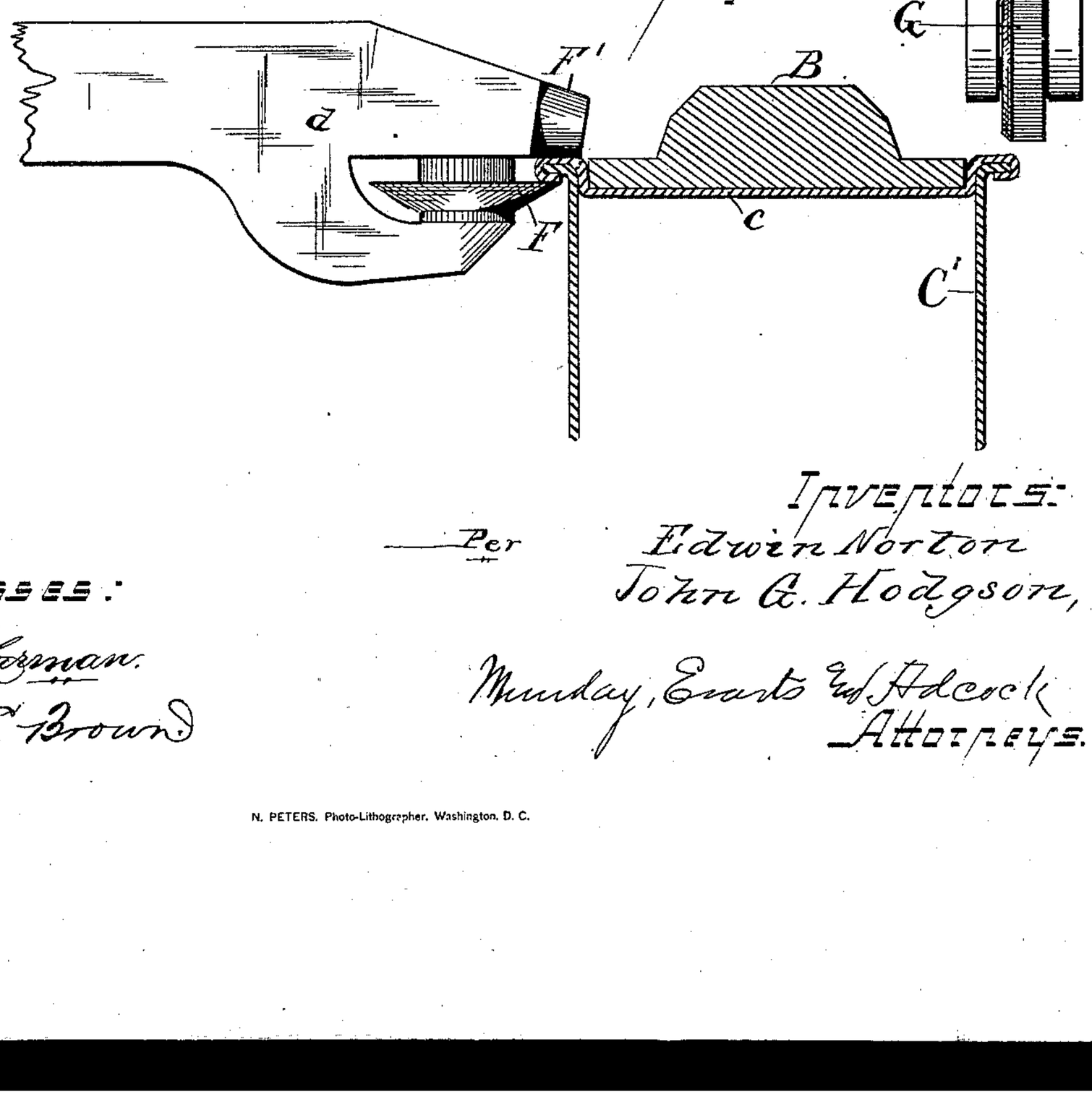


Fig. 9.



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E. NORTON & J. G. HODGSON.

DOUBLE SEAMING MACHINE.

No. 300,002. Patented June 10, 1884.

Fig. 10

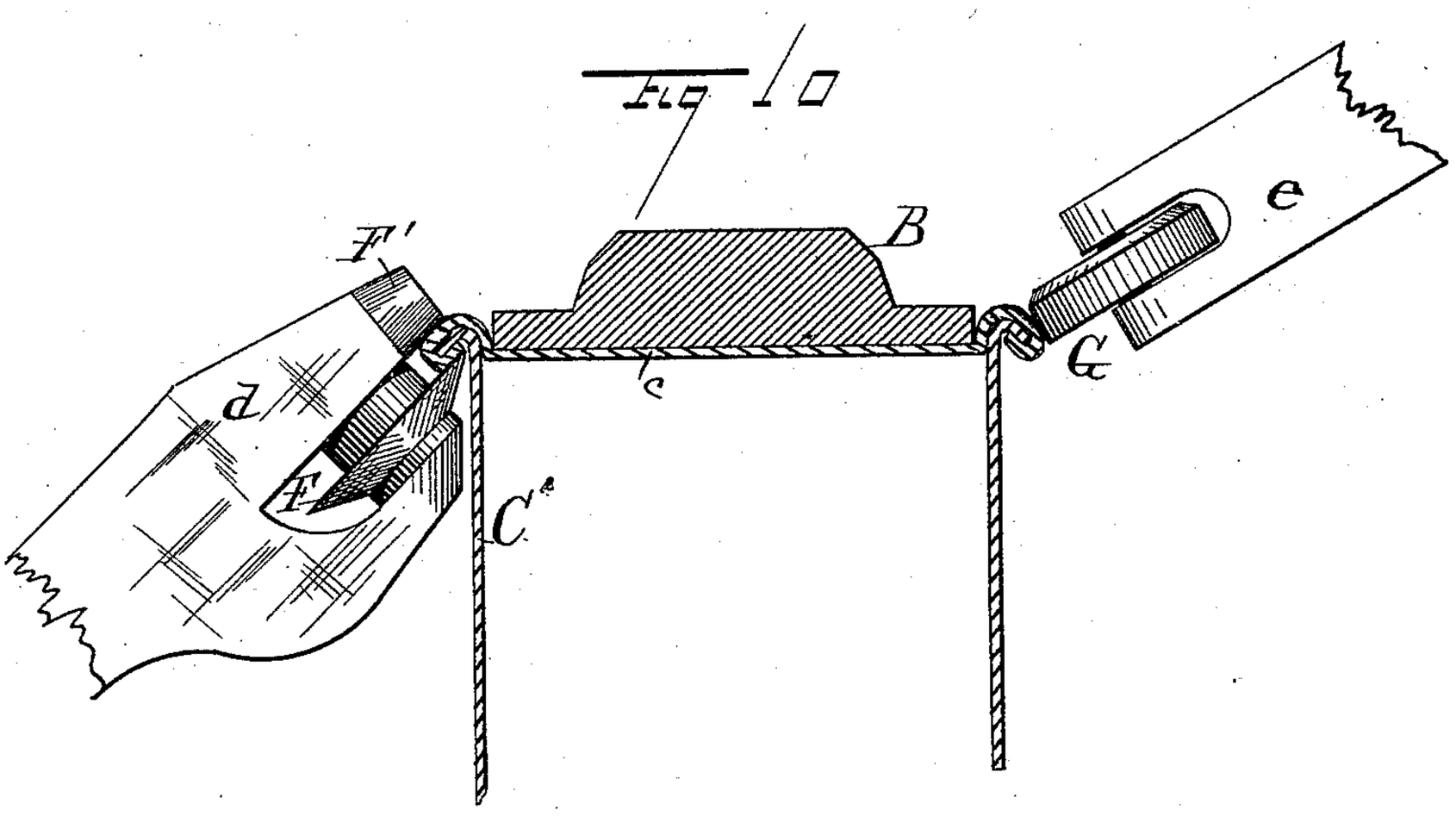
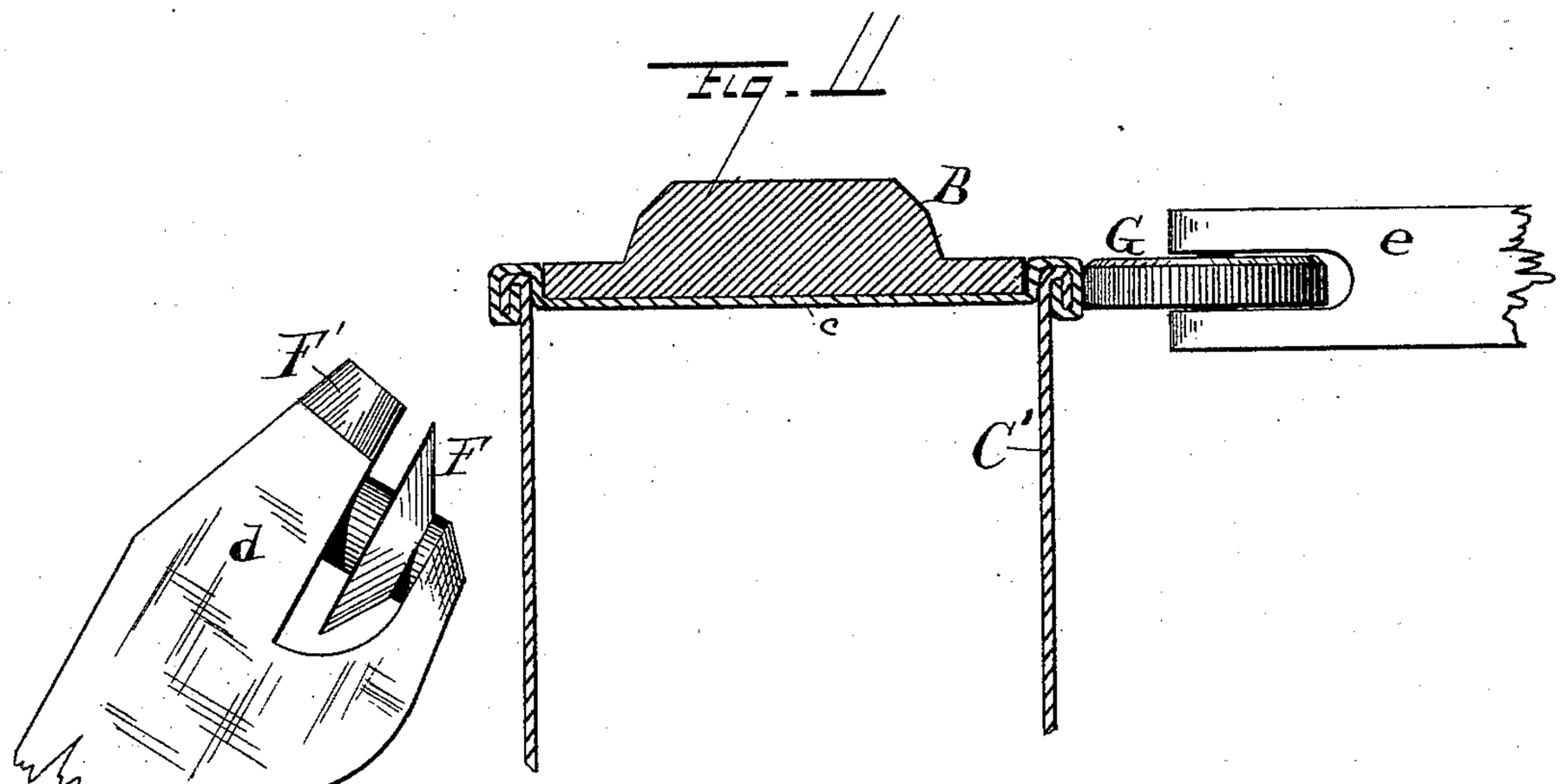


Fig. 11



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UNITED STATES PATENT OFFICE.

EDWIN NORTON AND JOHN GEORGE HODGSON, OF CHICAGO, ILL., ASSIGNORS TO SAID NORTON AND OLIVER W. NORTON, OF SAME PLACE.

DOUBLE-SEAMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 300,002, dated June 10, 1884.

Application filed February 14, 1884. (No model.)

To all whom it may concern:

Be it known that we, EDWIN NORTON and JOHN G. HODGSON, citizens of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Double-Seaming Machines, of which the following is a specification.

The present invention relates to machines for seaming heads upon cans; and the object of the invention is to provide a machine for automatically double-seaming the heads to flangeless sheet-metal cans rapidly, and so as to form perfect double seams; and to this end the invention consists in a tool and its actuating mechanism, by means of which the edge or horizontal flange of the countersunk head is first bent down or folded over the vertical wall of the can-body, and then such flange, together with the wall of the can-body embraced thereby, turned down or folded upon itself.

It also consists, in connection with the tool, of mechanism for giving it the requisite movements automatically, and of supporting and revolving the can, and in a tool or device for pressing the folded seam close against the vertical wall of the can-body, and mechanism for operating said tool in connection with the seam-forming tool.

It also consists in the novel constructions and combinations of devices herein shown and described and claimed.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a front view of a device or machine embodying the invention. Fig. 2 is a side elevation. Fig. 3 is a rear view. Fig. 4 is a sectional view showing the driving-shaft and clutch mechanism. Figs. 5 and 6 are detail views of parts of the clutch mechanism; and Figs. 7, 8, 9, 10, and 11 are enlarged detail views showing the position of the seaming-tools at different stages in the formation of the seam. Figs. 12 and 13 are sectional detail views of parts hereinafter described.

In the drawings, A represents the frame of the machine, and B B′ the revolving chuck for holding and rotating the can while the seam is being formed by the seaming-tools. The upper disk, B, of the chuck is secured to a shaft, b, mounted in suitable bearings, b', on the frame of the machine, which shaft is continuously rotated by means of a bevel-gear, b^2, meshing with a bevel-gear, b^3, on the pulley-shaft b^4. The shaft b^4 is arranged horizontally, and journaled in bearings b^5 on the frame of the machine.

C is the driving-pulley keyed to this shaft. The lower disk, B′, of the chuck is secured to a shaft, b^6, which is journaled so as to reciprocate vertically in a bearing, b^7, on the bracket A′. The bracket A′ is secured to the frame of the machine by suitable bolts. C′ represents the can, and c the head to be seamed or secured thereto. The head c is countersunk in the usual manner, and has a horizontal part or flange, c', which rests upon the top edge of the can-body. The countersunk portion of the head is made to fit snugly within the can-body, and the chuck-disk B fits within the recess of the can-head, and serves as a support to the can-body and head while the seam is being formed.

D and E are a pair of rock-shafts arranged on opposite sides of the machine, to the ends of which rock-shaft the tool-holder or heads D′ and E′ are secured, so as to rock with the shafts. The rock-shafts D and E are journaled upon adjustable sliding heads D^2 and E^2, mounted on the frame of the machine. By adjusting the slides D^2 and E^2 in or out, the machine may be adapted to cans of different sizes.

D^3 and E^3 represent two stationary grooved cams secured rigidly to the sliding heads or blocks D^2 and E^2, by means of which cams the tool-arms d and e, mounted in radial grooves or ways on the heads D′ and E′, are reciprocated radially in and out on said tool-holders or heads D′ and E′, as they are rocked. The tool-arms d and e are each provided with pins or projections d' and e', which fit in these grooved cams. These pins or projections should preferably be provided with small friction-rollers d^2 and e^2.

The seaming-tool consists of a beveled-edge roller F and a smooth conical roller F′, jour-

naled at right angles to each other on the sliding tool-arm *d*. The space between these rollers is about equal to three thicknesses of the stock, and the first operation of the tool is to turn or fold the horizontal flange *c'* of the head, as shown in Fig. 7, down over the edge of the can-body, as shown in Fig. 8. The grooved cam D^3 is provided with a short kink or turn at its upper portion, by which the reciprocating motion is given to the tool-arm to perform this operation. The circular central portion of the cam D^3 then keeps the tool on the folded and partially-formed seam while the tool-arm rocks or swings down into the position shown in Figs. 9 and 10, thus turning the seam down and forming a fold in the can-body, as shown in Fig. 10, while the flange of the can-head is folded over it. The tool G, consisting of a single smooth roller journaled on the tool-arm *e*, serves to turn or bend the folded seam, as shown in Fig. 10, down flat against the wall of the can-body, as shown in Fig. 11. When the operation begins, the tools F, F', and G are in the position shown in Figs. 1 or 7. During the first quarter-turn of the tool-arm *d*, or while it is swinging from the position shown in Fig. 7 to that shown in Fig. 9, the tool-arm *e* moves to the upper part of its cam, and then, while the tool F F' is being swung into the position shown in Fig. 10, the tool G comes back to near its original position, as shown in Figs. 10 or 7. The tool F F' is then drawn back away from the can, as shown in Fig. 11, by the curve near the lower part of the cam D^3, while at the same time the tool G is brought down against the seam, as shown in Fig. 10, and as the tool-arm *e* continues to swing down it presses the seam flat against the wall of the can, as shown in Fig. 11. The lower portion of the cam E^3 is eccentric from the upper half of said cam, so that while the tool-arm is moving through the upper part of the cam the tool G does not press against the seam; but while the tool-arm is moving down through the lower part of the cam the tool G is pressed gradually against the seam and performs the operation of turning the seam down against the wall of the can-body. The cams D^3 and E^3 are both secured by screws or bolts or other suitable means to their respective sliding heads D^2 and E^2, which are mounted on suitable guides on the frame of the machine. These sliding heads are provided with adjusting-screws D^4 and E^4, by which they may be adjusted to and from the can, as may be required, to adjust the machine to cans of different sizes. The shaft D is rocked so as to swing the tool-head or holder D' by means of the toothed quadrant-arm H, which meshes with the spur-gear *h* on the counter-shaft *h'*, which spur-gear meshes with a toothed arm, h^2, on the rock-shaft D, and the pitman H' is pivoted to said quadrant-arm H and connected to the revolving cam-wheel H^2 on the shaft H^3. The shaft E is rocked so as to swing the tool-holder or head E', secured thereto, up and down, from the rock-shaft D by means of the toothed quadrant-arm h^2, connecting-rod h^3, pivoted lever or rock-shaft h^4, and bar h^5, which is connected to the arm h^6, secured rigidly to the rock-shaft E'. The connecting-rod h^3 is secured to the lever h^4 by a set-screw or other suitable means, so as to adjust the arm to different lengths, as may be required in operating upon cans of different sizes, the lever H^4 being pivoted upon the adjustable head-block E^2, and the toothed arm h^2 being mounted upon the sliding head D^2. As the tool-head D' swings down to the horizontal position, the crank-arm h^2 passes the dead-point and moves the rock-shaft h^4 to the extreme of its throw, and as the head D' continues to swing down the lever or rock-shaft h^4 is then turned in the opposite direction and the movement of the head E' reversed, as before described—that is to say, said head then begins to rock or swing down from the upper to the lower part of the cam E^3. The shaft H^3 is journaled in suitable bearings, H^4, on the frame of the machine. Power is communicated to it by means of a belt, H^5, from a small pulley, H^6, on the counter-shaft H^7, which is provided with a spur-gear, H^8, that meshes with a spur-gear, H^9, on the driving-shaft. The belt H^5 operates a band-wheel, K, on a counter-shaft journaled in suitable bearings on the frame of the machine, and this counter-shaft is provided with a spur-gear that meshes with a spur-gear K', fitting loosely on the shaft H^3. The loose gear K' is clutched to the shaft H^3 by means of a clutch, K^2, which engages with a corresponding clutch-surface on the side of the gear K'. The clutch K^2 is operated by a spring, K^3, surrounding the shaft H^3, which abuts against a collar, K^4, secured to the shaft H^3 in the ordinary manner. The operation of the spring is to press the clutch K^2 against the clutch-surface of the gear when the horizontal pivoted arm K^6 is raised, so that the pin K^7, secured to the outside of the clutch-sleeve, does not strike against said pivoted arm. The pivoted arm K^6 is provided with a cam-surface, K^8, on its side, so that when said arm is dropped, so as to rest upon the clutch-sleeve K^2, it will operate to retract the clutch from its engagement with the loose spur-gear K'. The clutch-sleeve K^2 is secured to the shaft H^3, so as to revolve with it by means of a pin, K^9, which passes through said shaft and through a slot, K^{10}, in said clutch-sleeve. The pivoted arm K^6 is raised, so as to permit the clutch to engage the gear, by means of a rod, K^{11}, connected with a bent hand-lever, K^{12}, which is pivoted to the frame of the machine in convenient reach of the attendant, so that by moving this lever he can operate the clutch when desired. The shaft b^6 is reciprocated vertically, so as to chuck the can from the cam-wheel H^2, by means of the crank-shaft L, provided with two arms, *l* and *l'*, the former of which has a roller which engages with the cam H^2, and the latter of which is connected by a rod, l^2, with an arm, l^3, on the crank-shaft l^4, which is provided with another arm,

l^5, upon which said shaft b^6 rests or is supported. The lower end of the shaft b^6 should be made conical or tapering, and the arm l^5 should be provided with a pivoted base-block, l^6. The rod l^2 is secured in the end of the arm l^3 by means of a set-screw, so that said rod-connection may be adjusted as may be necessary to operate upon cans of different lengths.

M is a tube or chamber containing a spring, *m*, which presses against the lower end of the crank-arm l', so as to press the arm l always against the cam-surface H^2.

The machine is ordinarily provided with a treadle, N, connected with an arm, *n*, on the crank-shaft l^4, so that the chuck-disk B′ may be operated by hand when desired by simply loosening the set-screw which connects the rod l^2 with the arm l^3.

P is a friction-wheel provided with a friction-clamp, *p*, which will serve to steady the motion of the machine.

The tool-arm *d* is provided with a slot, *f*, in its end, in which slot the bevel-roller F is mounted. The roller F′ is journaled on the end of the tool-arm, and should preferably be slightly conical in form. This roller, however, may be rigid or integral with the tool-arm *d;* but the preferable construction is to employ a journaled roller, as before described. The tool-arms *d* and *e* and the tools mounted thereon both have a compound rocking and radially-reciprocating motion, the rocking or swinging motion being imparted to the tool-arm by the rock-shafts, and the reciprocating motion being imparted to the tool-arms by the cams D^3 and E^3. The disk B of the chuck operates in conjunction with the tools F, F′, and G, and serves as a bearing or support for the tools to operate against. In the first step or operation, the roller F serves to turn the flange *c* down over the can-body, and then the roller F′, in connection with said roller F, serves to turn the fold thus formed down upon itself and form the second fold of the seam. The pivoted block or step l^6 is made hollow or provided with a recess, in which fits the rubber or elastic block l^7 and the metal plate l^8, upon which a shaft, b^6, rests. The purpose of this elastic cushion l^7 is to permit the chuck to yield slightly, and thus adjust itself to those slight variations in the height of the can which sometimes unavoidably occur. This elastic cushion of the movable chuck or disk may, of course, be placed at some other point in the connecting or operating mechanism than the block l^6. It may, for example, be on the end of the arm *l*, upon which the cam H^2 operates; but we deem the block l^6, as shown, the most convenient place, and the cushion may consist of a spring or other elastic device instead of the simple rubber block.

We claim—

1. In a can-seaming machine, the combination of a seaming-tool, F F′, mounted on a rocking and radially-reciprocating arm, *d*, with tool G, mounted on a rocking and radially-reciprocating arm, *e*, substantially as specified.

2. The combination of a compound seaming-tool, F F′, sliding tool-arm *d*, tool-holder D′, rock-shaft D, adjustable sliding head D^2, and grooved cam D^3, for reciprocating said tool-arm as the tool-holder D′ is rocked, substantially as specified.

3. The combination of compound seaming-tool F F′, sliding tool-arm *d*, tool-holder D′, rock-shaft D, adjustable sliding head D^2, grooved cam D^3, rock-shaft E, seaming-tool G, sliding arm *e*, tool-holder E′, adjustable sliding head E^2, grooved cam E^3, and arm h^2, rod h^3, rock-shaft h^4, bar h^5, and arm h^6, for operating said rock-shaft E from the rock-shaft D, substantially as specified.

4. The combination of the revolving chuck for the can, with rock-shafts E and D, tool-holders secured to said rock-shafts, seaming-tools journaled on sliding arms mounted on said tool-holders, cams for actuating said sliding arms, a cam and mechanism connecting said cam with rock-shaft E, to operate the same, and mechanism for actuating the movable disk of the chuck, substantially as specified.

5. The combination of the rocking tool-holders E′ and D′ with mechanism for operating the same, substantially as specified.

6. The combination of the rocking tool-holders E′ and D′ with sliding tool-arms mounted on said holders, and cams for actuating said sliding arms, substantially as specified.

7. The combination, with the rock-shafts, tool-holders, and seaming-tools mounted thereon, of the pitman-rod H′, cam-wheel H^2, shaft H^3, gear K′, fitting loosely thereon, provided with a clutch-surface, clutch K^2, spring K^3, and collar K^4, secured to said shaft H^3, and pivoted arm K^6, provided with cam-surface K^8, and pin K^7, secured to said clutch K^2, substantially as specified.

8. The combination of can-chuck disk B′ and shaft b^6, to which it is secured, with crank-shaft L, provided with arms *l* and l', cam H^2, rod l^2, and crank-shaft l^4, provided with arms l^3 and l^5, substantially as specified.

9. The combination, with the revolving chuck for the can, of the tool-holder secured to a rock-shaft, and provided with radial grooves or guides, a sliding tool-arm mounted in said grooves or guides, and a seaming-tool adapted to fold the horizontal flange of the can-head over the vertical wall of the can-body and mounted on said tool-arm, and a cam for operating said tool-arm as the tool-holder is rocked, substantially as specified.

10. The combination, with the revolving chuck for the can, the upper disk of said chuck fitting within the countersunk head of the can, so as to support the same, of the tool-holder secured to a rock-shaft and provided with radial grooves or guides, a sliding tool-arm mounted in said grooves or guides, and a seaming-tool adapted to fold the horizontal

flange of the can-head over the vertical wall of the can-body and mounted on said tool-arm, and a cam for operating said tool-arm as the tool-holder is rocked, substantially as specified.

11. The combination of stationary revolving disk B, movable revolving disk B′, shaft b^6, crank-shaft L, provided with arms l l', cam H^2, rod l^2, crank-shaft l^4, provided with arms l^3 and l^5, and pivoted block l^6, provided with rubber cushion l^7 and plate l^8, substantially as specified.

12. The combination of the movable revolving disk B′ and its shaft b^6, of the cam H^2 and suitable connecting mechanism for operating said shaft b^6 from the cam H^2, said connecting mechanism being provided with an elastic cushion to compensate for irregularities in the can-body, substantially as specified.

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