No. 769,927. PATENTED SEPT. 13, 1904.

E. ZEH.

FEED MECHANISM FOR CAN BODY MACHINES.

APPLICATION FILED DEC. 14, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

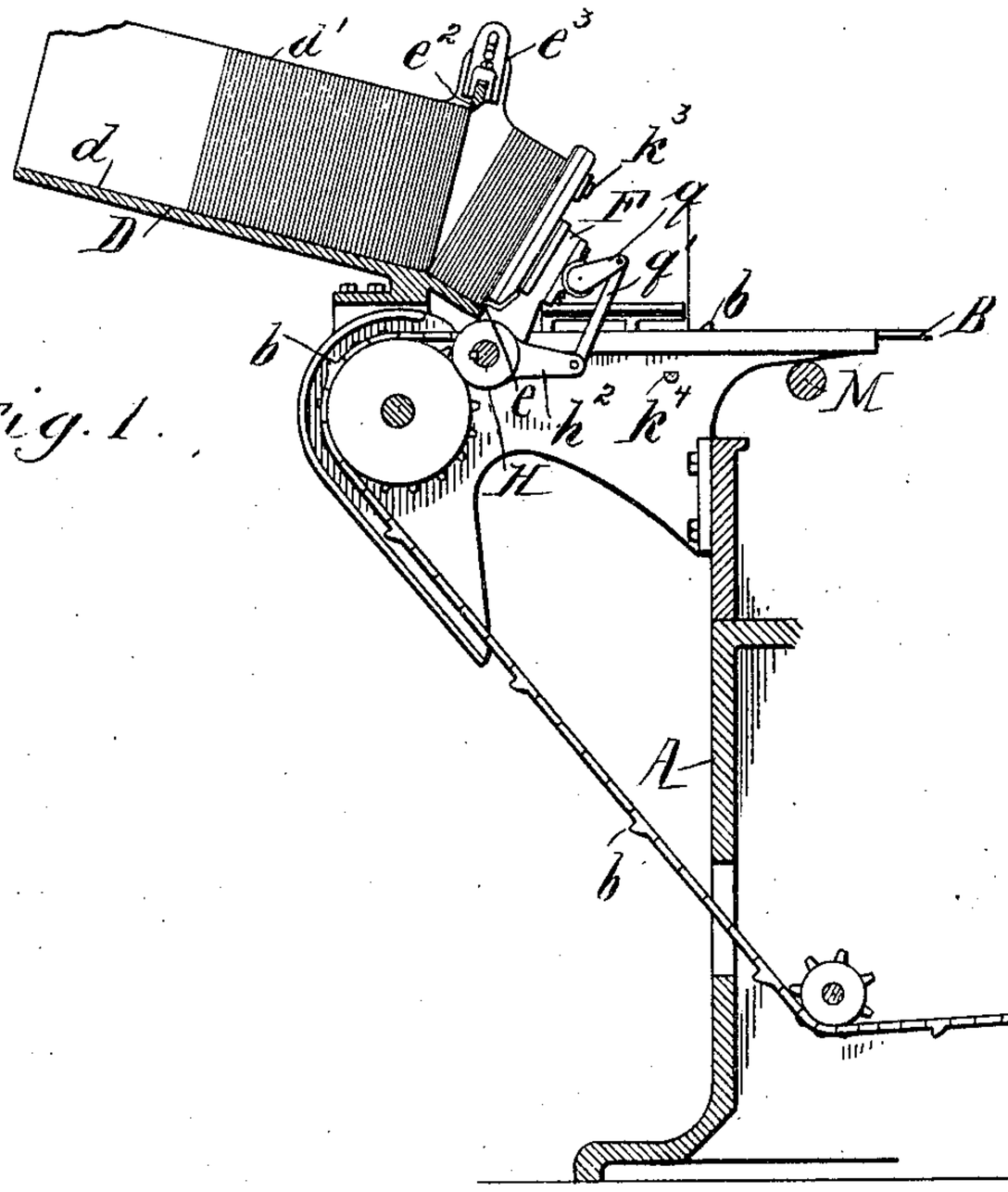
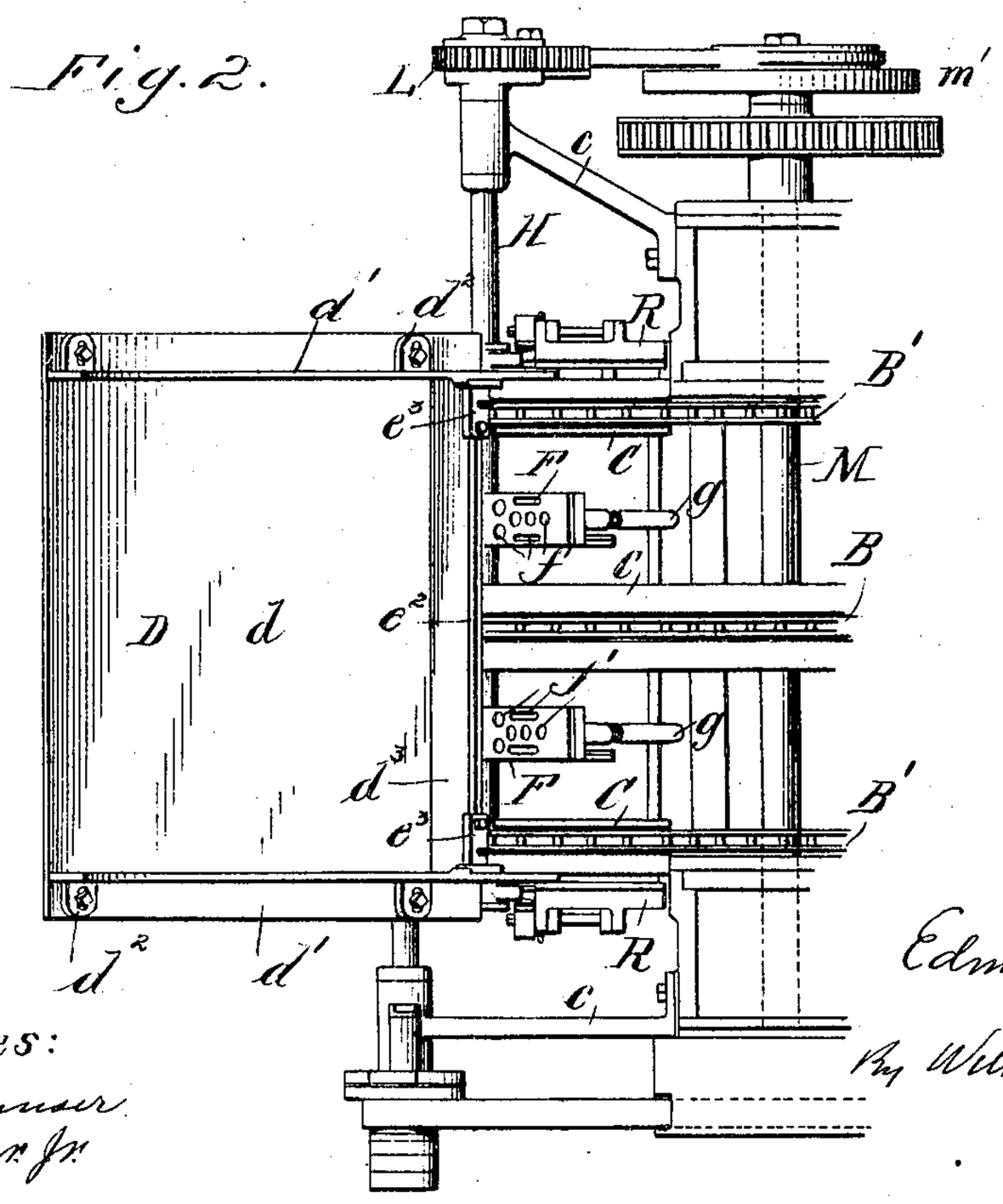


Fig. 2.



Witnesses:
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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.

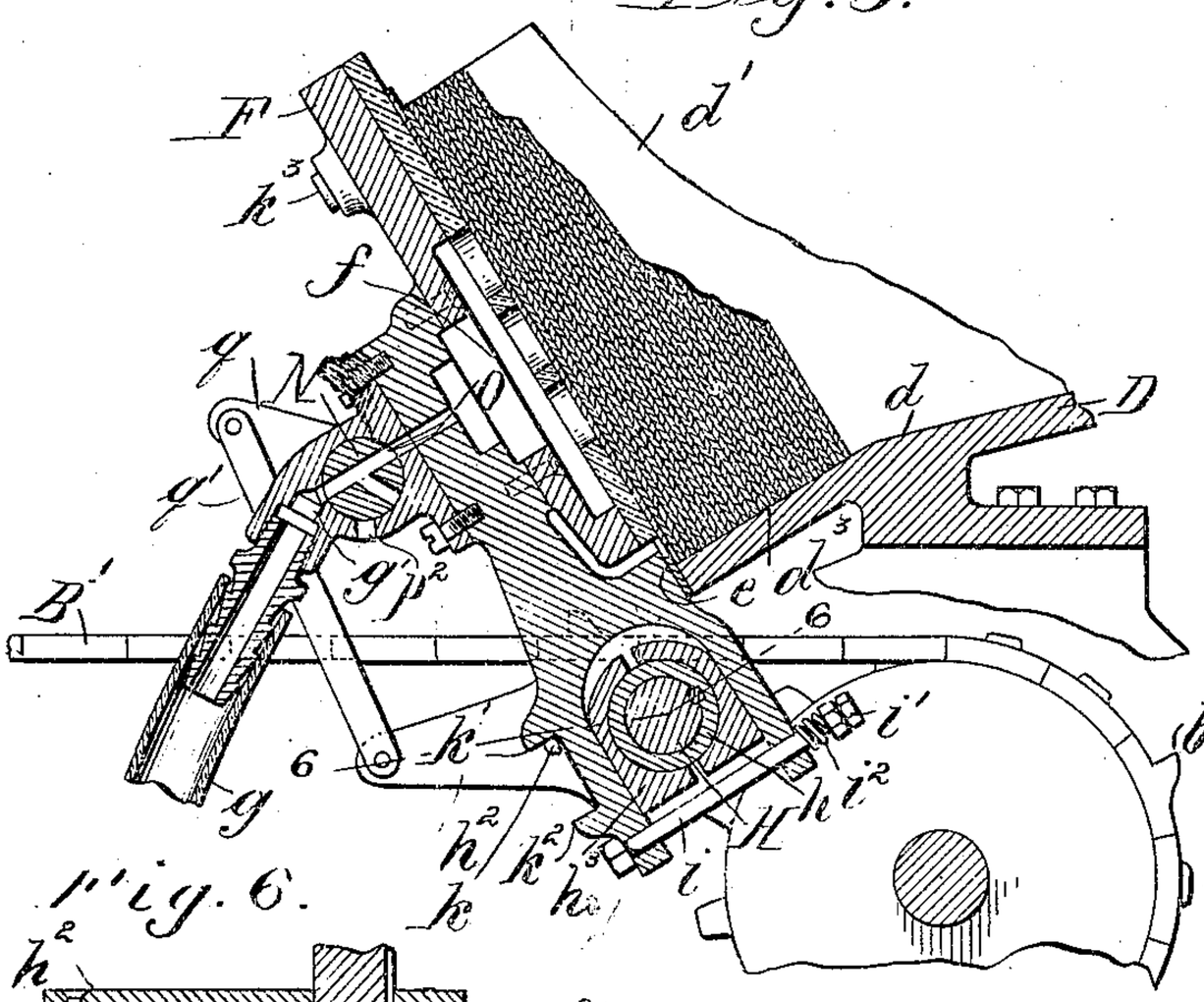


Fig. 4.

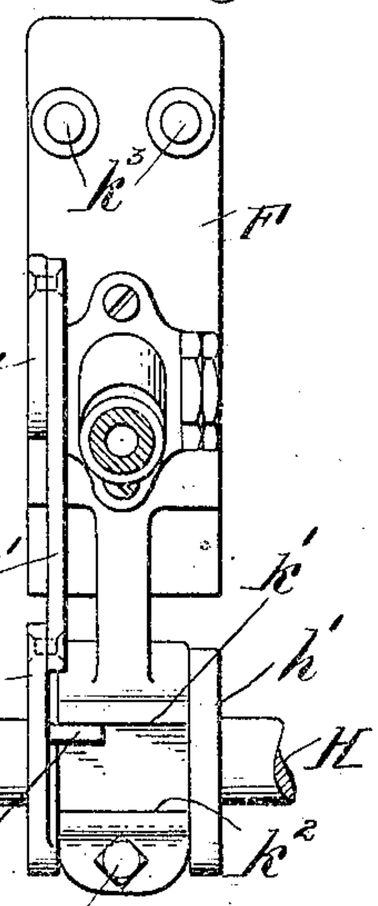


Fig. 6.

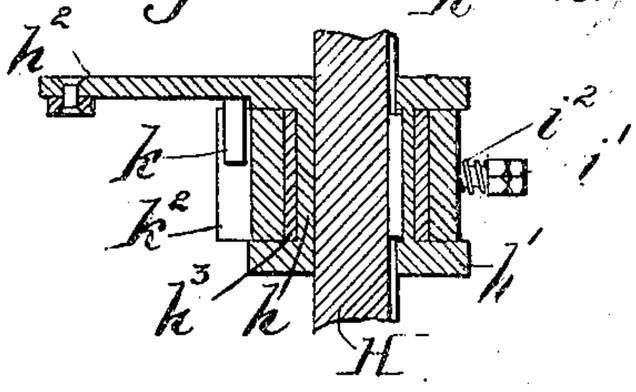
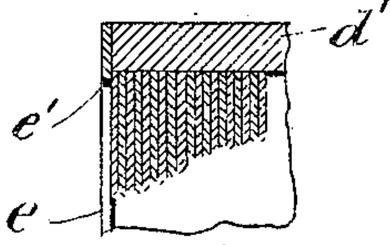


Fig. 7.

Fig. 8.



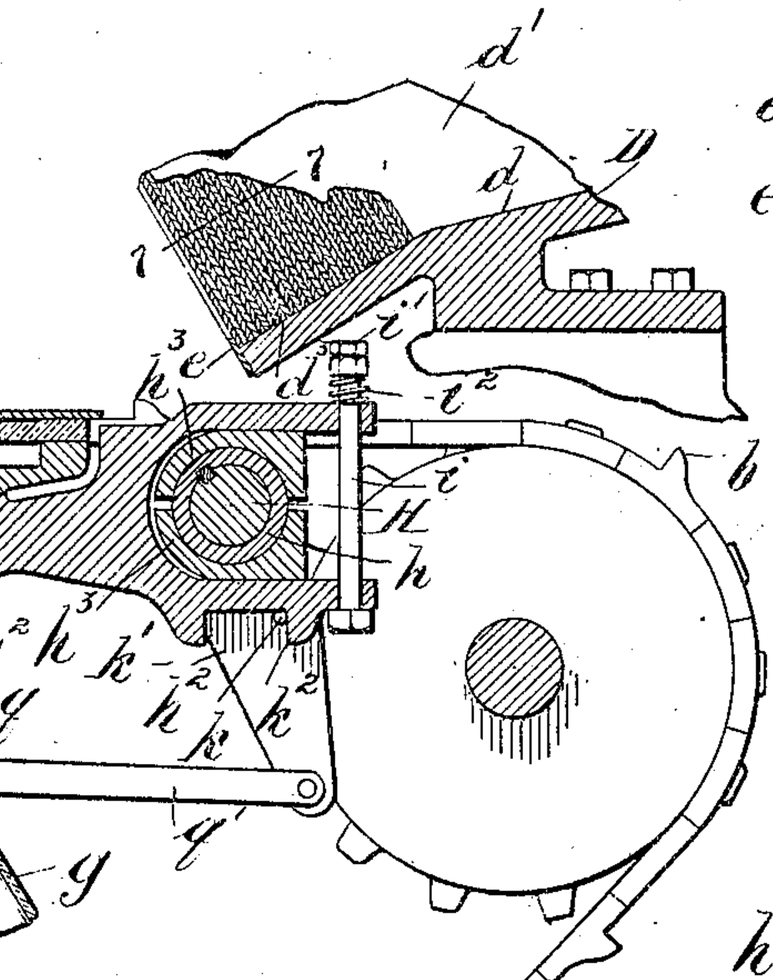
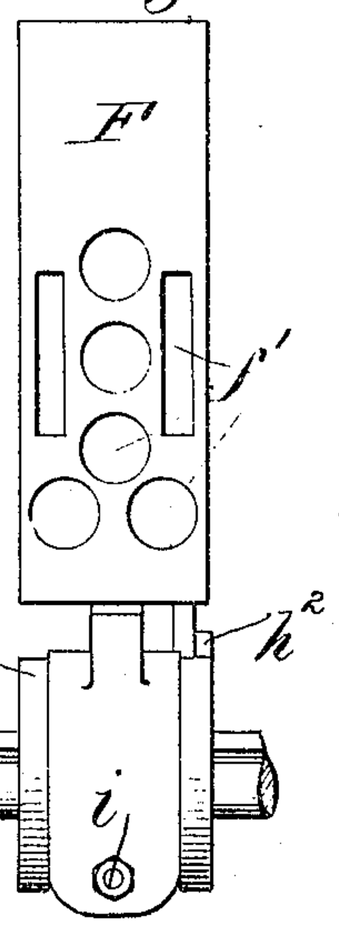


Fig. 5.



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No. 769,927. PATENTED SEPT. 13, 1904.

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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 9.

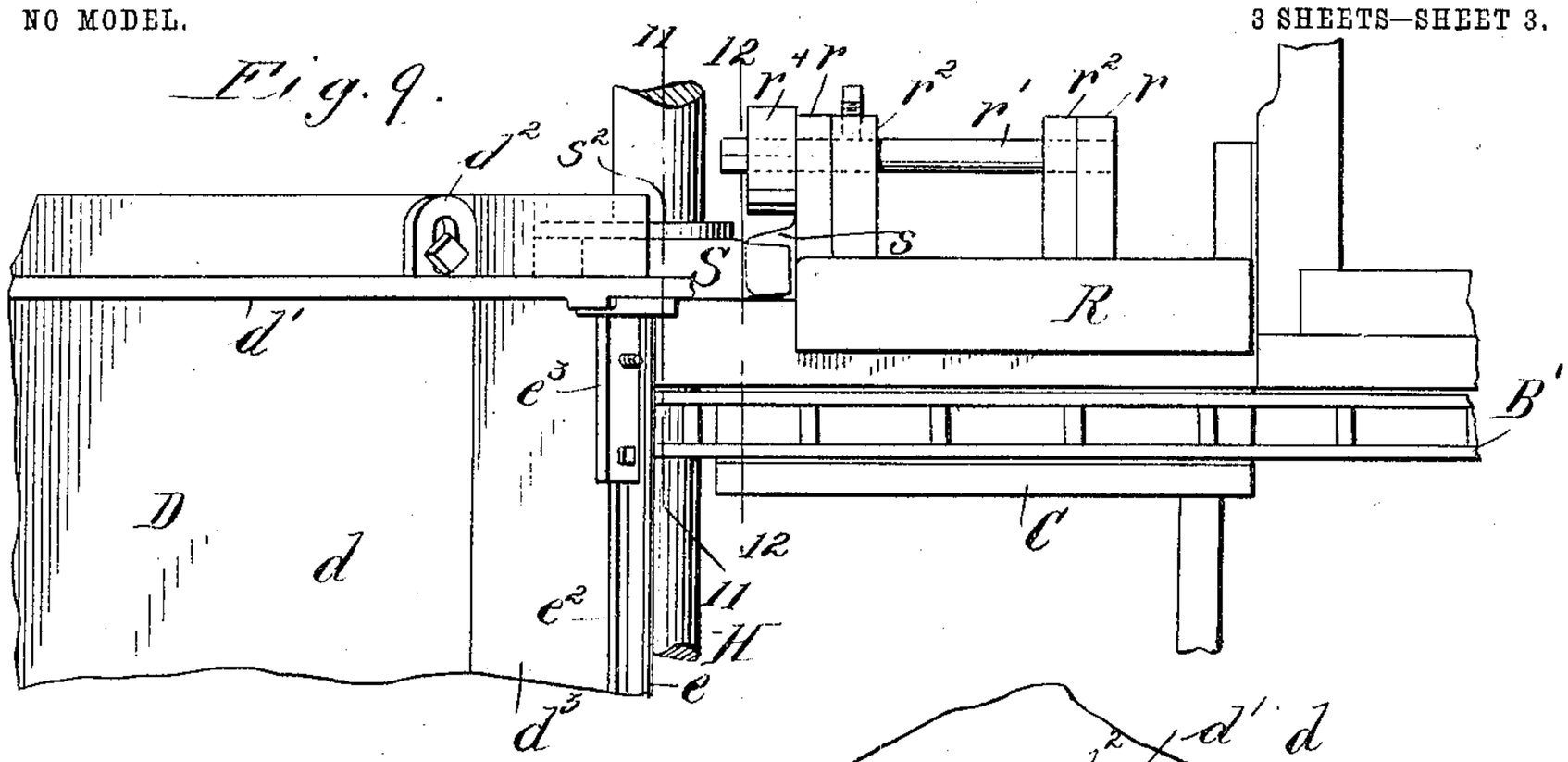
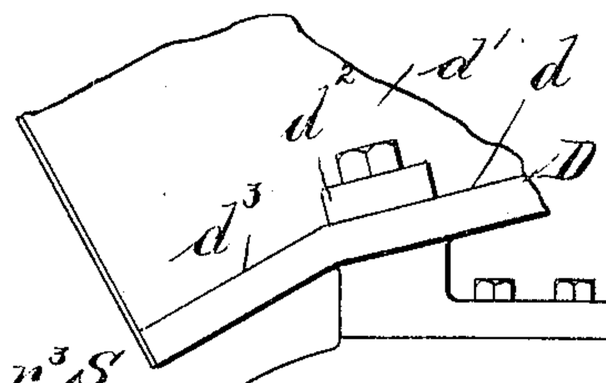


Fig. 10.



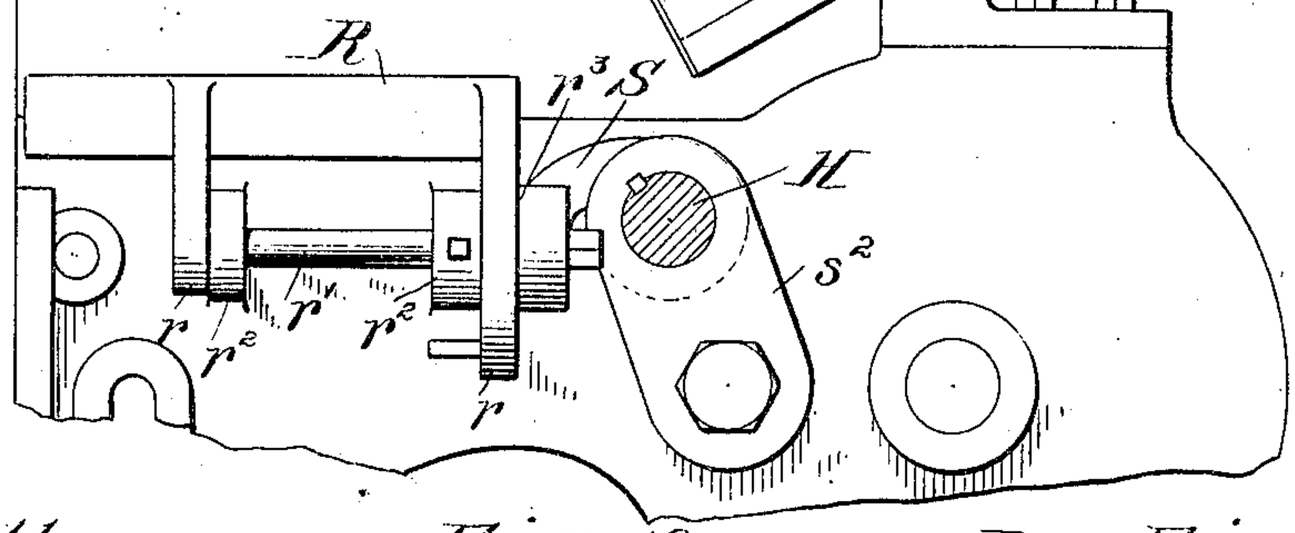


Fig. 11.

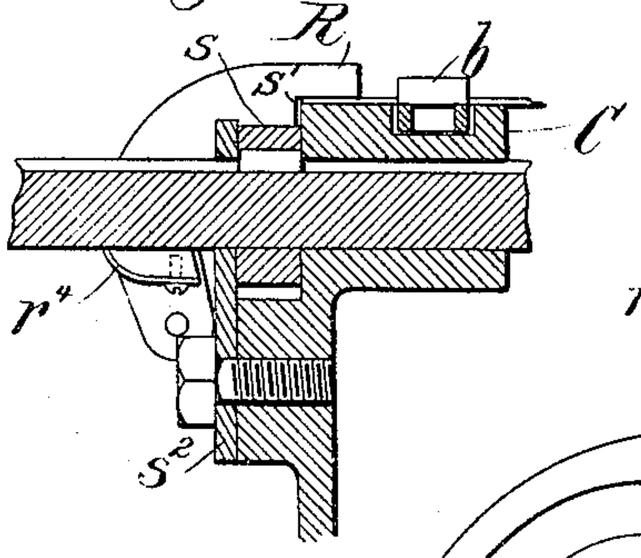


Fig. 12.

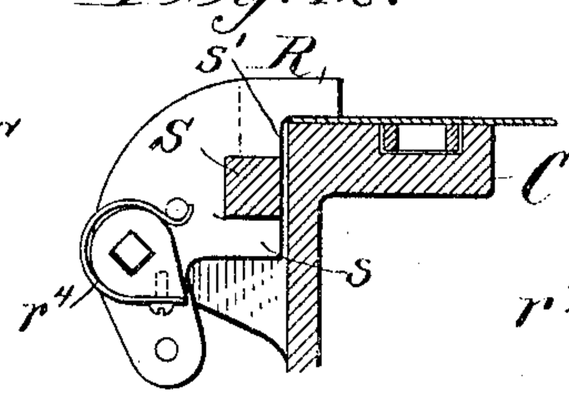


Fig. 13.

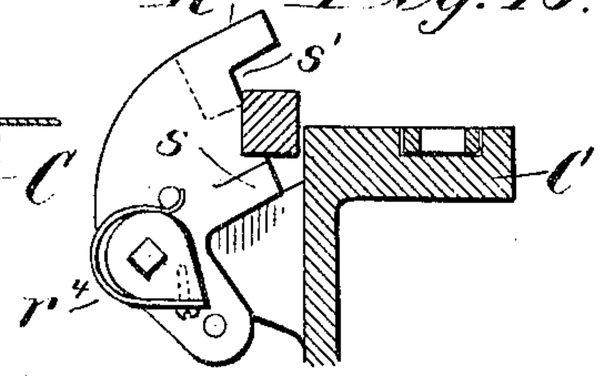
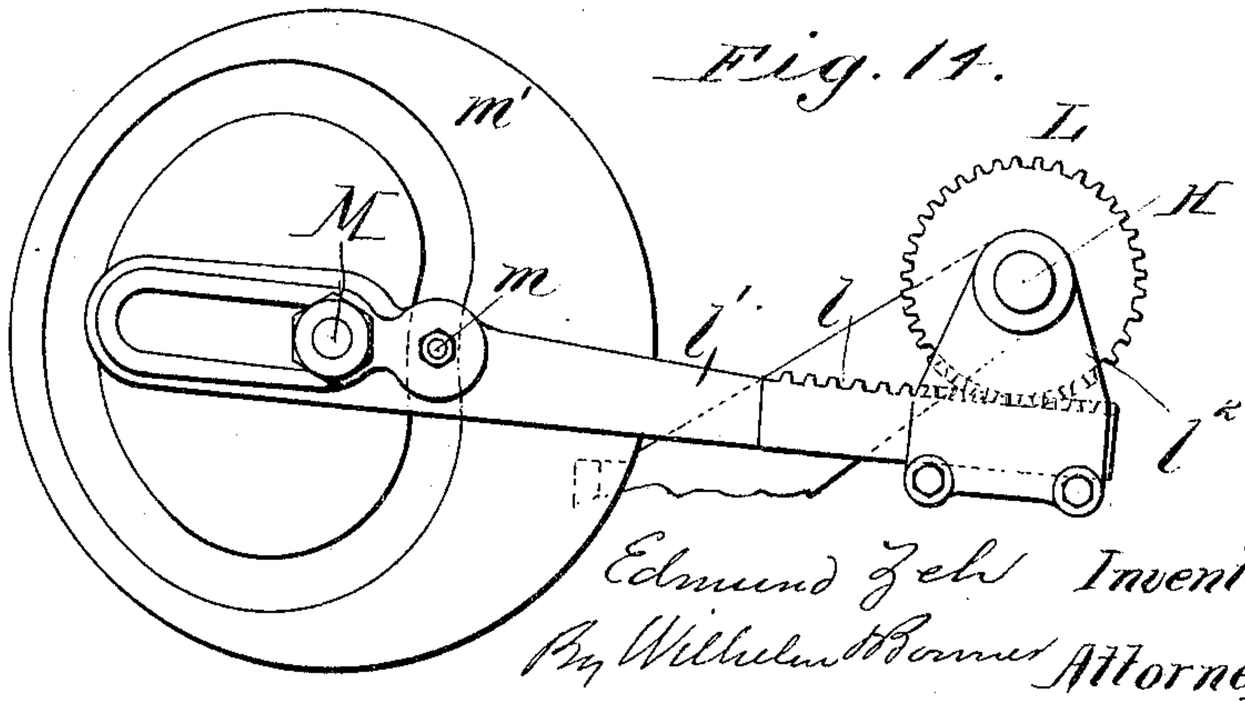


Fig. 14.



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No. 769,927. Patented September 13, 1904.

UNITED STATES PATENT OFFICE.

EDMUND ZEH, OF BUFFALO, NEW YORK, ASSIGNOR TO NIAGARA MACHINE & TOOL WORKS, OF BUFFALO, NEW YORK.

FEED MECHANISM FOR CAN-BODY MACHINES.

SPECIFICATION forming part of Letters Patent No. 769,927, dated September 13, 1904.

Application filed December 14, 1903. Serial No. 185,025. (No model.)

To all whom it may concern:

Be it known that I, EDMUND ZEH, a citizen of the German Empire, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Feed Mechanism for Can-Body Machines, of which the following is a specification.

This invention relates to mechanisms for feeding metal or analogous sheets from a pile or stack, and more particularly to feed mechanisms for successively feeding can-body blanks to can-body-making mechanisms.

The object of the invention is to provide a rapid efficient feed mechanism of simple and practical construction.

The feed mechanism hereinafter described is especially designed for use in connection with can-body-making machines of the type disclosed in United States Letters Patent granted to me July 28, 1903, No. 734,648, but is or can be readily adapted to other machines. The machine described in said patent embodies intermittently-moving endless conveyer-chains, to which the blanks are supplied successively by hand and which carry the blanks to the edging mechanism, in which the side-seam hooks are formed on the opposite side edges of the blank.

The feed mechanism comprises a holder, in which a stack or number of blanks are placed on edge, and one or more movable arms which have at their free ends pneumatic means for taking hold of the foremost blank, which is placed by the arms in position to be engaged and carried forward by the conveyers, after which the feed-arms return and take hold of the next blank.

In the accompanying drawings, consisting of three sheets, Figure 1 is vertical sectional elevation of a blank-feeding mechanism embodying the invention and a portion of a can-body-making machine to which the feed mechanism is applied. Fig. 2 is a plan view thereof. Fig. 3 is a fragmentary sectional elevation, on an enlarged scale, of one of the feed-arms and associated parts, showing the arm engaging the foremost blank in the holder, said blank being raised to pass the retaining-lip on the bottom of the blank-holder. Fig. 4 is a front elevation, on an enlarged scale, of the feed-arm. Fig. 5 is a sectional elevation similar to Fig. 3, showing the feed-arm lowered with the blank in position to be carried forward by the conveyers. Fig. 6 is a fragmentary section of the feed-arm and feed-shaft in line 6 6, Fig. 3. Fig. 7 is a fragmentary horizontal section of the blank-holder in line 7 7, Fig. 5. Fig. 8 is an enlarged rear elevation of the feed-arm. Fig. 9 is a fragmentary plan view, on an enlarged scale, showing the blank-clamp and side gage. Fig. 10 is a fragmentary side elevation, on an enlarged scale, of the parts shown in Fig. 9. Fig. 11 is a detail section of the operating device for the blank-clamp in line 11 11, Fig. 9. Figs. 12 and 13 are detail sectional elevations of the blank-clamp in line 12 12, Fig. 9, showing the blank-clamp respectively in released and clamping position. Fig. 14 is a side elevation, on an enlarged scale, of the mechanism for rocking the feed-shaft.

Like letters of reference refer to like parts in the several figures.

A represents a portion of the frame of a can-body-making machine or other machine, and B B′ represent, respectively, a central and two side conveyer-chains, which are driven intermittently by any suitable mechanism and are provided with feed dogs or teeth *b* for the blanks. The conveyer-chains are guided in grooves in brackets or arms C, the top faces of which are horizontal and constitute a support for the blank as it is moved forward by the conveyers. The side conveyers and their supporting-brackets are adjustable toward and from each other, as described in said patent, to accommodate blanks of different widths.

D represents a holder or box for a stack or pile of blanks. The blank-holder is supported in any suitable manner above the conveyers, preferably being bolted to the supporting-brackets for the conveyers and preferably comprising, as shown in the drawings, an inclined bottom *d* and upright sides *d′*, which are adjustable toward and from each other to properly center the blanks relative to the conveyers and accommodate blanks of different widths. The sides are provided with out-

wardly-projecting slotted feet d^2, through which and through holes in the bottom pass securing-bolts. The front ends of the bottom and sides of the blank-holder are provided with lips or flanges e and e', which project, respectively, above and inwardly from said bottom and sides and engage the bottom and side edges of the foremost blank in the holder to prevent its escape from the holder. The forward end d^3 of the bottom of the blank-holder has a greater inclination than the other portion thereof, and the holder is provided above and substantially opposite to the angle formed by the two portions of the bottom with a transverse horizontal holding-bar e^2, which is secured at its opposite ends in suitable brackets e^3, adjustably secured by bolts or otherwise to the sides of the blank-holder to permit the holding-bar to be raised and lowered, so that its lower edge projects only slightly below the top edges of the blanks, as shown in Fig. 1. The horizontal holding-bar receives the thrust or weight of the main portion of the stack of blanks and holds the weight thereof off of the foremost blank, which bears against the retaining-lips, so that less force is required to pull such blank out from between the lips and other blanks than would be the case if the weight of all of the blanks were sustained by the retaining-lips. As the blanks successively reach the holding-bar and angle of the bottom they slide or slip forward until their upper edges disengage the holding-bar and fall forward against that portion of the pile which is supported by the retaining-lips.

F represents the swinging feed-arms, which take the blanks from the blank-holder and place the same upon the blank-support over the conveyers. Two of these swinging arms are shown in the drawings arranged between the central and side conveyer; but one feed-arm could be employed, and as the two arms are similar in construction only one will be herein described. The outer portion of the feed-arm is provided with a vacuum-chamber f on its rear side, or next to the blank-holder, and this chamber is covered by a friction-plate of rubber or suitable yielding material to which the blanks will readily adhere, said friction-plate having perforations f' communicating with the chamber of the arm.

g represents a hose or flexible pipe secured to a nipple on the feed-arm and connected by a passage g' with the vacuum-chamber. The hose or pipe is connectd to a suitable pump or other device for exhausting the air from the vacuum-chamber, so that when the arm bears against a blank and the air is exhausted the blank will be held firmly on the arm by atmospheric pressure.

As the lower edge of the foremost blank bears against the retaining-lips on the bottom and sides of the blank-holder, it is first lifted clear of said bottom lip and then pulled or snapped out from between the side lips by the feed-arm. The feed-arm is raised to thus disengage the blank from the bottom lip and then swung downwardly to place the blank on the blank-support and conveyers by the following mechanism: H represents a horizontal rocking feed-shaft, which is journaled in suitable bearings on the frame-brackets C and a bearing-bracket c. The lower end of each feed-arm is forked and straddles a bushing or sleeve h, Figs. 3 to 6, which is keyed on the feed-shaft or otherwise secured thereto so that it can be adjusted longitudinally on the shaft, but will turn therewith. The feed-arm is confined between a flange h' and an arm h^2 at opposite ends of the bushing, and friction-shoes h^3 embrace the bushing between the same and the opposite portions of the fork of the feed-arm. The arm is retained on the bushing and the friction-shoes caused to bear against the bushing with the requisite pressure by a bolt i, which passes through holes in the fork-arms and is provided at one end with adjusting-nuts i'', between which and the fork is a coil-spring i^2, surrounding the bolt. By tightening or loosening the adjusting-nut i'' the pressure of the friction-arms on the bushing can be regulated as desired. The arm h^2 of the bushing is provided with a pin or projection k, which extends in between lugs or shoulders k' k^2 on the feed-arm. When the feed-shaft is rocked to the right in Fig. 3, the feed-arm is caused to turn with the shaft, by reason of the friction between the bushing and the friction-shoes until the friction-plate of the feed-arm bears against the foremost blank in the blank-holder. The feed-arm is then held from further rotary movement with the feed-shaft, and the pin on the bushing-arm is carried against the upper projection on the feed-arm, thus raising the arm bodily and lifting the blank, which has been caused to adhere to the feed-arm, above the lip on the bottom of the blank-holder. The feed-shaft is then rocked to the left to swing the feed-arm downwardly between the conveyers until the blank rests upon the blank-support over the conveyers. The feed-arm is arrested in this position by the engagement of a bumper k^3 thereon with a stop-pin or projection k^4, secured to one of the stationary frame-brackets. (See Figs. 1 and 5.) After the feed-arm has been thus stopped the feed-shaft and bushing continue their rotation and the pin on the arm of the bushing engages the lower projection k^2 on the feed-arm, shifting the latter forwardly to its former position, so that when the feed-arm is again swung upwardly against the blanks it will be in its lower position ready to grasp the blank and lift the latter over the retaining-lip on the bottom of the blank-holder. The feed-shaft is provided at one end with a gear-wheel L, Figs. 2 and 14, which meshes with a toothed rack l on a rack-bar l', the front end of which slides in a stirrup l^2, which

is hung on the feed-shaft H and straddles the gear-wheel L. This stirrup holds the toothed rack in engagement with the gear-wheel and guides the same in the reciprocation of the rack-bar. The inner or rear end of the rack-bar is slotted and slides and bears on the end of a shaft M, which constitutes one of the shafts of the can-body-making machine, or may be considered to be a shaft driven by any suitable power. The rack-bar is provided with a stud or roller m, which projects into a cam-groove in the adjacent face of a cam disk or wheel m', secured to rotate with the drive-shaft M. The shape of the cam-groove is such as to swing the feed-arm from the position shown in Fig. 3, in which it is engaged with the foremost blank in the blank-holder, down between the conveyers, as indicated in Fig. 5, and hold the arm stationary in this position until the blank has been removed out of the path of the feed-arm by the conveyers and then return the feed-arm to its upper position, (shown in Fig. 3,) holding it there momentarily until the blank is grasped and lifted above the retaining-lip on the bottom of the blank-holder. The vacuum is established and destroyed in the vacuum-chamber to grasp and release the blank by a valve N of any suitable form. A three-way valve is shown arranged to turn in a valve-chamber on the feed-arm and having passages O and P. The valve is provided with an operating-arm q, connected by a link q' with the arm h^2 of the bushing for the feed-arm. When the feed-arm is moved upwardly into engagement with the blank, the valve is turned to the position shown in Fig. 3, in which its passage O connects the two parts of the passage g' in the feed-arm leading from the vacuum-chamber to the exhaust-pipe, thus permitting the air to be exhausted from the vacuum-chamber. When the feed-arm is swung downwardly to place the blank on the blank-support and conveyers, the valve is turned so that its passages O P connect the passage g', leading from the vacuum-chamber, with a port p^2, connecting with the atmosphere, thereby permitting the flow of air into the vacuum-chamber and destroying the vacuum, so that the blank is released from the feed-arm and permitted to be moved forwardly by the conveyers. The feed-arm preferably moves down below the plane of the blank-support, so that the blank is not dragged over the friction-plate on the arm by the conveyers.

The blank is centered on the blank-support and held stationary thereon until it is engaged by the teeth of the conveyers by the following mechanism: R represents gage and clamp devices which are arranged lengthwise outside of the two adjustable side brackets for the conveyers. Each clamp has a bar overhanging the adjacent blank-support and is provided with arms r, hinged to turn on a stationary shaft or pin r', which is fixed in arms r^2, projecting from the adjustable bracket. One end of the pin r' is provided with a fixed collar r^3, to which is secured one end of a spring r^4, the other end of which engages a pin or projection secured to the adjacent arm of the clamp. This spring tends to normally hold the clamp in its upper outer position. (Shown in Fig. 13.) The arm of the clamp adjacent to the feed-shaft is provided with a lug or part s, which is arranged in the path of a tappet-arm S, fixed to rotate with the feed-shaft. When the blank is placed by the feed-arms on the blank-support, the tappets S strike the lugs on the clamps, thereby swinging the latter downwardly against the tension of the springs and causing the clamping bars or portions to bear on the outer edges of the blank, as shown in Figs. 11 and 12. If the blank is not properly placed on the blank-support and projects out beyond the side frame-bracket, the upright portions s' of the clamps will strike the edge of the blank and move it over on the blank-support to a proper central position. The tappet-arm is keyed or otherwise secured to the feed-shaft, so that it rocks with the shaft, but is adapted to be adjusted longitudinally on the shaft and is held between the frame-bracket and a plate s^2, secured to the bracket, whereby the tappet is moved with the bracket in adjusting the latter.

I claim as my invention--

1. The combination of a blank-holder provided with a retaining device for the blanks, a movable feed-arm, means which engages the face of the foremost blank and to which the blank adheres, and means for operating said feed-arm to first move the blank edgewise parallel with itself to disengage it from the retaining device and then move it away from the other blanks in the holder, substantially as set forth.

2. The combination of one or more conveyers, a blank-holder in which the blanks are supported on edge, a retaining device for the lower edges of the blanks, a swinging feed-arm which carries the blanks from said holder to said conveyer, pneumatic means for holding the blank on said feed-arm, and means for first moving the blank edgewise parallel with itself out of engagement with said retaining device and then moving it away from the blanks in the holder, substantially as set forth.

3. The combination of a blank-holder provided with a retaining-lip for the lower edges of the blanks, a feed-arm, pneumatic means for holding the blank on said feed-arm, and means for first moving said feed-arm to lift the blank edgewise parallel with itself out of engagement with said retaining-lip and then swinging the arm away from said blank-holder, substantially as set forth.

4. The combination of one or more horizontally-operating conveyers, a blank-holder having an inclined bottom on which the blanks

are supported on edge, the front end of said bottom having greater inclination than the other portion, a holding device arranged opposite to the angle of said bottom, retaining means at the end of said blank-holder, a feed-arm, pneumatic means for holding the blank on said feed-arm, and means for swinging said arm down with the blank to place the latter on said conveyer, substantially as set forth.

5. The combination of a blank-holder provided with a retaining device for the lower ends of the blanks, a movable feed-arm provided with a vacuum-chamber, means for creating a vacuum in said chamber to hold the blank on said arm, means for first lifting the blank edgewise parallel with itself out of engagement with the retaining device and then moving it away from the blanks in the holder, and means for destroying the vacuum to release the blank, substantially as set forth.

6. The combination of a blank-holder, a rock-shaft, a feed-arm mounted on said shaft and provided with means to take hold of the blank, a friction device for causing said feed-arm to turn with said shaft, and means for shifting said feed-arm relative to the said shaft, substantially as set forth.

7. The combination of a blank-holder, a rock-shaft, a feed-arm provided with means for taking hold of the blank and having a forked portion straddling said shaft, friction-shoes interposed between said shaft and the forked portion of said feed-arm, and a shifting device movable with said shaft and which engages said feed-arm to shift the latter relative to said shaft to disengage the blank from said blank-holder, substantially as set forth.

8. The combination of a blank-support, a holder for a quantity of blanks, a feed-arm provided with means for holding a blank, means for operating said feed-arm to carry the blank to said support, a side gage and clamp, and means for operating said clamp to engage and move the blank to center it on the support and hold it when it is released from said feed-arm, substantially as set forth.

9. The combination of a blank-support, a holder for a quantity of blanks, a feed-arm provided with means for holding the blank, means for operating said feed-arm to carry the blank to said support, clamps at opposite sides of said support, and means for moving said clamps toward each other to engage and move the blank to center it on said support, substantially as set forth.

10. The combination of one or more conveyers, a support for holding the blank adjacent to said conveyer, a feed-arm provided with means for holding the blank, means for operating said feed-arm to place the blank on said support, pivoted clamps at opposite side of said support, and means for swinging said clamps toward the blank to center and hold the same on said support, substantially as set forth.

Witness my hand this 8th day of December, 1903.

EDMUND ZEH.

Witnesses:

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C. M. BENTLEY.