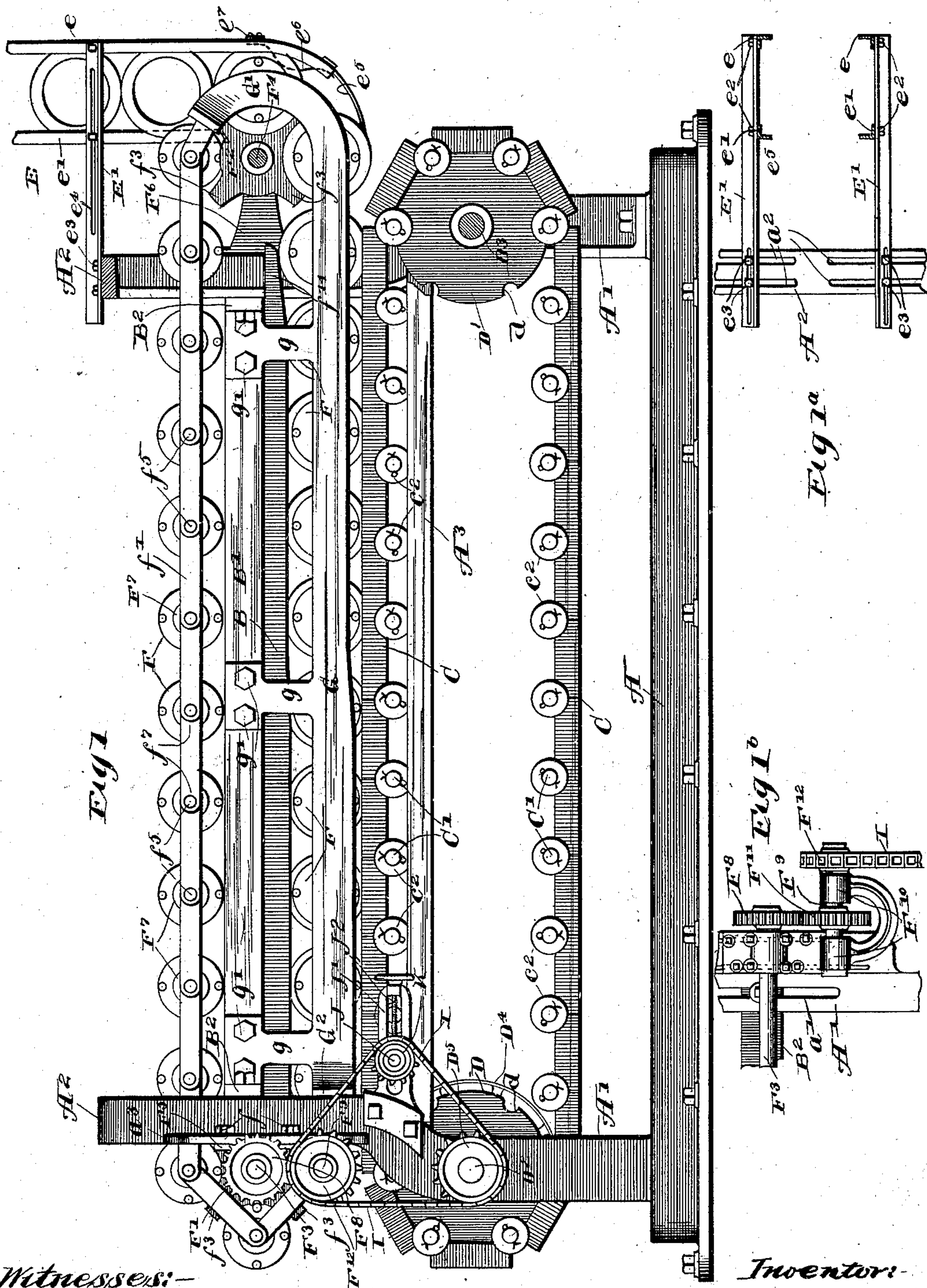


C. STECHER.  
MACHINE FOR DOUBLE SEAMING CANS.

APPLICATION FILED MAY 9, 1902.

NO MODEL.

5 SHEETS—SHEET 1.



Witnesses:  
Carl H. Crawford  
William Hall

Inventor:  
Charles Stecher  
by Pooler & Brown  
his Attorneys



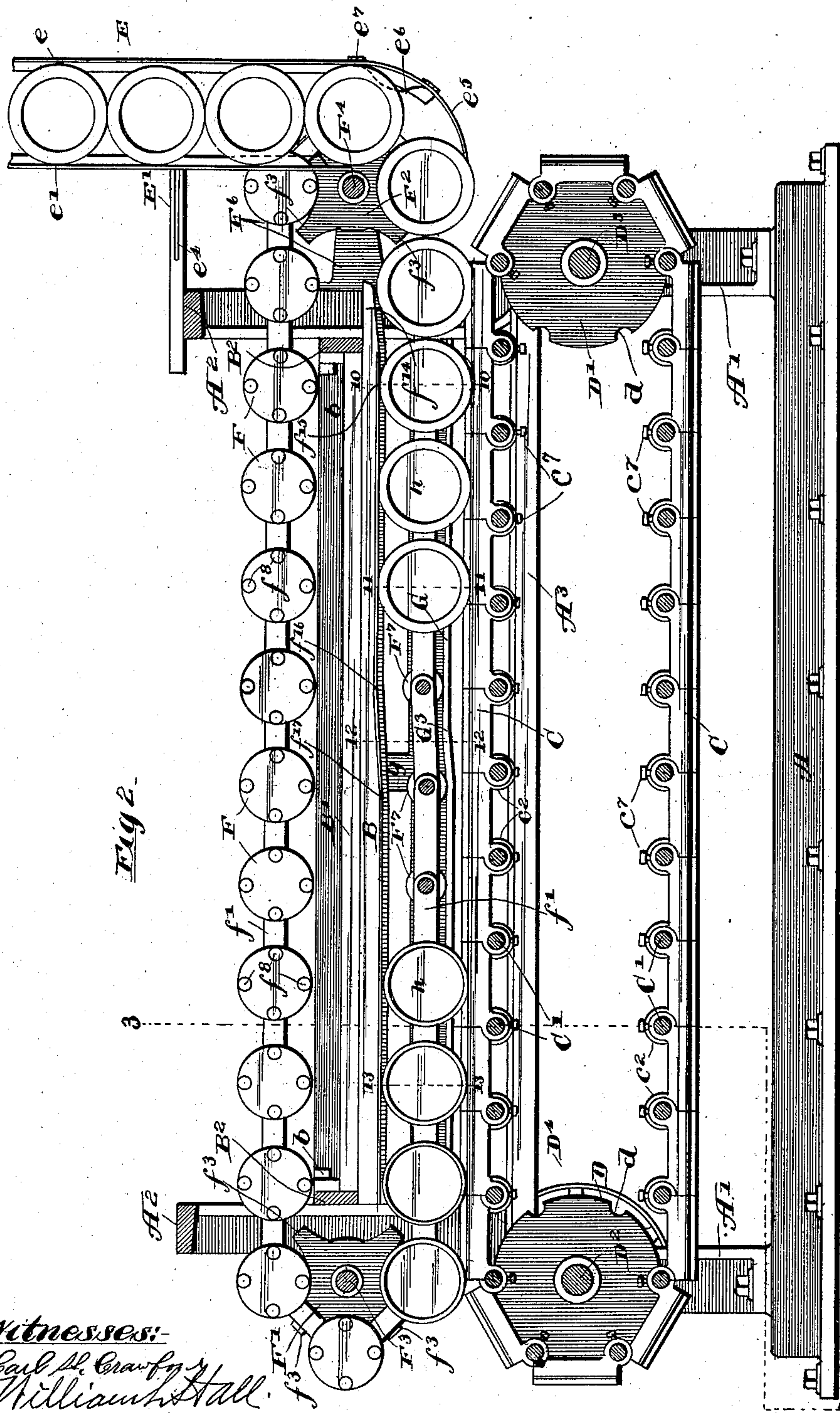
C. STECHER.

# MACHINE FOR DOUBLE SEAMING CANS.

APPLICATION FILED MAY 9, 1902.

NO MODEL

6 SHEETS—SHEET 2.



Witnesses:-

Carl H. Crawford  
William Hall

Inventor:

Charles Stecher

By Bole & Brown  
Attorneys

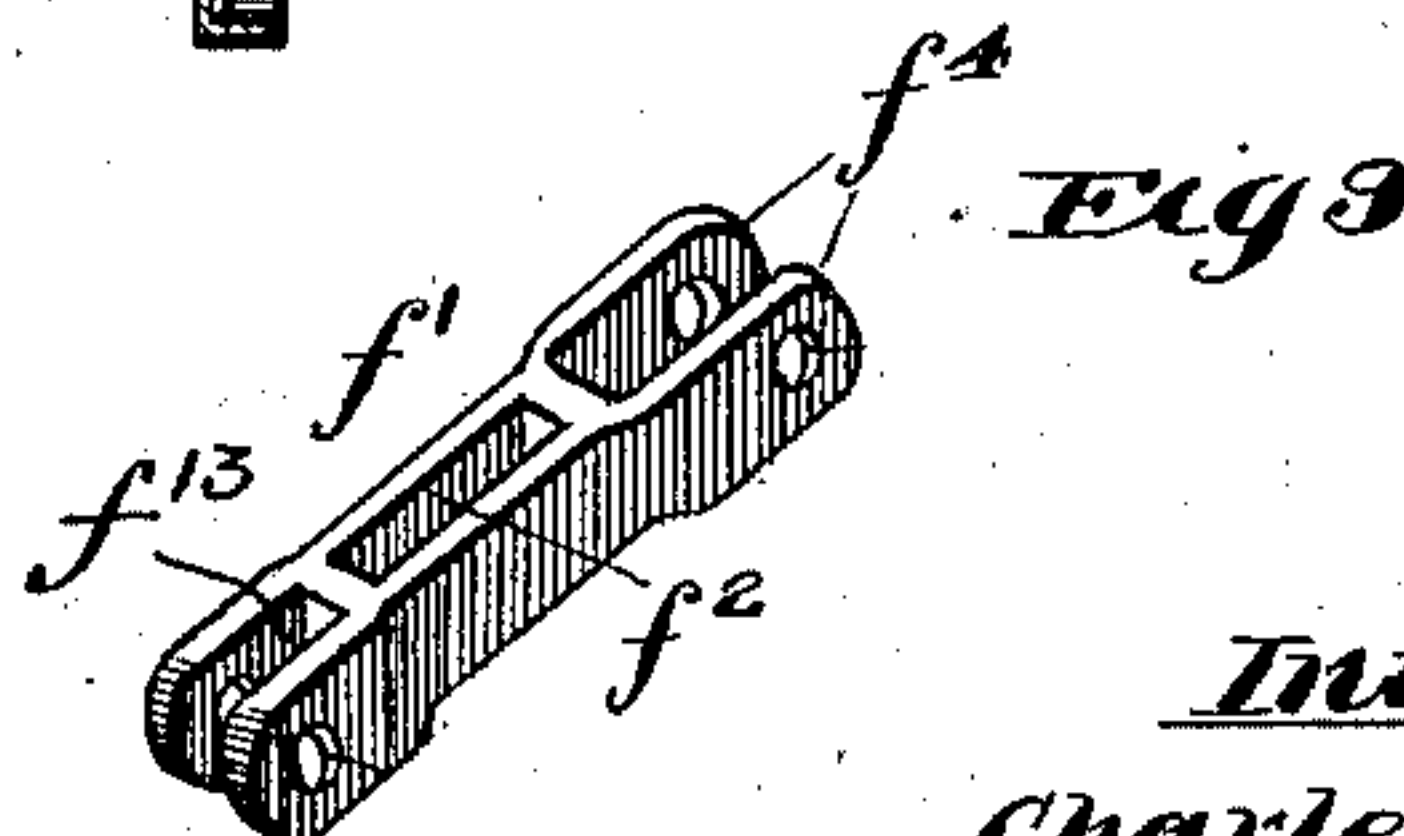
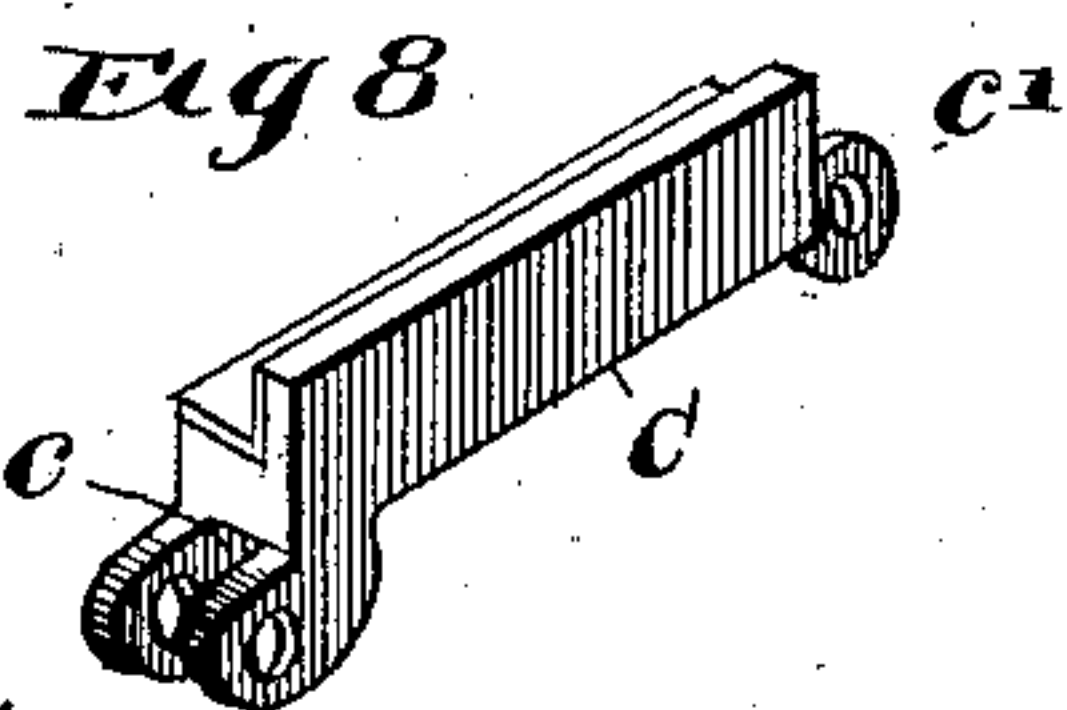
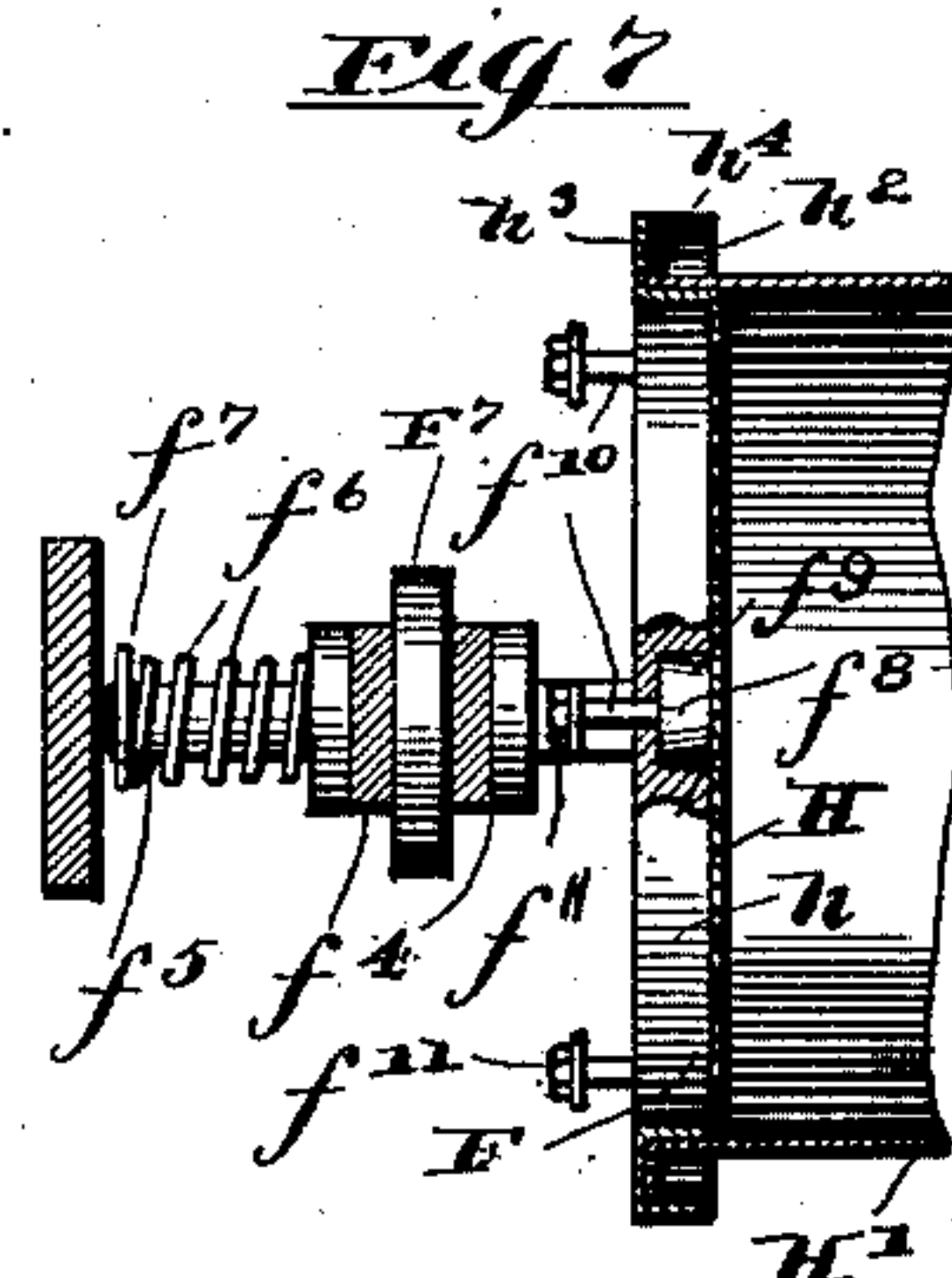
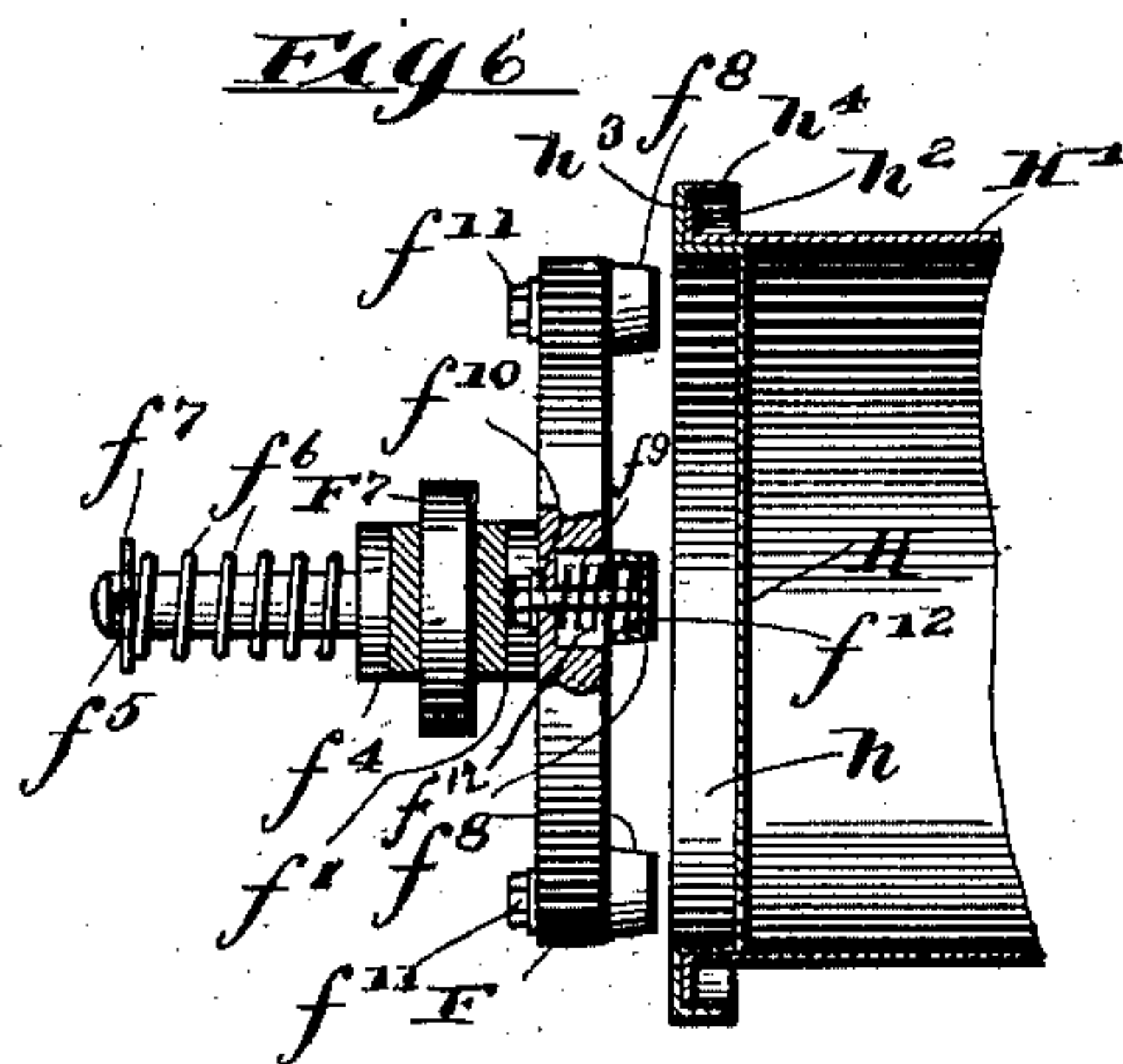
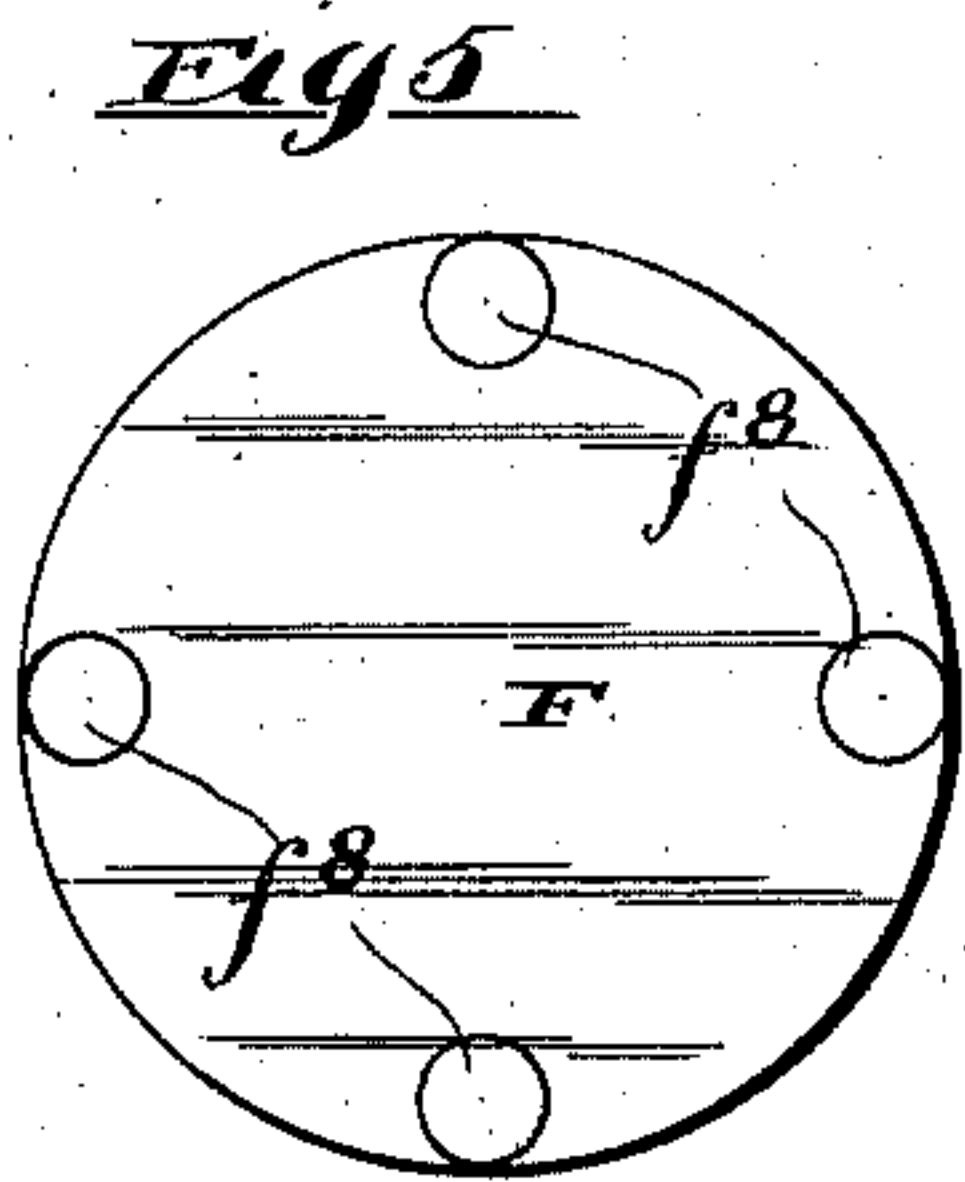
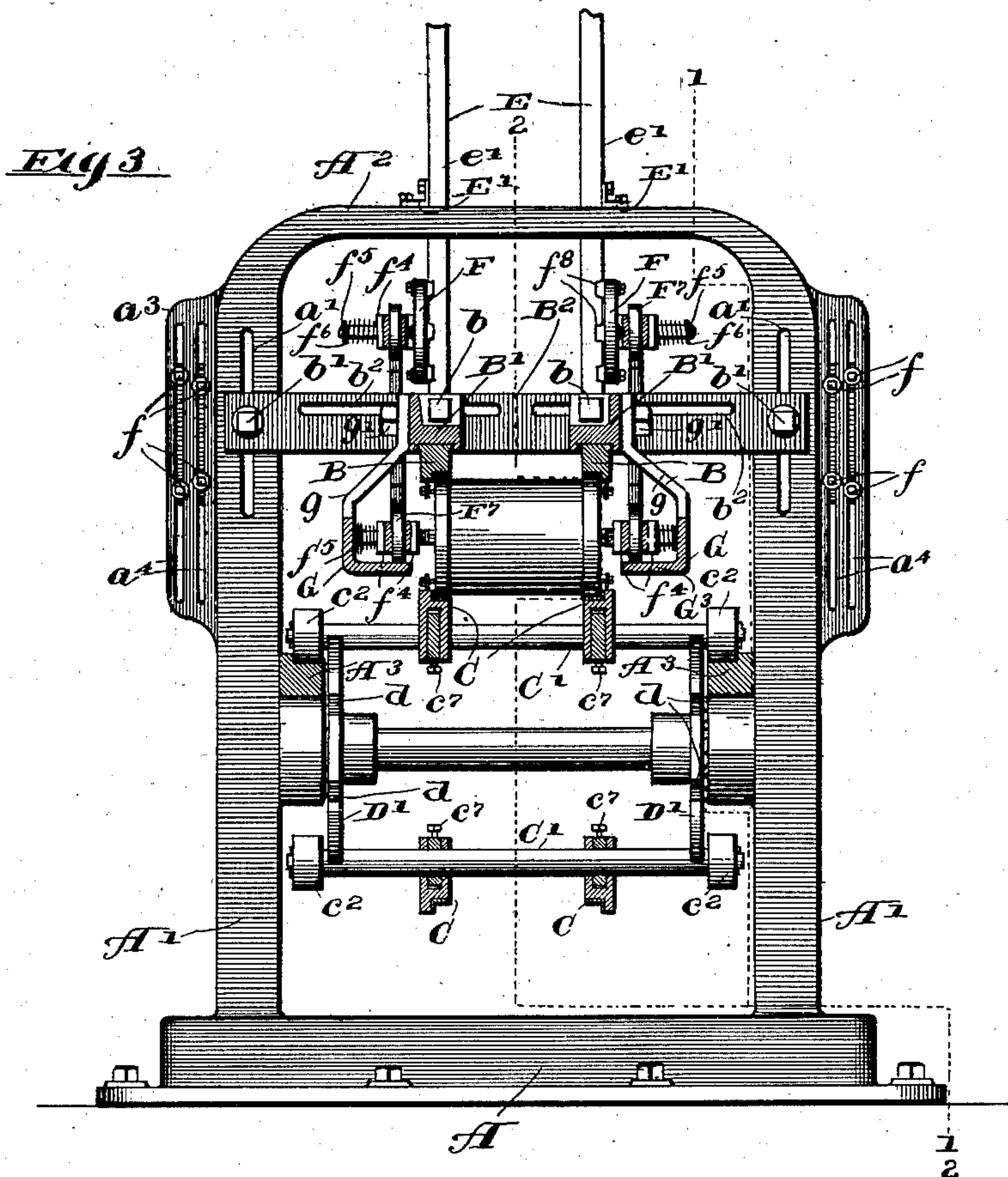
C. STECHER.

# MACHINE FOR DOUBLE SEAMING CANS.

APPLICATION FILED MAY 9, 1902.

NO MODEL.

5 SHEETS—SHEET 3.



Witnesses:-

Carl A Crawford  
William H. Hall.

Inventor:-

Charles Stecher

By Poole & Brown  
his Attorneys

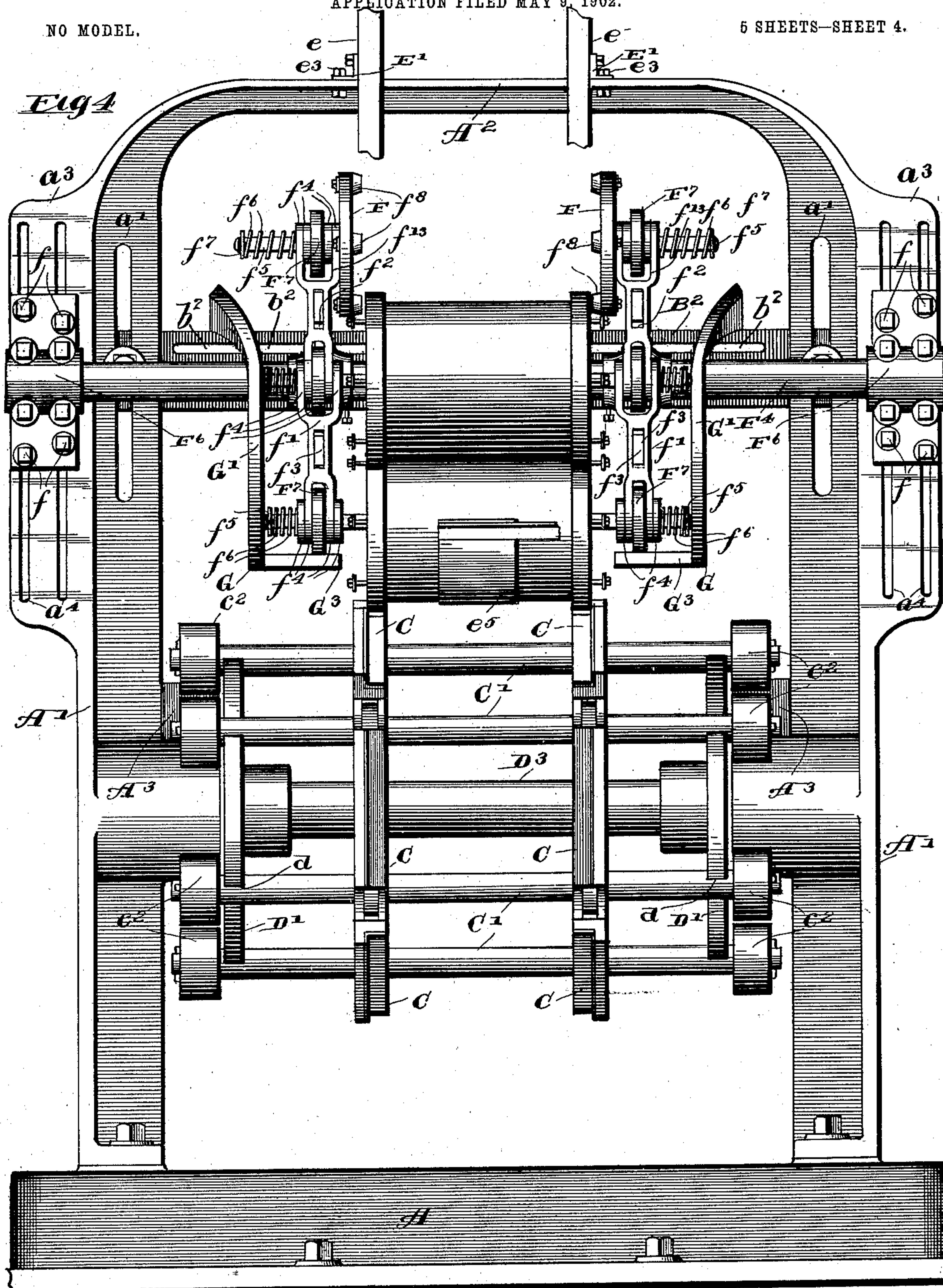


C. STECHER.  
MACHINE FOR DOUBLE SEAMING CANS.

APPLICATION FILED MAY 9, 1902.

NO MODEL.

5 SHEETS—SHEET 4.



Witnesses:-

Carl H. Crawford  
William H. Hall

Inventor:-

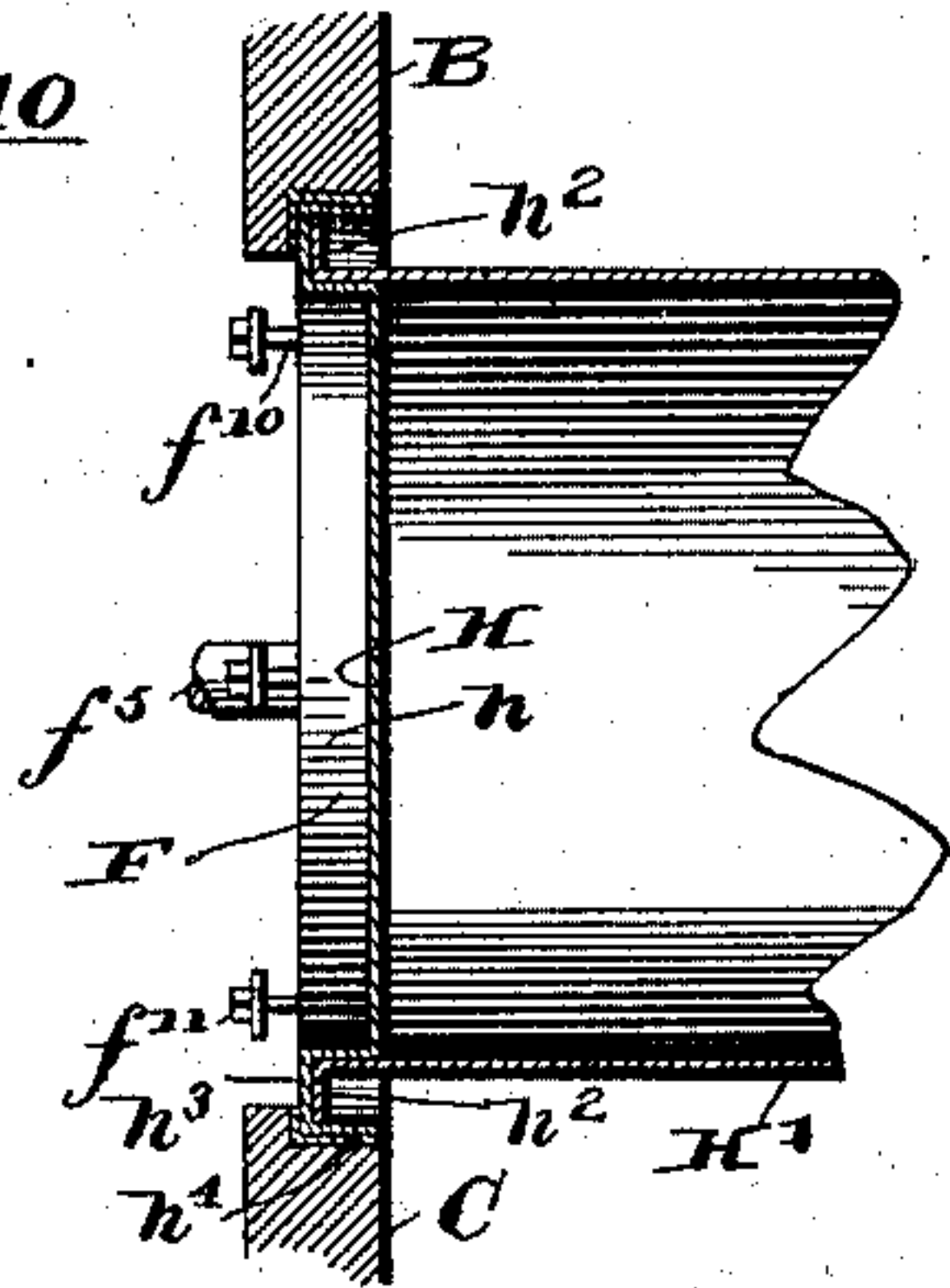
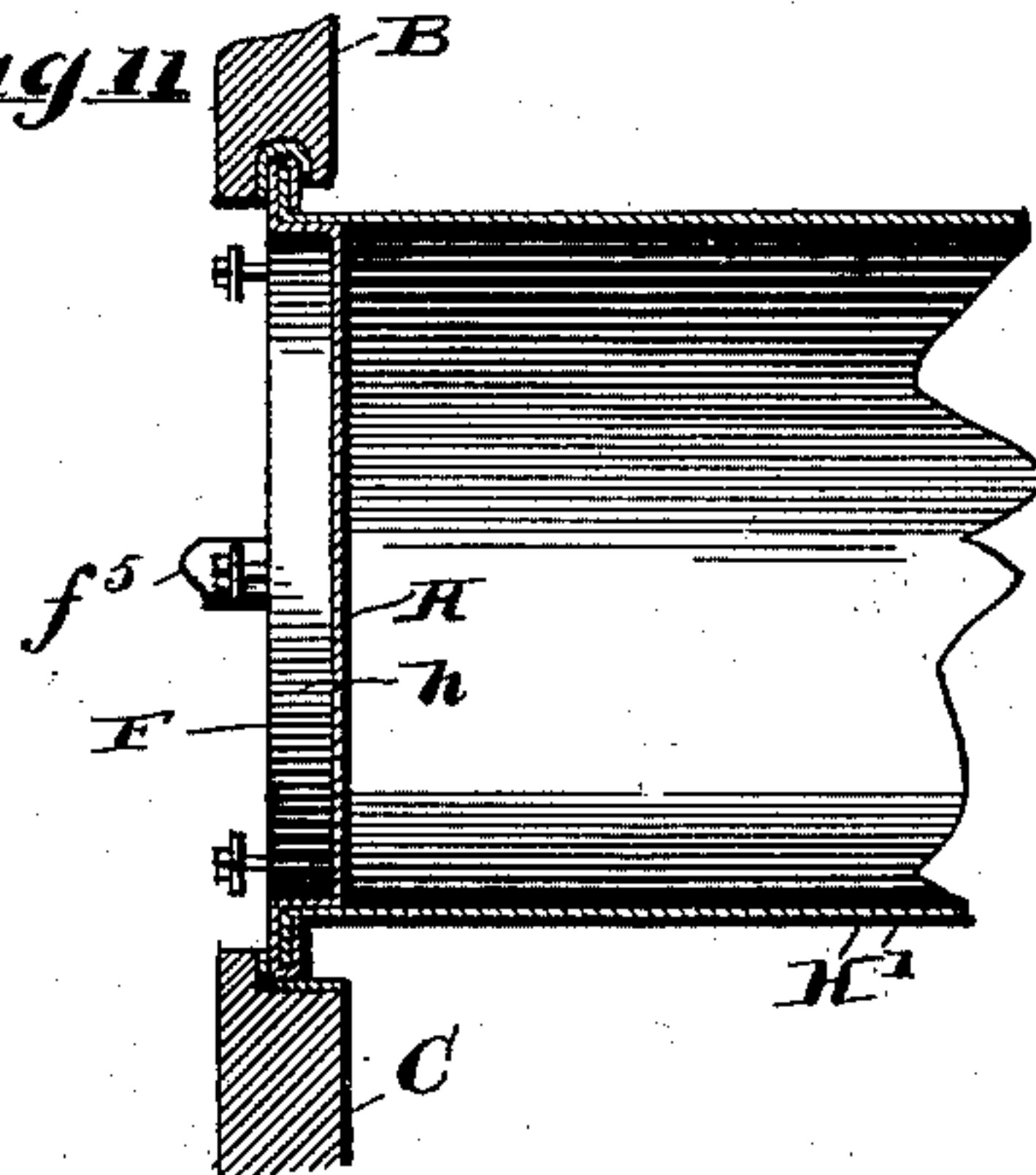
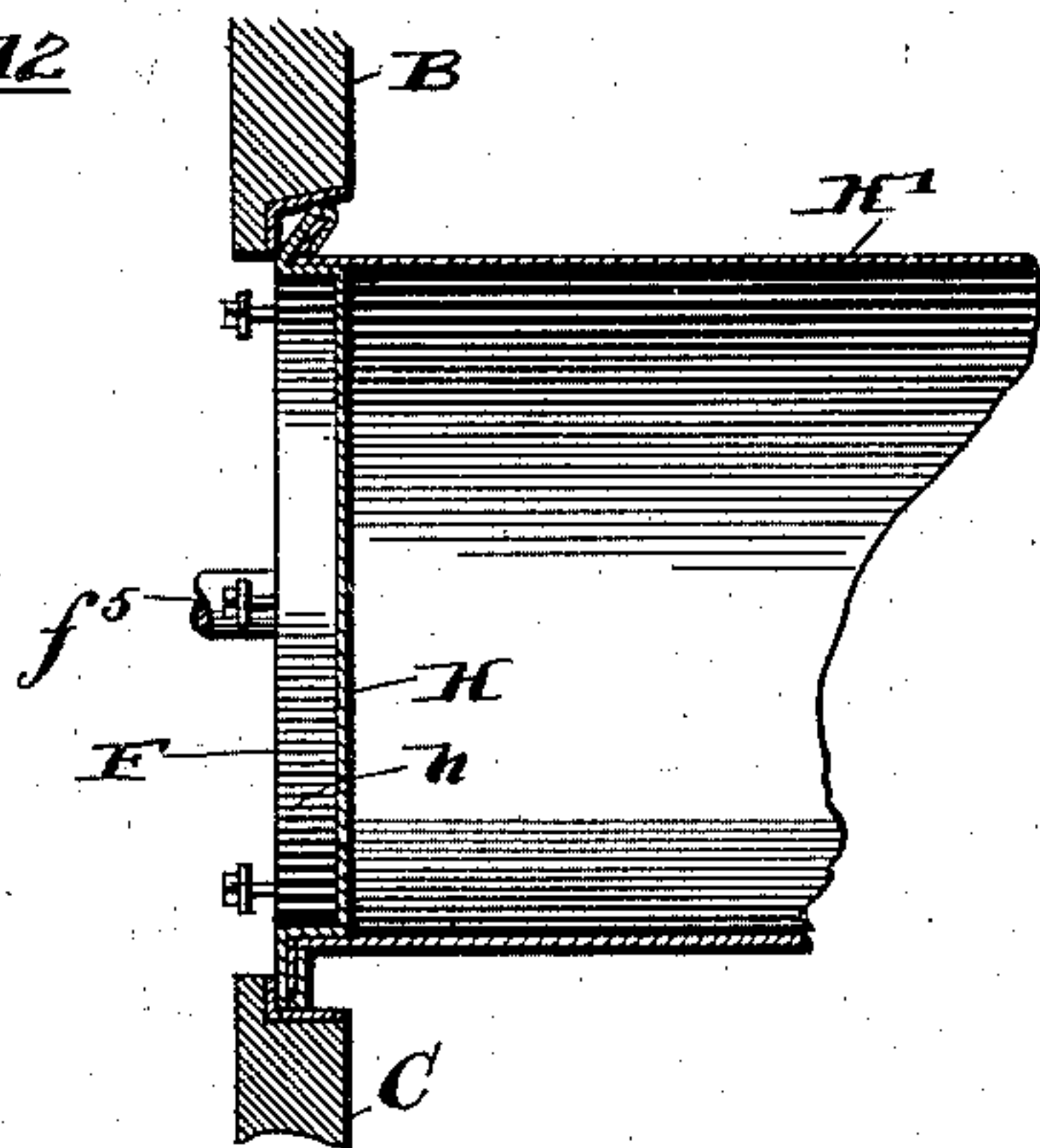
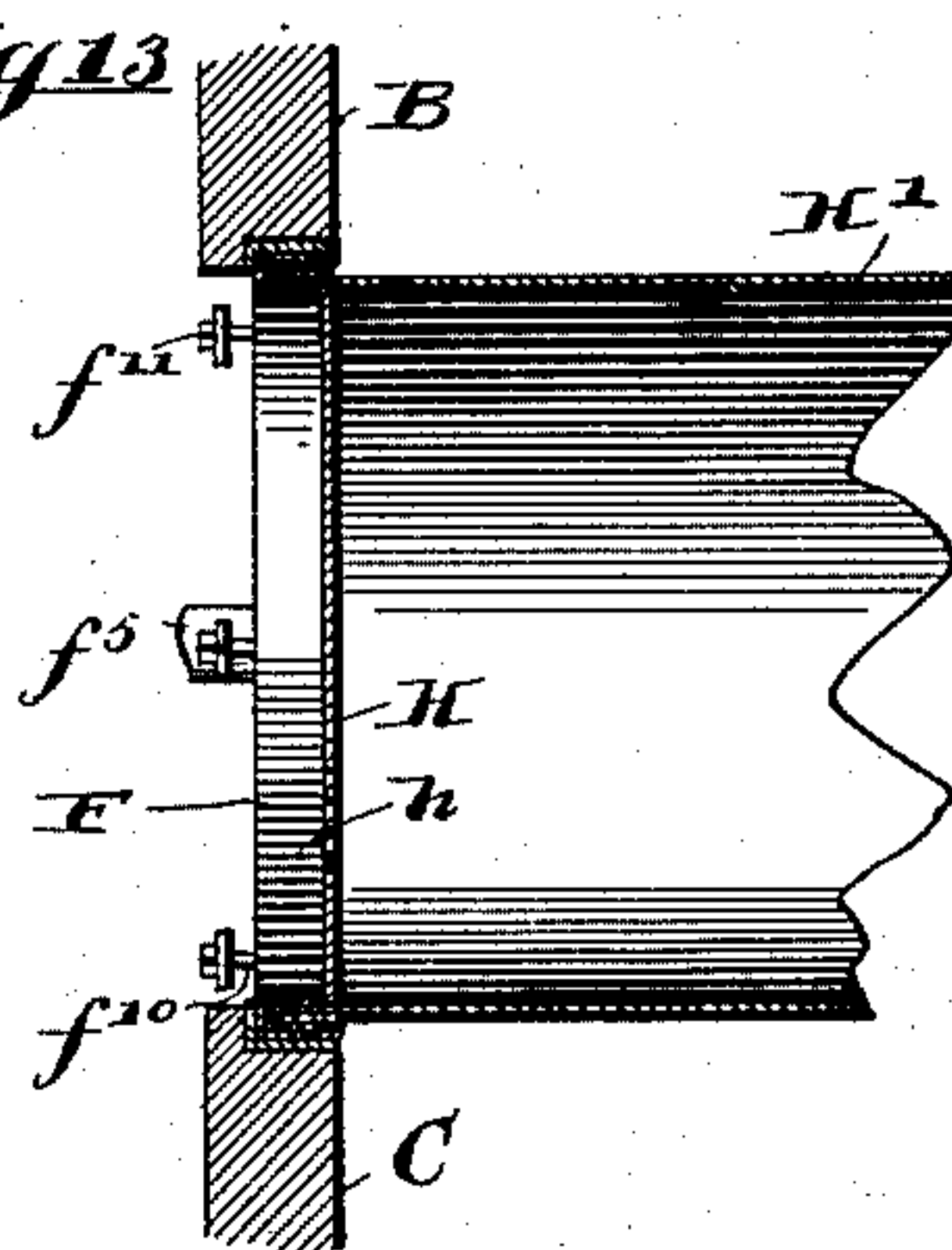
Charles Stecher:

by Poole & Brown  
his Attorney

C. STECHER.  
MACHINE FOR DOUBLE SEAMING CANS.  
APPLICATION FILED MAY 9, 1902.

NO MODEL.

6 SHEETS—SHEET 5.

*Fig 10**Fig 11**Fig 12**Fig 13*Witnesses:

Carl H. Crawford  
William H. Hall

Inventor:

Charles Stecher

by Poole & Brown  
his Attorneys



# UNITED STATES PATENT OFFICE.

CHARLES STECHER, OF POINT EDWARD, CANADA, ASSIGNOR OF TWO-THIRDS  
TO PETER FULFORD, OF NORTH PORT HURON, MICHIGAN, AND WILLIAM  
S. CUMMING, OF CHICAGO, ILLINOIS.

## MACHINE FOR DOUBLE-SEAMING CANS.

SPECIFICATION forming part of Letters Patent No. 741,942, dated October 20, 1903.

Application filed May 9, 1902. Serial No. 106,539. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES STECHER, of Point Edward, in the Province of Ontario and Dominion of Canada, have invented certain  
5 new and useful Improvements in Machines for Double-Seaming Cans; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the  
10 letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in machines for double-seaming sheet-metal cans or like vessels for the purpose of fasten-  
15 ing or securing the can heads or ends to the bodies of the cans; and the invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

20 The machine herein illustrated embodies certain of the features of construction illustrated in my prior application for United States Letters Patent, filed on the 25th day of April, 1902, for improvements in machines  
25 for crimping or otherwise fastening the heads of cans to the bodies thereof, the features in common in said machine being the two opposing dies or two sets of opposing dies for operating upon one or both ends of the can or  
30 other vessel and said can or other vessel being carried through the machine in rolling contact with the opposing dies. The machine herein shown, like the machine referred to in said prior application, is provided with two  
35 straight parallel forming-dies and with two series of movably-connected dies, which move in a plane parallel with the plane of the stationary dies and between which the flanges of the can heads and bodies are folded to form  
40 the crimps as the cans are rolled through the machine. In the machine herein illustrated the straight dies constitute the forming-dies for folding or bending over the flanges of the can body and head to effect the double-seam-  
45 ing of the same, while the movably-connected series of dies, which are connected in the manner to form two endless chains, engage the head-flanges in such manner as to hold the cans in the proper rolling contact with  
50 the forming-dies and to advance the same

through the machine. Said machine embraces, in connection with the parallel dies between which the cans or like sheet-metal bodies are passed, a connected series of chucks, which move in unison with the traveling dies  
55 and are adapted to engage the centrally-depressed heads of the cans and serve as a means to center the cans between the dies and in some instances as abutments against which the dies act to give proper form to the  
60 head and body flanges.

With this brief explanation of the general features of the machine I will proceed to a detailed description thereof, reference being  
65 had to the accompanying drawings.

In said drawings, Figure 1 is a partial side elevation and partial section of the machine, taken on line 1 1 of Fig. 3. Fig. 1<sup>a</sup> is a fragmentary horizontal section taken through the chute for delivering the cans to the dies  
70 and illustrating also the means for attaching and adjusting the chute. Fig. 1<sup>b</sup> is a detail illustrating the driving connection between the movable die-actuating mechanism and the chuck-actuating mechanism. Fig. 2  
75 is a longitudinal vertical section of the machine, taken on line 2 2 of Fig. 2 with parts omitted. Fig. 3 is a transverse vertical section of the machine, taken on line 3 3 of Fig. 2. Fig. 4 is an enlarged view of the  
80 rear end of the machine with the delivery-chute partially removed. Fig. 5 is a face view of one of the centering-chucks for the cans. Fig. 6 is a view, partially in elevation and partially in section, of said chuck and  
85 its supporting devices, together with the means for actuating the same and showing the position of the chuck with respect to the can before it enters the depression in the head thereof. Fig. 7 is a view similar to that  
90 shown in Fig. 6, showing the chuck engaged with the can-head. Fig. 8 is a perspective view of one of the lower-die links. Fig. 9 is a perspective view of one of the links of the chain which supports the centering-chucks  
95 and connect said chucks as a movable connected series. Figs. 10, 11, 12, and 13 are cross-sections of the upper and lower dies, taken on lines 10 10, 11 11, 12 12, and 13 13  
100 of Fig. 2, showing the manner in which the



upper dies operate to fold the flanges of the can body and head.

As shown in said drawings, A designates the rectangular base of the machine, and A' A' vertical side standards at the ends of the machine, rising one from each corner of said base. Said standards are connected at their upper ends by integral connecting members A<sup>2</sup>.

B B, Figs. 2 and 3, designate two parallel horizontal upper-die bars, which have longitudinal dovetail connection with parallel horizontal die-supporting bars B' B', which latter are attached, by means of bolts b, to cross-frame members B<sup>2</sup> B<sup>2</sup>, which latter are attached, by means of bolts b', to the standards A'.

CC designate a plurality of lower connected movable dies, which have the form of short links and are connected together at their ends to form two endless chains, one located beneath each upper-die bar B and the upper laps of which travel in paths parallel with the horizontal planes of said upper-die bars. The series of dies C on each side of the machine are connected by transverse link-bars C', the individual dies of each series being pivoted to said link-bars, so as to flexibly connect the dies in the manner of a chain, and the link-bars extend transversely from one series to the other and connect corresponding links of the two series. As herein shown, each die link or section is provided at one end with a notch c, as shown in Fig. 8, and at its other end with a reduced portion c', adapted to enter the notch of the adjacent die link or section, and said notched and reduced parts of the links are provided with apertures, through which the link-bars C' extend when said dies are assembled in overlapping relation. The die-links C are all made of the same cross-section, being provided at their inner corners with rabbets which afford horizontal surfaces on which the cans rest and roll and vertical surfaces which engage the end faces of the heads to prevent endwise shifting of the cans, while the different parts of the lengths of the upper-die bars B are of varying cross-sections, as clearly shown in Figs. 10 to 13, inclusive, and as will hereinafter more fully appear. It may be stated here, however, that two distinct folding operations are essential to complete the folding of the flanges as the machine herein shown is organized, so that said upper dies are shown as made at least as long as twice the length of the circumference of the largest cans which are to be passed through the machine. The working faces of said dies will preferably consist of separate steel facings, which are attached to the bodies of the dies in any suitable manner. The two series or sets of connected movable dies are given movement by being trained over front and rear sprocket-wheels D D', which are affixed to rotative shafts D<sup>2</sup> D<sup>3</sup>, said shafts being rotatively mounted in the standards A', as most clearly shown in Fig. 3. Said sprocket-wheels

are provided with peripheral notches d, which are engaged by the link-bars C' in their parts outside of the dies C, whereby positive movement is transmitted from the sprocket-wheels to the series of connected dies. The series of dies are driven through the medium of a belt pulley or wheel D<sup>4</sup>, affixed to one end of the forwardmost shaft D<sup>2</sup> outside of the frame, as shown in Figs. 1 and 2. The upper laps of the connected series of dies C travel in paths parallel with the upper-die bars B, and said upper laps are supported, through the medium of the link-bars C', by means of parallel horizontal longitudinal bars A<sup>3</sup>, which are supported at their ends on inwardly-extending hollow projections or bosses on the standards A', through which extend the shafts D<sup>2</sup> D<sup>3</sup>, as most clearly shown in Fig. 3. The link-bars are preferably provided at their ends with antifriction-rollers c<sup>2</sup>, which rest and roll on said bars A<sup>3</sup>, thereby reducing the friction between said parts. Desirably also the supporting-bars A<sup>3</sup> are provided with longitudinal depressions, in which the rollers c<sup>2</sup> travel and which prevent endwise shifting of the link-bars, thereby preventing the lower series of dies C getting out of alinement with the upper series of dies. The said supporting-frame bars A<sup>3</sup> act as backing-bars for the upper laps of the lower connected series of dies to hold the same to their work.

The cans are delivered to the space between the upper and lower dies through a delivery-chute indicated as a whole by E, which is suitably supported on the receiving end of the machine. Said chute is rectangular in cross-section and consists of four angle-bars e e' e', located one at each corner of the chute, the flanges of which are directed toward each other in a manner to engage the ends and sides of the can, as clearly shown in Fig. 1<sup>a</sup>. Said chute-bars are attached, by means of bolts e<sup>2</sup>, to horizontal arms E', which extend rearwardly from the rear cross member A<sup>2</sup> of the machine-frame in the manner most clearly shown in Fig. 1<sup>a</sup> and are attached thereto by means of bolts e<sup>3</sup>. The rear bars e of said chute are fixed stationary to said arms E', while the front bars e' are movably fixed to said arms, whereby the chute may be adjusted to cans of varying diameters. For this purpose the attaching-bolts e<sup>2</sup> of the front chute-bars engage longitudinal slots e<sup>4</sup> in said arms E', thereby permitting the front chute-bars to be moved toward and away from the rear chute-bars. The lower ends of the rear chute-bars e extend below the level of the upper-die bars and are curved inwardly to direct the cans toward the space between the upper and lower dies, while the lower ends of the front bars e' need not extend below the level of the upper-die bars B. The rear chute-bars e terminate some distance in the rear of the upper horizontal portions or laps of the connected series of the dies C, and a curved plate e<sup>5</sup>, attached to the lower curved end of the chute-bars e cen-



trally thereof, extends toward the space between the upper and lower dies to direct the cans to said space. The chute is also adjustable to accommodate cans of different lengths, and two of the bars  $e e'$  at one side of the chute are therefore movable from the corresponding bars at the other side of the chute in a manner to vary the width of the chute. As a means for providing such lateral adjustment the arms  $E'$ , supporting the corresponding bars at the sides of the chute, are connected with the upper transverse member  $A^2$  of the frame in a manner to move toward and from each other, said transverse member being herein shown as provided with longitudinal slots  $a^2$ , Fig. 1<sup>a</sup>, through which extend the bolts  $e^3$  by which said arms  $E'$  are attached to the transverse member or bar. Said adjustment of the chute may, however, be effected by shifting but one of the bars  $E'$ .

The upper and lower dies  $B C$  are movable toward and away from each other to accommodate cans of different diameters and are also capable of adjustment for accommodating cans of different lengths. For the purpose of adjusting the dies for cans of different diameters the upper-die bars  $B$  are mounted in the machine-frame so as to be moved toward and away from the lower series of dies. The means herein-shown for effecting this result consists of providing the standards  $A'$  with vertical slots  $a'$ , through which extend the bolts  $b'$ , by which are attached to said standards the transverse frame members  $B^2$ . For the purpose of adjusting the dies to cans of different lengths the upper-die-supporting bars  $B'$  are movable toward and from each other. This result is effected by providing the transverse frame members  $B^2$  with longitudinal slots  $b^2$ , through which extend the attaching-bolts  $b$  by which said die-supporting bars are connected with said transverse frame members. The series of die-links  $C$  are also movable toward and away from each other longitudinally of the link-bars  $C'$ , and for this purpose the die-links are attached to said link-bars by means of set-screws  $c'$  in the manner shown in Fig. 3, which permit said die-links to be moved toward and from each other longitudinally of the bars, as desired.

The cans are centered relatively to the upper and lower dies by means of two series of movable chucks  $F F'$ , one at each side of the path of the cans through the machine. The chucks of each series are connected by links, as hereinafter described, and thus connected form two endless chains, the lower laps of which, as herein shown, travel one on each side of the path of the cans through the machine and parallel with the coacting parts of the upper and lower dies. Said chucks  $F$  are made circular to enter the circular depressions of the can-heads when heads of this type are operated upon, and the series of connected chucks are trained over the front and rear sprocket-wheels  $F' F^2$ , which are affixed to rotative shafts  $F^3 F^4$ , respectively, which

latter are mounted in bearing-brackets  $F^5 F^6$ , projecting forwardly and rearwardly from the standards  $A'$  in the manner shown in Fig. 2. Said bearing-brackets  $F^5 F^6$  are attached, by means of bolts  $f$ , to outwardly-extending flanges  $a^3$  on the standards  $A'$ , Figs. 3 and 4, and said flanges are provided with slots  $a^4$ , through which extend the attaching-bolts of the bearing-brackets, whereby said series of connected chucks may be raised and lowered to correspond with the raising and lowering of the upper-die bars  $B$ . The said sprocket-wheels  $F' F^2$ , about which the series of chucks are trained, are also adapted to be moved longitudinally of the shafts  $F^3 F^4$ , whereby the series of chucks may be spread apart to conform with the adjustment of the die-bars and die-links when the latter are shifted to adjust the machine to cans of varying lengths. The chains in which said chucks are included, as aforesaid, embrace a plurality of links  $f'$ , Figs. 1, 2, 4, and 9, which are provided at their centers with openings  $f^2$ , through which the arms or projections  $f^3$  of the driving pulleys or wheels extend, and each of said links is provided at one end with laterally-separated arms  $f^4 f^4$ , between which extend the ends of the adjacent link, and the overlapping parts of adjacent links are provided with apertures through which extend stems  $f^5$ , attached rigidly to the chucks  $F$ . Said stems are made cylindric and extend loosely through the apertures in the overlapping parts of the links, so as to turn freely and also move longitudinally therein toward and from the cans. Springs  $f^6$  surround the ends of stem  $f^5$  outside of the links and are interposed between washers  $f^7$  at the outer ends of the stems and the adjacent arms  $f^4$  of the links through which the stems extend, whereby said springs tend to hold the stems and the attached chucks retracted from the cans. Means are provided for pressing said chucks inwardly into engagement with the can-heads prior to the delivery of said cans from the chute to the space between the upper and lower dies, this work being effected just before the cans leave the lower end of the chute. The means for effecting the inward thrusting of the chucks in the manner stated consists of cam or guide bars  $G G$ , located one at each side of the space between the upper and lower dies through which the cans pass, said bars being attached, by means of short inwardly and upwardly extending arms  $g$ , to the die-supporting bars  $B'$ , as shown in Figs. 1 and 3, by means of set-screws  $g'$ . Said guide-bars are provided at the rear end of the machine with upwardly-turned parts  $G'$ , located one at each side of the chute and centrally of the path of the cans through the lower end of the chute. The extremities of said upturned parts  $G'$  are flared outwardly, as clearly shown in Figs. 1 and 4, which permits the stems of the chucks to enter between said extreme ends of the guide-bars as said connected chucks are turning over the sprocket-wheel  $F^2$ . As said



chucks pass downwardly between the up-  
turned extremities of the guide-bars the ends  
of the chuck-stems engage said curved parts  
of the guide-bars, and said chucks are there-  
by moved inwardly toward the cans to engage  
the can-heads, as clearly shown in Figs. 4 and  
7. The extremities of the guide-bars are so  
shaped and arranged as to engage the chucks  
with the can-heads as they leave the lower  
end of the chute and just before they enter  
the space between the upper and lower dies.  
Means are provided for momentarily arrest-  
ing each can at the lower end of the chute, so  
as to permit the chucks to engage the can-  
heads. Such momentary stoppage of the cans  
is effected by means of a spring  $e^6$ , Figs. 1 and  
2, which is attached at its upper end to a cross-  
bar  $e^7$ , extending between the rear chute-bars  
 $e$ , and said spring is curved forwardly between  
the ends to engage the cans and is made of  
such strength as to fully stop each can at the  
lower end of the chute until it is engaged by  
two opposite chucks, after which said can is  
moved forwardly by reason of its engagement  
with said chucks. The construction of the  
chucks and the manner of engaging the same  
with the cans is shown most clearly in Figs.  
5 to 7, inclusive. In Fig. 6 is shown the re-  
lation of a chuck to a can just before the  
chuck enters between the curved parts of the  
guide-bars  $G$ , and Fig. 7 illustrates the en-  
gagement of the chuck with the can-head af-  
ter the chuck has been moved inwardly by  
the curved surface of the guide-bar. The  
surfaces of said bars are parallel with each  
other from the curved parts  $G'$  to the front  
parts of the dies, where they are curved lat-  
erally, as shown at  $G^2$ , and after the cans  
pass said parts  $G^2$  of the bars the chucks are  
permitted to spread outwardly under the in-  
fluence of their actuating-springs, whereby  
the cans are free to be discharged from the  
machine and deposited upon a discharge-  
chute, (not shown,) by which the cans may  
be directed from the machine. In order to  
properly guide said chucks into the depres-  
sions in the can-heads when depressed heads  
are being operated upon, said chucks are pro-  
vided on their faces adjacent to the can-heads  
with inclined guide projections  $f^8$ , Figs. 5, 6,  
and 7, which are circularly disposed on the in-  
ner faces of the chucks, near the peripheries  
thereof, and are located in suitable notches or  
recesses  $f^9$  in said chuck-bodies. Said guide  
projections are provided with stems  $f^{10}$ , which  
extend outwardly through the chuck-bodies  
and through the recesses  $f^9$  therein and are  
provided on their outer ends with nuts  $f^{11}$ .  
The projections are held in their outermost  
positions, as shown in Fig. 6, through the me-  
dium of springs  $f^{12}$ , which surround the stems  
 $f^{10}$  and are contained within the recesses  $f^9$   
and the projections  $f^8$ , which latter are made  
hollow to receive the springs, said springs be-  
ing interposed between the ends of said pro-  
jections and the bottoms of the recesses  $f^9$ .  
The inclined guide projections  $f^8$  guide the

chucks into the depressions of the can-heads  
in case the chucks are not brought exactly  
into line with said depressions when moved  
inwardly, and when said chucks are moved  
inwardly said springs  $f^{12}$  yield to permit the  
projections to be moved inwardly into the  
notches or recesses  $f^9$  of the chuck-bodies in  
the manner clearly shown in Fig. 7, the stems  
 $f^{10}$  being projected outwardly from the chucks,  
as shown in said figure. In this manner the  
guide projections  $f^8$  afford means for guiding  
the chucks into the depressed can-heads and  
at the same time do not interfere with the  
proper engagement of the chucks with the  
can-heads after such guiding function has  
been performed. Desirably the lower laps  
of the chains which include said chucks and  
between the supporting or sprocket wheels  
 $F'$   $F^2$  are supported so as to hold the said se-  
ries of chucks in substantially straight lines  
parallel with the path of the cans while pass-  
ing through the machine, whereby said chucks  
are held in proper relation to said cans. The  
means herein shown for supporting the chucks  
consist of inwardly-extending horizontal  
flanges  $G^3$  on the guide-bars, on which rest  
and roll supporting disks or wheels  $F^7$ , which  
are rotatively mounted on the stems  $f^5$  of the  
chucks in the manner clearly shown in Figs.  
4, 6, and 7, said rollers or wheels being set  
into notches  $f^{13}$ , Fig. 9, in the ends of the  
links  $f$ , which fit between the arms  $f^4$  at the  
enlarged ends of adjacent links.  
The can-covers  $H$  herein shown are pro-  
vided with the usual central depressions here-  
inbefore referred to, Fig. 6, and the depressed  
parts of said heads fit within the ends of the  
cylindric bodies  $H'$  of said cans in the usual  
manner. The can-bodies illustrated have  
previously been passed through a flanging-  
machine, whereby is produced at the end of  
the can-body a flange  $h^2$ , and the can-head  
while being stamped and formed is provided  
with a radial flange  $h^3$ , which overlies the  
flange at the end of the can-body, and a flange  
 $h^4$ , which is bent downwardly and inwardly  
around the flange  $h^2$ , parallel with the cy-  
lindric wall of the can-body. The can-heads  
are fitted to the bodies by a heading-machine  
before they are fed to the machine herein  
shown and described.  
The lower-die links or sections are all made  
of the same cross-section, as illustrated in  
Figs. 8, 10, 11, 12, and 13, inclusive, but the  
cross-section of the upper dies is varied in  
different parts of their length. The cross-  
section of the upper dies at the entrance of  
the cans between said dies is substantially  
the same as that of the lower-die links, being  
provided with approximately horizontal and  
vertical working faces which engage the ends  
of the heads and the flanges  $h^4$  thereof. The  
parts of the working faces of the upper dies  
which first engage the flanges  $h^4$  are inclined  
slightly upwardly, as shown at  $f^{14}$  in Fig. 2,  
thereby facilitating the entrance of the cans  
between the upper and lower dies. Said hori-



zontal working faces of the upper dies are gradually inclined downwardly and inwardly from the initial cross-section shown in Fig. 10 until they assume the cross-section shown in Fig. 11, the latter cross-section being reached at or about the point  $f^{15}$ , Fig. 2. The working faces of the dies at and beyond this point have the form of grooves by which the flanges  $h^4$  are pressed fully against the flanges  $h^2$  of the can-body, as shown in said Fig. 11. The parts of the dies between the entering ends thereof and the points  $f^{15}$  serve to start the inward folding of the flange  $h^4$ . The cross-section of the dies shown in Fig. 11 is made of a length equal at least to the length of the circumference of the largest can which is to be passed through the machine, so as to insure that all parts of the flanges will be brought to the shape shown in Fig. 11. When all parts of the flanges have assumed the form shown in Fig. 11, one-half of the work of forming the double seam has been finished. The remaining portion of the cross-section of the dies by which the double-seaming operation is finished is illustrated in Figs. 12 and 13. In Fig. 12 the cross-section of a die is changed so as to bend laterally and downwardly the folded flanges  $h^2$   $h^3$   $h^4$  toward the cylindric wall of the body of the can. For this purpose the horizontal working faces of the dies just beyond the end of the cross-section shown in Fig. 11 are made so as to start said fold inwardly, and the remaining portions of the working faces are made as shown in Fig. 13, which act to fold the flanges flat upon the body of the can. The change from the cross-section shown in Fig. 11 to that shown in Fig. 13 takes place between the points  $f^{16}$   $f^{17}$ , Fig. 2, and from the points  $f^{17}$  of the upper dies to the end thereof the cross-section of the dies is that shown in Fig. 13. As the flanges are bent inwardly from the points  $f^{16}$  to  $f^{17}$  the working faces of the dies are inclined downwardly or dropped toward the lower dies  $f^{16}$   $f^{17}$  a distance equal to such changes of diameter. From the points  $f^{17}$  to the ends of the dies the working faces of the dies are horizontal and of constant distance from the lower dies. The length of the upper dies from the points  $f^{17}$  to the ends of the dies is shown as great as that of the circumference of the largest can which is to be passed through the machine. In view of the decreased distance between the upper and lower dies at the forward ends thereof, and therefore the changes of centers of the cans, the part  $G^3$ , constituting the track for the series of chucks, is shown in Fig. 2 as inclined slightly to conform the centers of said chucks to the changed centers of the cans. The series of movable chucks move in unison with the dies C, and for this purpose the shafts on which are mounted the sprocket-wheels which drive the chucks and dies C are operatively connected by suitable driving connections. One means for effecting this result is shown more clearly in Figs. 1 and 1<sup>b</sup>, wherein the shafts  $F^3$   $D^2$  at the front

end of the machine are shown as extended outwardly beyond the machine-frame standard, and the shaft  $D^2$  is provided at its end with a sprocket-wheel  $D^5$  and the shaft  $F^3$  at its corresponding end with a gear-wheel  $F^8$ .  $F^9$  is a short shaft which is rotatively mounted in a bearing-bracket  $F^{10}$ , attached to the adjacent bearing for the shaft  $F^3$ . Said shaft carries a gear-wheel  $F^{11}$ , which meshes with the gear-wheel  $F^8$ , and is provided outside of said gear-wheel with a sprocket-wheel  $F^{12}$ . Said sprocket-wheels  $D^5$  and  $F^{12}$  are connected by a sprocket-chain I. In order to permit the shafts  $F^3$   $D^2$  to be moved toward and away from each other, said sprocket-belt I is provided with a tension device which consists of a sprocket-wheel K, which is engaged with the sprocket-belt I between the sprocket-wheels  $F^{12}$  and  $D^5$ . Said sprocket-wheel K is rotatively mounted on a shaft J, which is adjustably connected with a slotted bracket  $J'$ , that is attached to the adjacent standard  $A'$ , as shown in Fig. 1, whereby said sprocket-wheel may be moved to give or take up the slack of the sprocket-chain as the chuck-carrying shafts are moved toward and away from the shafts  $D^2$   $D^3$  in adjusting the machines for cans of different diameters. The position of the sprocket-wheel in the bracket is determined by a screw-shaft  $J^2$ . Other means may obviously be employed for driving the chucks from the driving-shafts of the movable dies which are capable of providing the adjustment described.

In order to prevent, during the adjustment of the machine for cans of varying diameters, the centers of the cans shifting out of line with the chuck-centers at the place where they are engaged by the chucks, and therefore obviating the necessity of longitudinally shifting the sprocket-wheels for the series of chucks, means are provided for shifting the chute E as a whole. For this purpose the arms  $E'$  are provided with slots through which the bolts  $e^3$  extend, whereby the arms  $E'$  and the rear chute members  $e$  may be shifted forwardly or rearwardly for cans of different diameters, and after such adjustment is effected the front chute-bars are adjusted in the manner before described. With this construction the vertical center of the chute need not be changed in adjusting the machine to different cans.

The operation of the machine will be obvious from the foregoing, but may be briefly recapitulated as follows: The series of dies C and the chucks are given motion through the medium of the driving-pulley  $D^4$ , and the cans are fed continuously to the chute E and therethrough to the space between the upper and lower sets of dies. As the first can reaches the spring  $e^6$  it is momentarily retarded or detained in position to be engaged by two opposite chucks as the stems thereof engage the curved or cam portions  $G'$  of the guide-bars G. When this result is effected, the cans are carried forwardly by said chucks



until brought into rolling engagement with the upper and lower dies, after which said cans are carried through the machine both by reason of their rolling engagement with the upper and lower dies and because of their connection with the chucks in the manner described, said chucks remaining engaged with the cans until the stems of the chucks pass into engagement with the outwardly-curved parts  $G^2$  at the forward ends of the guide-bars  $G$ , at which time the chucks are spread outwardly by their actuating-springs and the cans are free to be released from the machine. As the cans strike the opposing upper and lower dies at the receiving end of the machine the shape of the upper dies is such as to begin folding the flanges  $h^4$  of the heads downwardly toward the flanges  $h^2$  of the body, and the cross-section of the dies is changed at  $f^{15}$  to that shown in Fig. 11, which acts to fold the said flanges  $h^4$  flat against the flanges  $h^2$  of the can-body. The parts of the dies having the cross-section shown in Fig. 11, as before stated, are at least as long as that of the circumference of the largest cans which pass through the machine, so that all parts of the can-head flanges  $h^4$  are subjected to the folding effect of the upper dies. After said flanges of the can body and head have been brought to the position in Fig. 11 the cross-section of the dies changes gradually from the points  $f^{16}$  to  $f^{17}$ , between which points the working faces of the dies  $B$  decline or drop downwardly toward the dies  $C$ . The cross-section of the dies between the points  $f^{16}$  and  $f^{17}$  is such as to start the folded flanges inwardly toward the can-body, as shown in Fig. 12, and from the points  $f^{17}$  to the ends of the dies the cross-section of the dies is that shown in Fig. 13, which causes the folded flanges of the head and body of the can to be turned downwardly flat against the body. The length of the dies having the cross-section shown in Fig. 13 is shown to be as great as the circumference of the largest can which is to be passed through the machine, so as to insure that all parts of the folded-down flanges come into contact with these parts of the upper dies. It will be seen, therefore, that the full length of the upper die is somewhat longer than twice the length of the circumference of the largest cans which are passed through the machine. By reason of the fact, however, that the cross-sections of the upper and lower dies are the same from the points  $f^{17}$  to the ends of the upper dies both the upper and lower dies may act as forming-dies, in which case the upper dies from the points  $f^{17}$  to the outer ends thereof need be made only as long as half of the circumference of the largest can which is to be passed through the machine. While, therefore, as shown in the drawings, the lower or movable dies serve only as means to press the cans to the upper dies and also to impart a rolling movement to the cans through the machine, said lower dies may serve partly as

forming-dies. By reason of the fact that the guide-bars  $G$  are attached to the upper-die-supporting bars  $B'$  it will be readily seen that when said die-supporting bars are moved vertically or laterally to adjust the machine to cans of varying dimensions said guide-bars are also automatically adjusted. The adjustment of the shafts which carry the series of connected chucks is, however, independent, but may be effected to correspond to the adjustment of the parts hereinbefore mentioned. The entire adjustment for cans of different diameters is effected by raising and lowering the upper dies and their supporting-bars and adjusting the chute in the manner stated; but the adjustment for cans of different lengths is effected by varying not only the distance between the upper dies, but also the distance between the dies, which for this purpose are adapted to be shifted longitudinally of the link-bars  $C'$ , the latter being connected with the link-bars by set-screws in the manner clearly shown in Fig. 3. The chucks are for this purpose adjusted by shifting the sprocket-wheels  $F'$   $F^2$  longitudinally of their shafts. The adjustment of the chute is effected in the manner before described. The upper and lower dies are herein shown as arranged centrally of the machine, laterally considered, so that the adjustment for the different lengths of cans may be effected by moving either of the upper and lower opposing dies, or both.

It is obvious that many of the structural details herein shown may be widely varied without departing from the spirit of my invention, and I do not wish to be limited thereto except as hereinafter made the subject of specific claims. It is to be furthermore understood that the combinations set forth in the several claims are intended to be separately covered without limitation to other features in connection with which they are shown and not mentioned in such claims.

I claim as my invention—

1. A machine for the purpose set forth comprising opposing dies with which the can-head flanges have rolling contact and movable chucks connected by links to form an endless chain or series and adapted to engage the can-heads.
2. A machine for the purpose set forth comprising opposing dies which engage the can-head flanges, one of which is straight and continuous, the die opposing said die being movable to impart a rolling movement to the cans to advance the same through the machine, and a movable endless series of connected chucks adapted to engage the can-heads.
3. A machine for the purpose set forth comprising opposing dies which engage the can-head flanges, one of which is straight and continuous, the die opposing said straight die being movable to impart a rolling movement to the cans and thereby advance the same through the machine, and movable chucks connected by links to form an endless chain



or series adapted to engage the can-heads, said movable series of chucks being operatively connected with the means for driving the movable dies.

5 4. A machine for the purpose set forth comprising a series of dies connected to form an endless chain, means for advancing said series of dies, a die opposing said series of connected dies and between which and the movable dies the flanges of the can-heads are compressed and folded and movable chucks connected by links to form an endless chain or series and adapted to engage the can-heads.

15 5. A machine for the purpose set forth comprising a series of dies connected to form an endless chain, means for advancing said series of dies, a continuous die opposing said series of connected dies and between which and the movable dies the flanges of the can-heads are adapted to be pressed and folded, said continuous die being made of a length at least as great as the circumference of the largest can to be passed through the machine and having a working face of varying cross-sections throughout its length and a connected series of movable chucks adapted to engage the can-heads.

30 6. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for advancing said series of dies, two parallel, straight, continuous dies opposing the movable dies and between which and the movable dies the can-head flanges are folded, the working faces of the straight dies varying in cross-section from one end thereof to the other, and two endless series of movable chucks, one on each side of the machine, adapted to engage the can-heads.

40 7. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for advancing said series of dies, two parallel, stationary dies opposing the movable dies and between which and the movable dies the head-flanges are folded, and two endless series of movable chucks one on each side of the machine adapted to engage the can-heads, said chucks being movable in unison with a series of connected dies.

50 8. A machine for the purpose set forth comprising opposing dies which engage the can-head flanges, the dies on one side of the path of the cans being movable to impart a rolling movement to the cans to advance the same through the machine, an endless series of chucks at each side of the machine, means for shifting the chucks laterally to engage the can-heads and to hold the same engaged therewith during the traverse of the cans through the machine, and means for retracting the chucks from the cans to release the same from the machine.

65 9. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for ad-

vancing said series of dies, two parallel, stationary dies opposing the series of movable dies and between which and the movable dies the head-flanges are folded, two endless series of movable chucks adapted to engage the can-heads, means for shifting the chucks laterally to engage the can-heads and means for retracting the same from the can-heads.

10. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for advancing said series of dies, two parallel, straight, continuous dies opposing said series of movable dies and between which and the movable dies the head-flanges are folded and compressed, two endless series of movable chucks adapted to engage the can-heads, means for advancing the said chucks toward the can-heads at the entering end of the machine and for holding the chucks engaged with the heads during the traverse of the cans through the machine, and means for retracting said chucks from the heads at the discharge end of the machine.

11. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for advancing said series of dies, two parallel, straight, continuous dies opposing said series of movable dies and between which and the movable dies the head-flanges are folded and compressed, a chute for delivering the cans to the space between said dies, two endless series of movable chucks one at each side of the machine adapted to engage the can-heads, means for advancing the chucks into engagement with the can-heads at the lower end of the chute, means for momentarily retarding each can at the lower end of the chute to receive said chucks and means at the discharge end of the machine for retracting said chucks from the heads.

12. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for imparting movement to said series of dies, two parallel, straight, continuous dies opposing said series of movable dies and between which and the movable dies the head-flanges are compressed and folded, two series of movable chucks, connected by links to form endless chains, one on each side of the machine, said chucks being provided with stems which extend outwardly through the links, springs on said stems which normally retract the chucks from the cans and means engaging the ends of the chuck-stems at the receiving end of the machine to thrust said chucks into engagement with the can-heads and to hold the same in engagement therewith during the traverse of the cans through the machine.

13. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for imparting movement to said series of dies, two parallel, straight, continuous dies oppos-



ing said series of movable dies and between which and the movable dies the head-flanges are compressed and folded, two series of movable chucks connected by links to form endless chains, one on each side of the machine, said chucks being provided with stems which extend outwardly through the links, springs on said stems which normally retract the chucks from the cans, parallel guide-bars located on opposite sides of the space between the upper and lower dies, the guide-bars at the receiving end of the machine being curved outwardly to permit the stems to enter between the same, the curvature thereof advancing the chucks into engagement with the can-heads, and the bars being curved outwardly at the discharge end of the machine to permit the chuck-stem springs to retract the chucks from the cans.

14. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for advancing said series of dies, two parallel, straight, continuous dies opposing said series of movable dies and between which and the movable dies the head-flanges are compressed and folded, a chute for delivering the cans to the space between said dies, two connected series of chucks, one on each side of the machine, each adapted to engage the can-heads, means for momentarily arresting the cans at the bottom of the chute, means for advancing two opposite chucks to engage the heads of each can when its progress is momentarily retarded, and for holding said chucks engaged with the can-heads during the traverse of the cans through the machine, and means for releasing said chucks from the can-heads at the delivery end of the machine.

15. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for advancing said series of dies, two parallel, stationary dies opposing said series of movable dies and between which and the movable dies the head-flanges are compressed and folded, two connected, endless series of chucks which are movable in unison with said movable dies, means for advancing said chucks into engagement with the heads of the cans at the receiving end of the machine and for holding the same engaged with the can-heads during the traverse of the cans through the machine, means for retracting the chucks from the cans at the delivery end of the machine, and a track for supporting said series of connected chucks during their engagement with the can-heads.

16. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for advancing said series of dies, two parallel, stationary dies opposing said series of movable dies and between which and the movable dies the head-flanges of the cans are compressed and folded, two connected series of

chucks which are movable in unison with said movable dies, and means for laterally advancing said chucks into engagement with the can-heads at the receiving end of the machine and for holding the same engaged with the can-heads during the traverse of the cans through the machine, means for retracting the chucks from the cans at the delivery end of the machine, tracks for supporting said series of connected chucks during their engagement with the can-heads, and roller-bearings included in the connected series of chucks adapted for engagement with said tracks.

17. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for advancing said series of dies, two parallel, stationary dies opposing said movable dies and between which and the movable dies the head-flanges are compressed and folded, two series of chucks adapted to engage the can-heads, said chucks being connected by links to form two endless chains, stems on said chucks which project laterally through the links, means for advancing said chucks into engagement with the can-heads at the delivery end of the machine and for holding said chucks engaged with the can-heads during the traverse of the cans through the machine, means for retracting the chucks from the can-heads at the discharge end of the machine, roller-bearings mounted on said chuck-stems and tracks on which said roller-bearings rest and roll at the time the associated chucks are engaged with the can-heads.

18. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for advancing said series of dies, two parallel, stationary dies opposing said series of movable dies and between which and the movable dies the head-flanges of the cans are compressed and folded, two series of movable chucks which are connected by links to form two endless chains, one on each side of the machine, stems on said chucks projecting laterally through said links, guide-bars, one on each side of the machine and located opposite to the space between said dies and adapted to engage said stems to hold said chucks in contact with the can-heads during the progress of the cans through the machine, integral tracks on said guide-bars and roller-bearings on said chuck-stems which rest and roll on said tracks.

19. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for advancing said series of dies, two parallel, straight, continuous dies opposing the series of movable dies and between which and the movable dies the head-flanges are compressed and folded, two endless series of movable chucks adapted to engage the can-heads during the traverse of the cans through the machine, means for varying the distance be-



tween the stationary and movable dies to adjust the machine for cans of varying diameters, and means for adjusting said chucks to correspond with the adjustment of said dies.

5 20. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for advancing said series of dies, two parallel,  
10 straight, continuous dies opposing said series of movable dies and between which and the movable dies the head-flanges are compressed and folded, two endless series of movable  
15 chucks adapted to engage the can-heads during the traverse of the latter through the machine, means for varying the distance between the opposing dies on opposite sides of the machine to adjust the machine for cans  
20 of different lengths and means for varying the distance between said series of chucks to correspond with the adjustment of said dies.

21. A machine for the purpose set forth comprising two series of dies connected to form two parallel, endless chains, means for  
25 advancing said series of dies, two parallel, straight, continuous dies opposing the movable series of dies and between which and the movable dies the head-flanges are adapted to be compressed and folded, a chute for delivering  
30 the cans to the space between said opposing dies, two endless series of chucks, one on each side of the machine, adapted to engage the can-heads during the passage of the cans between said dies, means for varying  
35 the distance between said dies to adjust the machine to cans of varying dimensions, means for varying the distance between said chucks to correspond with the adjustment of the dies and means for adjusting said chute to correspond  
40 with the adjustment of said dies and chucks.

22. The combination with opposing dies between which the cans are carried in rolling contact and which act to fold together the  
45 head and body flanges, of a chuck adapted to engage the depressions in the can-heads during the traverse of the cans through the machine, said chuck being provided on its engaging face with yielding projections which  
50 occupy recesses in the chuck-body, said projections being designed to guide the chucks into the depression of the can-heads and to thereafter recede into said recesses to permit the chucks to enter said depression.

23. A machine for the purpose set forth comprising opposing dies which engage the  
55 can-head flanges, the dies on one side of the path of the cans being movable to impart a rolling movement to the cans to advance the same through the machine, and a series of connected chucks adapted to engage depres-  
60 sions in the can-heads during the traverse of the cans through the machine, said chucks being provided on their engaging faces with yielding projections which are located in recesses in the chuck-bodies, said projections

being adapted to guide the chucks into the depressions in the can-heads and to thereafter recede into said recesses to permit the chucks to enter said depressions.

24. A machine for the purposes set forth 70 comprising opposing dies between which the can-head flanges are pressed and folded, the working face of one of said dies being longer than the circumference of the largest can adapted to be passed through the machine, 75 and having varying cross-sections in different parts of its length, one of said dies being movable to impart a rolling motion to the cans and thereby carry the same through the machine in rolling contact with the dies, and a 80 series of connected, movable chucks adapted to engage the can-heads during the time the cans are passing between the dies.

25. A machine for the purpose set forth comprising opposing dies with which the can- 85 head flanges have rolling contact, the working face of one of said dies having two parts of different cross-section, one at the receiving end of the machine, and the other at the discharge end thereof, and each made of ap- 90 proximately equal length to that of the circumference of the can to be operated upon, said parts of the die-face being joined by an inclined part which approaches the opposing die, whereby one of said parts of the die-face 95 is closer to the opposing die than the other.

26. A machine for the purpose set forth comprising opposing dies with which the can- head flanges have rolling contact, the work- 100 ing face of one of said dies having two parts of different cross-section, one at the receiving end of the machine, and the other at the discharge end thereof, and each made of ap- 105 proximately equal length to that of the circumference of the can to be operated upon, said parts of the die-face being joined by an inclined part which approaches the opposing die, whereby one of said parts of the die-face 110 is closer to the opposing die than the other, the opposing die being made of approximately the same cross-section throughout its length as the cross-section of the first-mentioned die at the discharge end of the machine.

27. A machine for the purposes set forth comprising a series of dies connected to form 115 an endless chain, means for advancing said series of dies, dies opposing said series of connected dies and made longer than the circumference of the largest can which is to be passed between the dies, the working faces 120 of the dies opposing the series of dies being made of varying cross-sections, and a movable series of connected chucks adapted to engage the can-heads during the traverse of the cans between said dies. 125

28. A machine for the purpose set forth comprising opposing dies with which the can- head flanges have rolling contact, the work- 130 ing face of one of the dies at the receiving end of the machine being made of different



cross-section than in its part at the discharge  
end of the machine, and the parts of the die  
of different cross-section being connected by  
an inclined part which approaches the op-  
5 posing die.

In testimony that I claim the foregoing as  
my invention I affix my signature, in pres-

ence of two witnesses, this 30th day of April,  
A. D. 1902.

CHARLES STECHER.

Witnesses:

JNO. M. GLEASON,

DAVID A. FITZGIBBON.