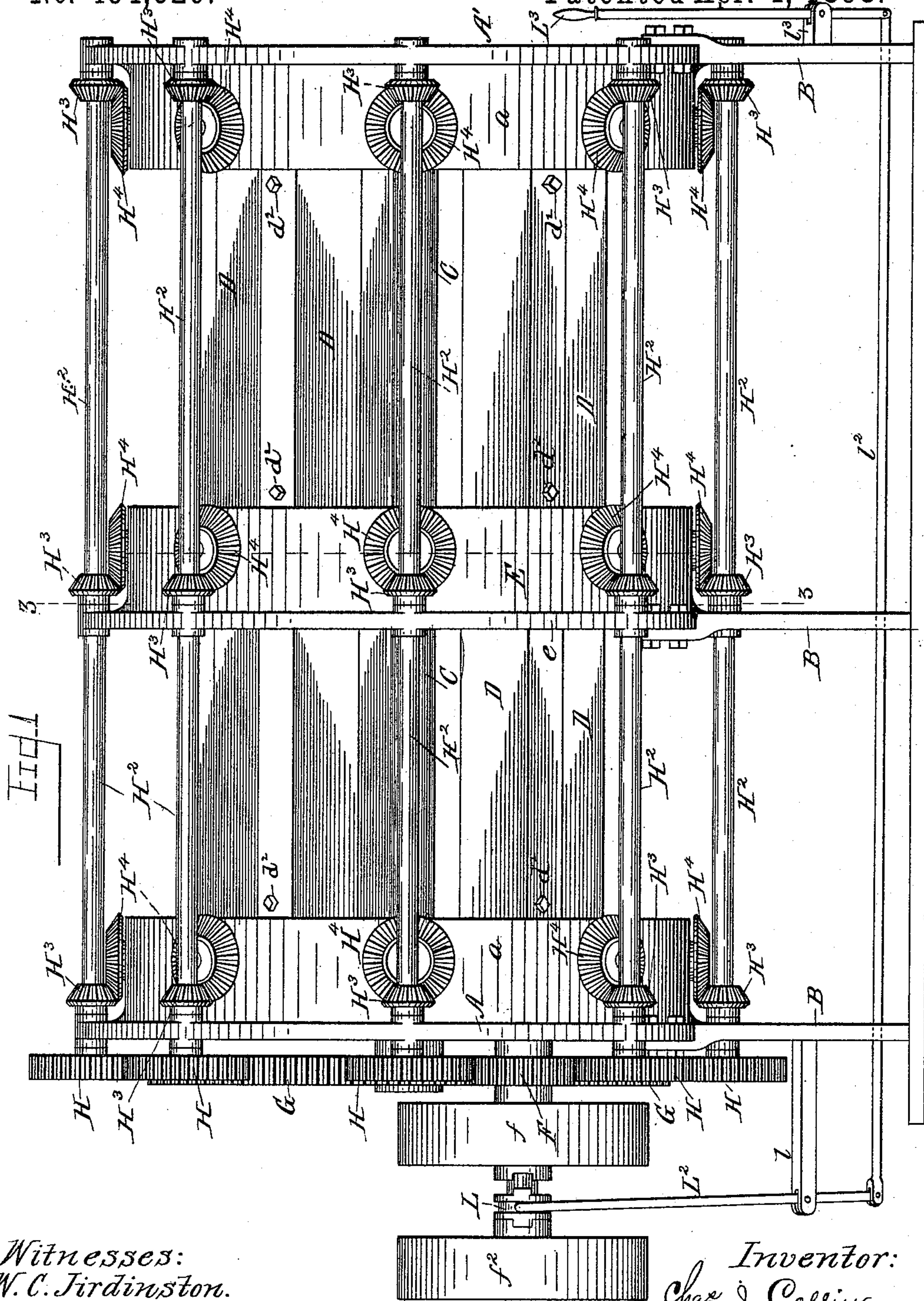



2 Sheets—Sheet 1.

MACHINE FOR CORRUGATING SHEET METAL PIPE.

Patented Apr. 4, 1893.



Witnesses:
W. C. Jirdin, ston.
Harry F. Koking.

 *Inventor:*
Chas. J. Colling
per O. M. Hill
Attorney.

(No Model.)

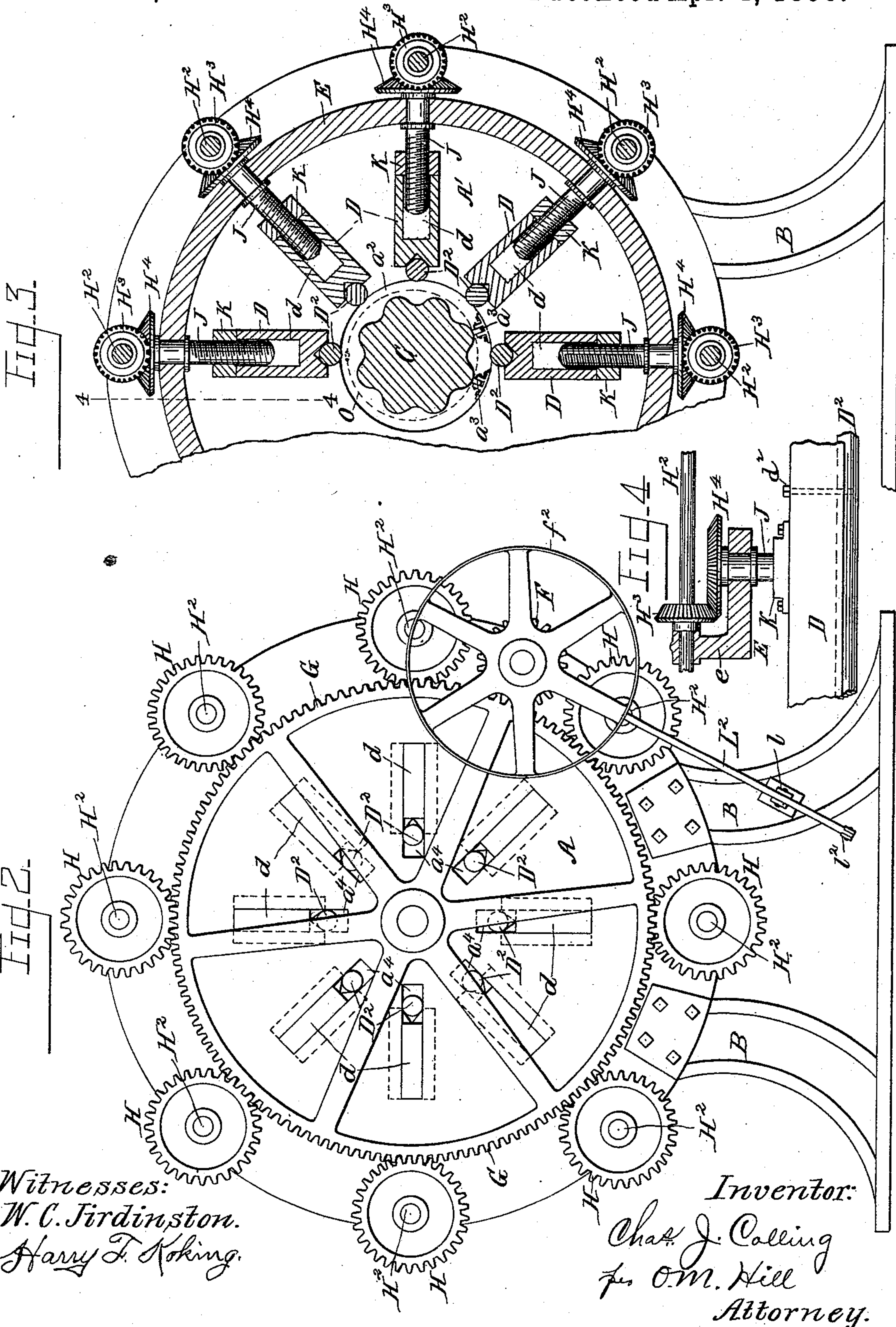
2 Sheets—Sheet 2.

C. J. COLLING.

MACHINE FOR CORRUGATING SHEET METAL PIPE.

No. 494,626.

Patented Apr. 4, 1893.



Witnesses:
W. C. Jirdinston.
Harry T. Koking.

Inventor:
Chas. J. Colling
per O. M. Hill
Attorney.

UNITED STATES PATENT OFFICE.

CHARLES J. COLLING, OF CINCINNATI, OHIO, ASSIGNOR TO J. M. ROBINSON & CO., OF SAME PLACE.

MACHINE FOR CORRUGATING SHEET-METAL PIPE.

SPECIFICATION forming part of Letters Patent No. 491,626, dated April 4, 1893.

Application filed May 23, 1892. Serial No. 433,945. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. COLLING, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Machines for Corrugating Sheet-Metal Pipes, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

The object of my invention and the various advantages resulting therefrom, will be apparent from the description and claims hereinafter contained.

In the accompanying drawings:—Figure 1, is a longitudinal side elevation of a machine embodying my invention. Fig. 2, is an end view of the machine shown in Fig. 1, taken at left hand in said latter figure. Fig. 3, is a transverse section (partially broken away) taken through the center supporting ring on the dotted line 3, 3, of Fig. 1, and looking toward the right hand end in said latter figure. Fig. 4, is a view taken on the dotted line 4, 4, of Fig. 3, looking toward the right hand, said view illustrating the preferred means for operating the longitudinal plunger-dies.

My invention consists of a stationary mandrel and suitable dies adapted to move toward and away from said mandrel on lines radiating from a common center, said dies extending the greater length of said mandrel.

My improved machine is preferably constructed as follows, viz: A, A', represent the two annular heads or ends of the machine mounted on suitable legs or supports B, said heads being provided with an internal annular flange a . The head A' has a central opening a^2 (see Fig. 3) the free end portion of mandrel C engaging centrally within said opening, as shown. The opposite end of this mandrel is rigidly connected to the inner face of head A in any suitable manner. In order to properly retain the free end of this mandrel in place, and to prevent sagging, it is preferred to have said free end rest upon one or more supporting rollers a^3 , the latter being connected to the end A' within the opening a^2 , as shown: but, if the mandrel be sufficiently light in weight, these supporting rollers may be dispensed with.

Each of the heads A and A' is provided with

elongated openings a^4 radiating from a common center, as shown in Fig. 2, the contracted end portions d , of plungers D, fitting and sliding within said openings, in the manner presently to be described. The said openings a^4 serve as guides for the die-plungers D as the latter are moved toward and away from the stationary mandrel, C.

The machine is also preferably provided with a central band or ring E, having an outwardly projecting bearing flange e , which latter rests upon the central legs or supports B, as shown. The ring E corresponds in dimension with the internal flanges a of the heads, while the outer peripheral face of flange e corresponds in dimensions with the outer peripheral faces of heads A and A'.

The plungers D are made to operate in the guide-openings a^4 by any suitable operative mechanism, that shown being preferred, which is as follows: Near the outer face of head A is journaled the gear F to be driven by pulleys f and f^2 the latter being rotated by means of a straight and cross-belt, in the usual manner to impart a reverse movement to said gear. The gear or pinion F engages with a large gear G journaled centrally to said head A, as shown, said gear G engaging with and imparting a rotary motion to the gears H, the latter being keyed to one end of the driving-shafts H^2 , as shown, said shafts resting and rotating within suitable bearings near the periphery of heads A and A', and also within the flange e of central ring E. Each driving-shaft H^2 has keyed thereto the beveled gears H^3 , which latter engage with and impart a rotary motion to the beveled gears H^4 , as shown, the latter being connected to the top of the driving-screws J. Each driving-screw is journaled within bearings in the internal flanges a of the heads, and also within the central ring E (see Fig. 4), said screws operating within screw-threaded openings in the brackets K, the latter being connected to the top face of each plunger D near its end and central portions. The plungers D are each provided with a central opening d beneath each bracket K (see Fig. 3) in order that the screws J may freely operate within and beneath their said brackets.

To the inner longitudinal face of each plun-

ger D is detachably connected a die D^2 , corresponding in outline configuration with the adjacent outline configuration on the mandrel C. These dies may be thus connected in
 5 any desired operative manner, one mode being shown more clearly in Fig. 4, and consisting of bolts d^2 passed through the plungers and tapped into said dies, the latter resting within a groove on the inner face of each plun-
 10 ger, as shown in Fig. 3.

Any suitable device may be employed for shifting the clutch L, that shown consisting of the bifurcated lever L^2 resting at its bifurcated portion in a groove therein, said lever
 15 being pivoted to the bracket l , on one end support, as shown. To the bottom or lower end of lever L^2 is loosely connected a rod l^2 , the opposite end of said rod being loosely connected to the lower end of lever L^3 , the latter
 20 being pivoted within the bracket l^3 on the front end support.

The operation of my improved machine for corrugating sheet-metal pipe is as follows: After having formed the pipe O in a circular
 25 form, the latter is then slipped over and around the mandrel C, through the opening a^2 in the front head A' , as shown in Fig. 3. The operator then moves the lever L^3 in the proper direction to engage the clutch with one
 30 of the driving pulleys, which will cause motion to be imparted to the driving-shafts H^2 through the medium of pinion F, gear G and gears H. The rotation of the driving-shafts in one direction will, through the medium of beveled
 35 gears H^3 and H^4 , screws J, brackets K and plungers D, cause the dies D^2 to approach and compress the pipe around the mandrel C,—a reverse movement of said mechanism causing said dies to recede from the mandrel and
 40 pipe, at which time the latter may be removed therefrom. It will be noticed that the dies D^2 approach the mandrel on lines radiating from the center thereof, so that an equal degree of pressure is had on all bearing surfaces
 45 around said mandrel, and in this manner all the corrugations are perfectly and evenly formed in the pipe.

Any desired configuration of mandrel may be employed, the shape of the detachable
 50 dies corresponding in outline with the outline surface of mandrel used. The number of dies and plungers may be varied to accommodate the class of product to be manufactured.

55 The central ring E and its flange e afford additional strength to the machine without materially adding to its cost,—said ring also serving as a stay to prevent the dies from

springing out of line centrally, thus insuring uniform and perfect corrugations throughout
 60 the entire length of the pipe.

Any desired length of machine may be constructed in the manner aforesaid: and, if desired, two or more of the intervening rings E
 65 may be employed.

If desired, any suitable operative mechanism, other than that herein set forth, may be employed for imparting motion to the plungers D without departing from my invention.

What I claim as new, and desire to secure
 70 by Letters Patent, is—

1. In a machine for corrugating pipes, the heads A and A' having guide openings a^4 therein, the front head having an opening a^2 , mandrel C connected to the rear head at one
 75 end, the opposite end resting in the opening a^2 , die-plungers D resting at each end in said guide-openings, and suitable mechanism for operating said die-plungers, substantially as set forth.
 80

2. The combination of heads A and A' having guide-openings a^4 and opening a^2 therein, plungers D resting in said guide-openings, dies D^2 detachably connected to said plungers, mandrel C, and suitable mechanism for
 85 moving said plungers toward and away from said mandrel, substantially as specified.

3. The combination of heads A and A' having guide openings a^4 therein, mandrel C, die-plungers D having brackets K connected there-
 90 to, screws J operating in said brackets, said screws rotating in bearings in the flanges a of the heads with beveled gears H^4 connected to said screws, gears H^3 mounted on shafts H^2 , said latter gears meshing with the gears H^4 ,
 95 and suitable means for rotating said driving-shaft.

4. The heads A and A' having the guide-openings a^4 therein, central stationary mandrel C, plunger-dies resting in said guide-
 100 openings in the heads, and an intermediate stay-ring E, and suitable mechanism connected to said heads and ring for operating said plunger-dies, substantially as set forth.

5. The heads A and A' having the elongated guide openings a^4 therein, the latter diverging from a common center, plungers D resting in said openings with dies detachably connected to said plungers, and a mandrel C located centrally between said dies,
 105 and suitable mechanism for moving said plungers.
 110

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Witnesses:

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 O. M. HILL.