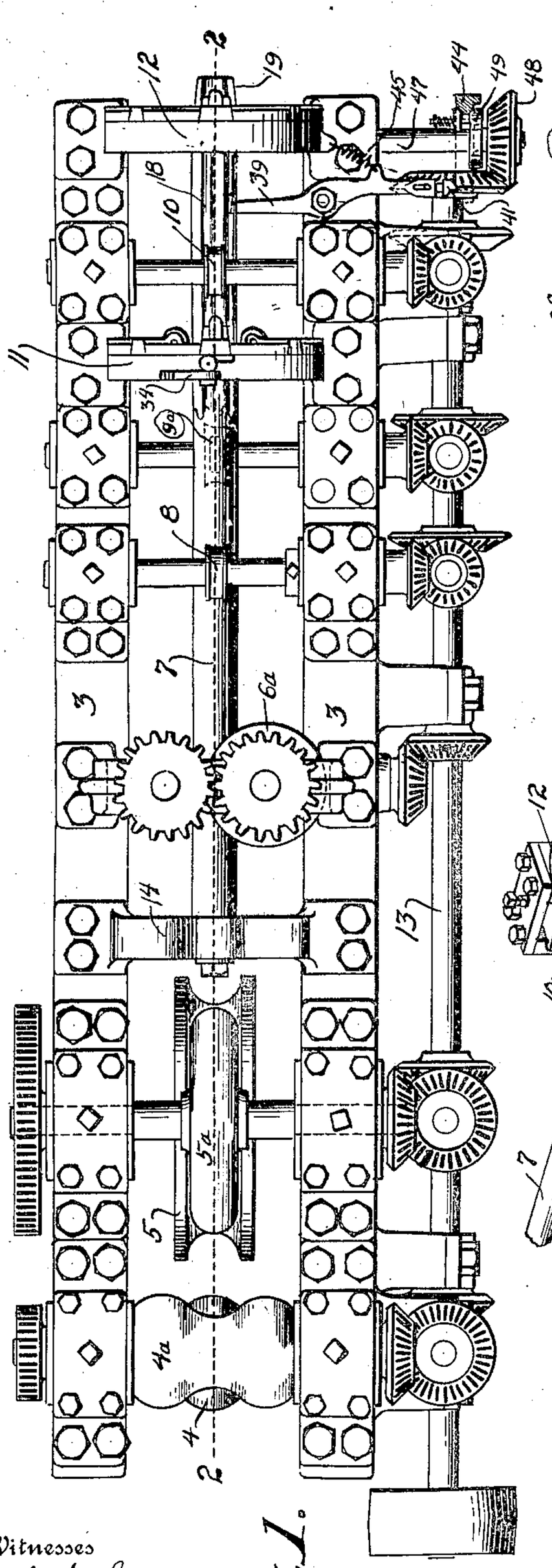
No. 845,437. PATENTED FEB. 26, 1907.

S. M. SCHMELTZER.

CONDUCTOR PIPE MACHINE.

APPLICATION FILED JAN. 18, 1906.

3 SHEETS—SHEET 1.



Witnesses
Jos. J. Stosler.
Fred'k. Billman.

Fig. 1.

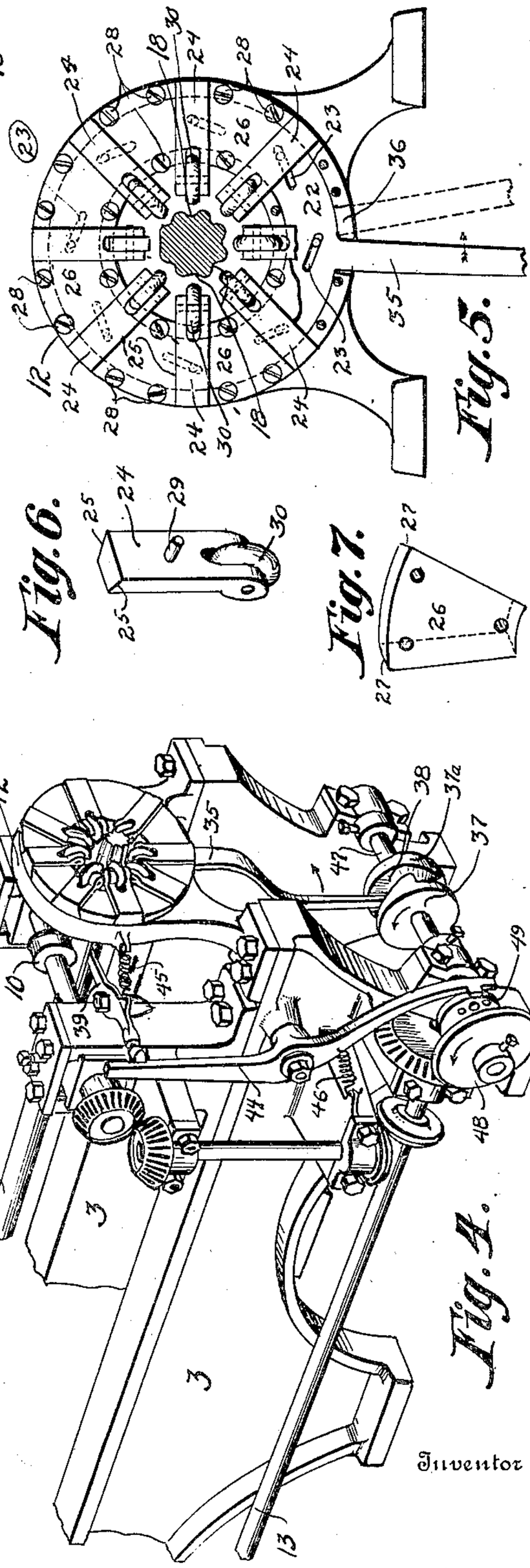


Fig. 5.

Fig. 6.

Fig. 7.

Fig. 4.

Inventor

Samuel M. Schmeltzer

By Harry Frease Attorney

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3 SHEETS—SHEET 2.

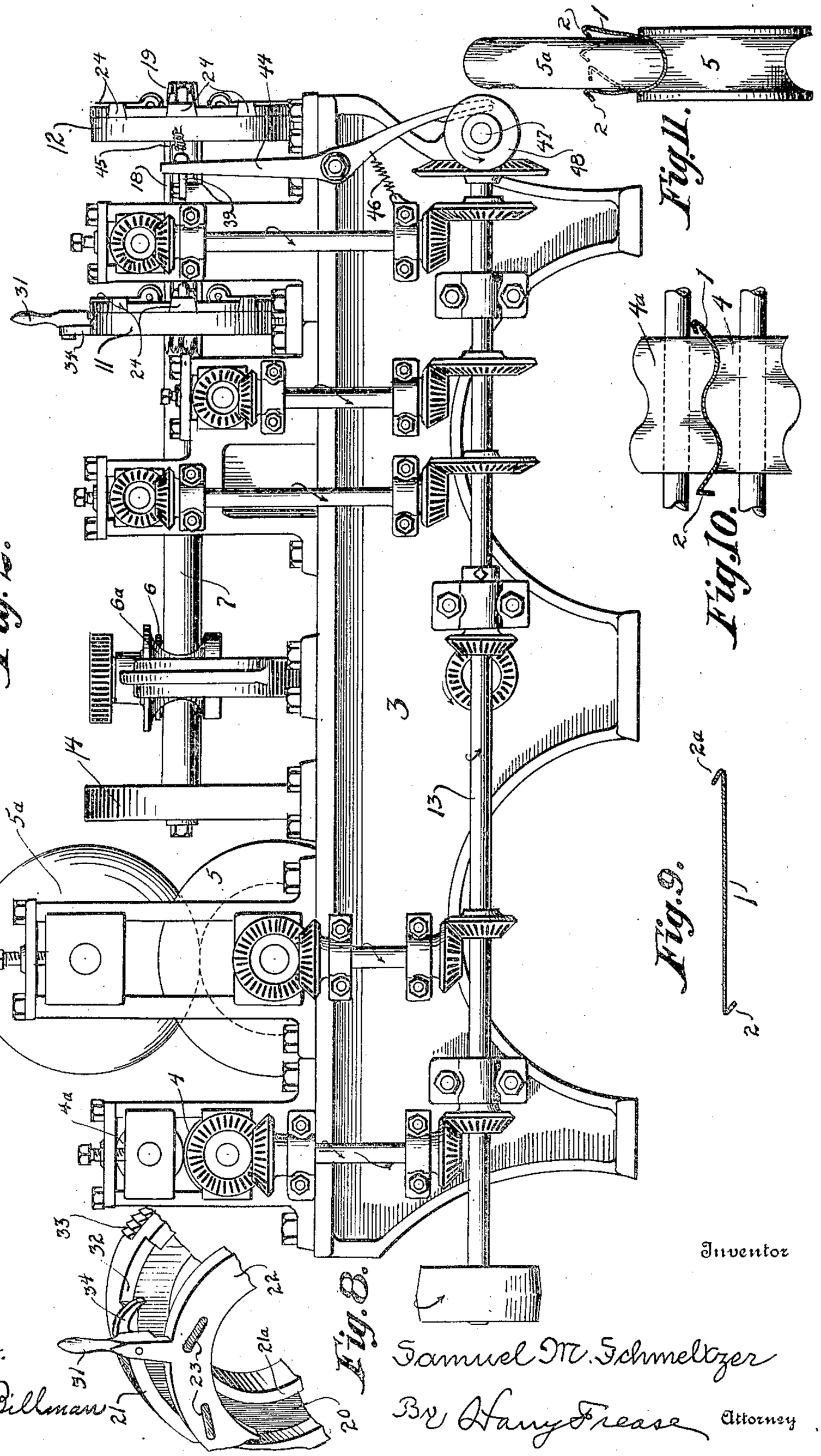

Fig. 2.

Fig. 11.

Fig. 10.

Fig. 9.

Witnesses

Jos. J. Hosler.

Obed B. Billman

Inventor

Samuel M. Schmeltzer

By Harry Frease Attorney

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3 SHEETS—SHEET 3.

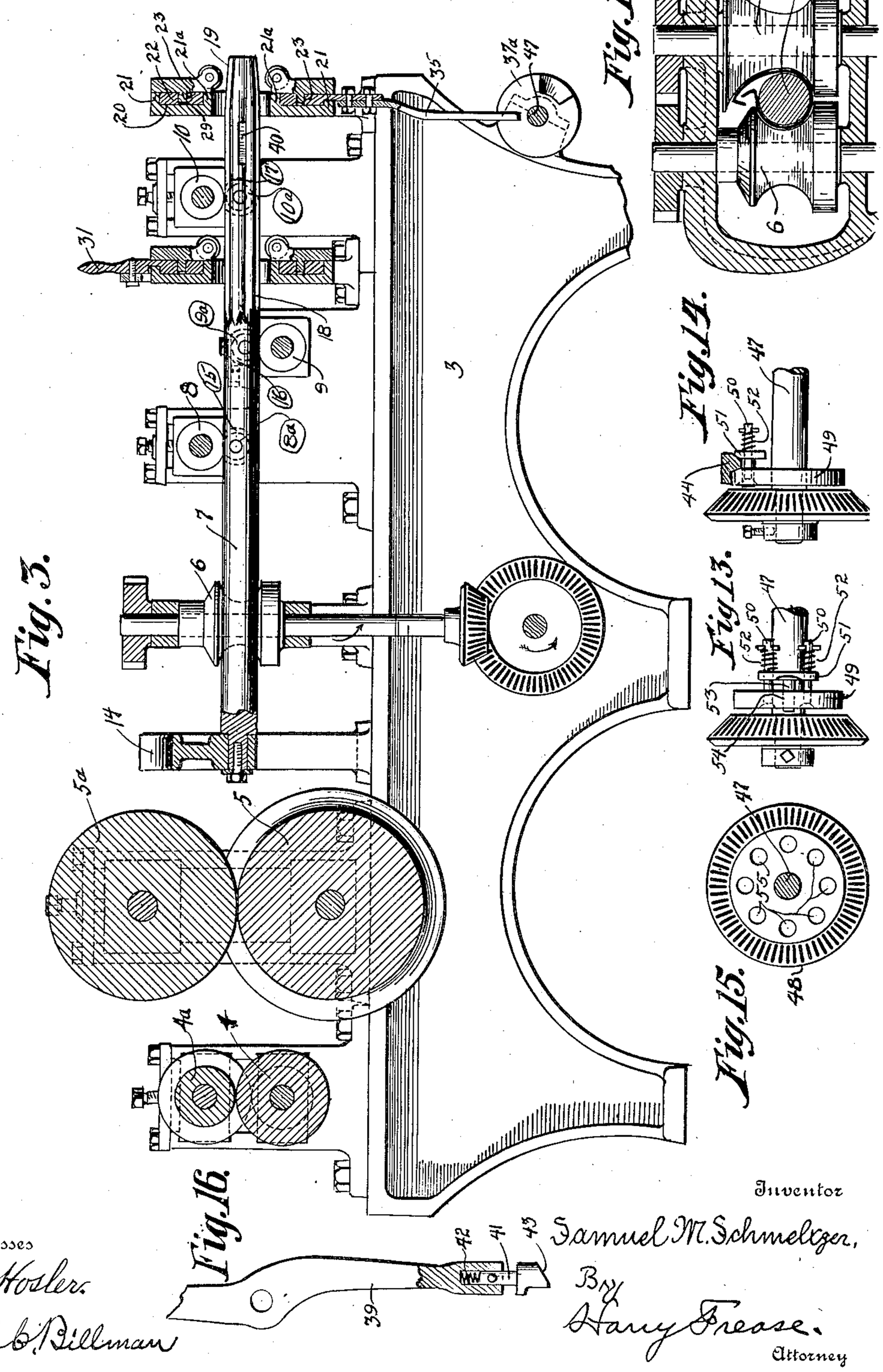

Fig. 3.

Fig. 12.

Fig. 14.

Fig. 13.

Fig. 15.

Fig. 16.

Witnesses

Jos. J. Hosler.

Obed B. Billman

Inventor

Samuel M. Schmeltzer,

By

Harry Grease.

Attorney

UNITED STATES PATENT OFFICE.

SAMUEL M. SCHMELTZER, OF MILWAUKEE, WISCONSIN.

CONDUCTOR-PIPE MACHINE.

No. 845,437. Specification of Letters Patent. Patented Feb. 26, 1907.

Application filed January 18, 1906. Serial No. 296,619.

To all whom it may concern:

Be it known that I, SAMUEL M. SCHMELTZER, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Conductor-Pipe Machine, of which the following is a specification.

The invention relates to a machine for making conductor-pipes out of sheets of metal the edges of which have been previously flanged in the usual manner; and the objects of the invention are to form the pipe, join the edges and lock the seam, corrugate the pipe when desired, and to crimp the end thereof, all in continuous or successive operations by one machine. These objects and other desirable results are attained by the mechanism, construction, and arrangement illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the conductor-pipe machine; Fig. 2, a right side elevation of the machine; Fig. 3, a longitudinal section on line 2 2, Fig. 1; Fig. 4, a perspective view of the forward end of the machine, showing details of the crimping mechanism; Fig. 5, a front elevation of the crimping-head; Fig. 6, a detached perspective view of one crimping or corrugating roll; Fig. 7, a similar view of one section of the crimping-head or corrugating-head face-plate; Fig. 8, a similar view showing details of the corrugating-head; Fig. 9, a cross-section of an edged sheet; Fig. 10, an elevation of the initial rolls; Fig. 11, an elevation of the intermediate rolls; Fig. 12, an elevation of the final rolls; Fig. 13, a side view of the crimping clutch-gear; Fig. 14, a plan view of the same; Fig. 15, a face view of the same, and Fig. 16 a detached view of the crimping trip-arm.

Similar numerals refer to similar parts throughout the drawings.

The metal sheets 1 are cut into strips of suitable length and width, and the flanges 2 and 2^a are bent in reverse directions, as shown in Fig. 9, which bending may be done in the usual manner by an edging-machine, and when by a sheet-metal edger of the type illustrated and described in Letters Patent No. 683,996, issued October 8, 1901, to this inventor the same can be connected or joined to the pipe-making machine and operated continuously therewith; but for simplicity an edging-machine is not shown in this case.

The parts of the pipe-machine proper are preferably mounted on the single frame 3 and comprise in general the initial rolls 4 and 4^a, the intermediate rolls 5 and 5^a, the final rolls 6 and 6^a, the mandrel 7, the grooving-rolls 8 and 8^a, the feed-rolls 9 and 9^a and 10 and 10^a, the corrugating-head 11, and the crimping-head 12, and the various rolls are actuated by suitable counter-shafts and gears from the main shaft 13, preferably mounted longitudinally on the side of the machine.

The initial dies are preferably, as illustrated, the rolls 4 and 4^a, which are horizontally disposed on transverse axes and are formed to bend or concave the lateral parts of the metal sheet approximately in the form required in the finished pipe and to bend or convex the middle portion of the sheet in a curve opposite to that of the finished pipe, as illustrated in Fig. 10. The intermediate dies, preferably the rolls 5 and 5^a, are located at an interval in front of the initial rolls and are likewise horizontally disposed on transverse axes and are formed to bend or concave the middle part of the sheet in the form required for the finished pipe, and in this operation the flanges on the end of the concave roll 5 slightly overlap the sides of the convex roll 5^a, which overlapping acts to force and spring the flanged edges of the concaved side parts of the metal sheet against the ends of the convex roll 5^a, as shown by full lines in Fig. 11, so that when the sheet has passed beyond the intermediate rolls the flanged edges thereof will spring inward quite close together, as shown by broken lines in the same figure. In this manner the partly-formed pipe is fed over the rear end of the mandrel 7, which is located at an interval in front of the intermediate rolls, the flanged edges of the pipe separating and passing on the sides of the pendent support 14 of the mandrel and then on between the final dies, preferably the rolls 6 and 6^a, which are mounted on vertical axes, one on each side of the mandrel at an interval in front of the rear end thereof.

The final roll 6 is concave in its vertical section, so as to fit approximately around the adjacent half of the mandrel, whereby the corresponding half of the pipe is pressed and held substantially in its ultimate semicircular shape, and the flanged edge 2 thereof is pressed down close to the top of the mandrel, while the final roll 6^a on the opposite side of the mandrel is more flatly concaved in the upper part of its vertical section, so that the corresponding flanged edge 2^a of the pipe is

forced over and above the opposing flanged edge 2, which brings these flanges in proper position for being engaged and locked to form the seam, as shown in Fig. 12. The pipe thus formed is then fed forward along the mandrel, and the flanged edges are engaged and locked by means of the ordinary adjustable grooving-roll 8, opposite which is mounted the companion roll 8[a] in the longitudinal slot 15 in the mandrel, which companion roll serves to eliminate the friction which would result if the grooving-roll pressed directly against the mandrel. The pipe thus completely formed and grooved is then passed forward along the mandrel, and its movement is made positive by means of the adjustable feed-rolls 9 and 10, preferably located one below and the other above the mandrel, and the pressure of these rolls is sustained by the antifriction companion rolls 9[a] and 10[a], which are mounted, respectively, in the slots 16 and 17 in the mandrel. These feed-rolls also serve to support the mandrel in its proper position.

The forward part of the mandrel is provided with the longitudinal laterally-rounded grooves 18, and the forward end 19 thereof is tapered to terminate in a reduced cross-section. The corrugating-head 11 and the crimping-head 12 are located around the mandrel, the former preferably between two feed-rolls and the latter around the forward reduced end of the mandrel. These heads are substantially alike except in their operating mechanism, and one description will serve for both.

The annular groove 20 is formed in the face of each head between the annular flanges 21 and 21[a], and in this groove is rotatably located the adjusting-ring 22, having therein the series of inclined slots 23. The series of radial slides 24 with beveled sides 25 are held in position against the faces of the respective heads by means of the sectional face-plates 26, having their edges 27 reversely beveled, which plate-sections may be fastened to the annular flanges of the heads by means of the screws 28. On the inner face of each radial slide is provided the pin 29, and the pins of the several slides enter and operate in the inclined slots of the adjusting-ring, by means of which slots and pins the slides are adjusted outward and inward in unison by the rotation of the adjusting-ring one way or the other. On the inner ends of the slides are mounted the corrugating or crimping dies, which, as illustrated, are preferably the rounded rollers 30, which register with the rounded grooves in the mandrel, and by means of these rollers the pipe may be corrugated by the corrugating-head and crimped by the crimping-head.

The adjusting-ring in the corrugating-head is provided with a handle 31, extending preferably upward through the slot 32 in the annular flange 21 of the head, by means of which handle the adjusting-head is rotated to throw the corrugating-rolls to and from the mandrel, and the ring is held in various positions of adjustment by means of the ratchet 33 on the periphery of the head and a detent 34 on the handle of the ring, and the adjusting-ring of the crimping-head is provided with the arm 35, extending preferably downward through the slot 36 in the annular flange 21 of the head, and by means of this arm and ring the crimping-rolls are adjusted to and from the mandrel by the rotation of the cam-disks 37 and 37[a] in the slot 38, between which disks the free end of the arm is entered.

The trip-arm 39 is pivoted adjacent to the mandrel at a point a short distance to the rear of the crimping-head, and the inner end of this arm extends and operates in the longitudinal slots 40 in the side of the mandrel. In the outer end of the trip-arm is mounted the telescoping bolt 41, which is normally forced outward by the spring 42, and the outer end of the bolt is beveled to present the forward inclined face 43. The clutch-lever 44 is pivoted on the side of the frame, and the forward side of its upper free end is normally engaged by the bolt on the end of the trip-arm, and the outer end of the trip-arm is normally drawn forward by means of the spring 45, attached to the crimping-head. As the forward end of the pipe approaches the crimping-head it carries the inner end of the trip-arm forward, which throws the outer end thereof backward, which in turn throws the upper end of the clutch-lever backward until the bolt is free to pass inside the lever, whereupon the upper end of the clutch-lever is free to move to its normal forward position, which it does by action of the spring 46, and after the pipe is passed beyond the inner end of the trip-arm the same is permitted to return to its normal position, and in so doing the telescoping bolt in its outer end passes inside the upper end of the clutch-lever, which it does by reason of its beveled end, after which the bolt-spring forces it out in front of the clutch-lever ready for another action.

The cam-disks 37 and 37[a] are arranged to make one revolution on their shaft 47 each time the clutch-lever is tripped by means of the clutch-gear-wheel 48, which is rotatably mounted on the disk-shaft. The clutch-head 49 is securely attached on the shaft adjacent to the gear-wheel, and on the outer side of the head are provided the rods 50, on which rods the detent-plate 51 is slidably mounted, and this plate is pressed toward the clutch-head by the springs 52. The detent-pin 53 extends from the inner side of the detent-plate through the aperture 54 in the clutch-head and is adapted to enter the several apertures 55 in the web of the gear-wheel.

When the clutch-lever is in its normal position, the wedge-shaped flange on the lower end thereof is entered between the clutch-head and detent-plate and by forcing the latter outward thus disengages the detent-pin from the apertures in the gear-wheel; but when the clutch-lever is tripped the wedge flange is thrown out and the gear-wheel is engaged by the detent-pin until the disk-shaft has made one revolution, whereupon the wedge flange of the clutch-lever, having been drawn back toward its normal position by action of the spring 46, forces out the detent-plate, and thus disengages the clutch-pin.

The cam-slot 38 is so shaped that the crimping-rolls are normally held outward free from the formed pipe, but that when the crimping mechanism has been tripped and the forward end of the pipe has been advanced to the forward reduced end of the mandrel the crimping-rolls are thrown inward to crimp the end of the pipe on the small end of the mandrel, after which the crimping-rolls are gradually moved outward, so as to give the crimp on the end of the pipe the desired length and taper. These movements of the crimping-rolls are accomplished by means of the crimping-lever as it is thrown one way and the other by the rotation of the cam-disks, one such revolution being made when the mechanism is tripped by each pipe.

It will be understood that by making the pipe in the manner described, that is, by first concaving the lateral parts of the metal sheet in approximately the proper ultimate form and convexing the median part of the metal sheet in the opposite direction, when this median part is then concaved in approximately its ultimate form the lateral parts are thrown upward and inward to approximately their ultimate proper position, so that the partly-formed pipe is in very convenient shape for entering between the final rolls.

This process of making the pipe which has been described and illustrated, but not claimed herein is made the subject of another application for Letters Patent, filed January 31, 1907, Serial No. 355,028.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A sheet-metal-pipe machine comprising initial, intermediate and final dies with a mandrel between the final dies; the initial dies being shaped to concave the lateral parts and convex the median part of the sheet, the intermediate dies being shaped to concave said median part of the sheet, and the final dies being shaped to form the pipe around the mandrel and bring the flanged edges of the sheet in relation for grooving.

2. A sheet-metal-pipe machine comprising initial, intermediate and final rolls with a mandrel between the final rolls; the initial rolls being shaped to concave the lateral parts and convex the median part of the sheet, the intermediate rolls being shaped to concave said median part of the sheet, and the final rolls being shaped to form the pipe around the mandrel and bring the flanged edges of the sheet in relation for grooving.

3. In a sheet-metal-pipe machine a mandrel having longitudinal grooves therein, a head around the mandrel having radial slides therein with dies on their inner ends, a rotatable ring in the head having inclined slots therein, and pins in the slides entered in the slots whereby the dies can be radially adjusted in unison by the rotation of the ring.

4. In a sheet-metal-pipe machine a mandrel having longitudinal grooves therein, a head around the mandrel having radial slides therein with rolls on their inner ends, a rotatable ring in the head having inclined slots therein, and pins in the slides entered in the slots whereby the rolls can be radially adjusted in unison by the rotation of the ring.

5. In a conductor-pipe machine a mandrel having a tapered end, a head around the tapered end having radially-adjustable dies therein, and mechanism tripped by the forward end of the pipe whereby the dies are moved inward when the end of the pipe is at the small end of the mandrel and then outward as the pipe advances.

6. In a conductor-pipe machine a mandrel having a tapered end, a head around the tapered end having radially-adjustable rolls therein, and mechanism tripped by the forward end of the pipe whereby the rolls are moved inward when the end of the pipe is at the small end of the mandrel and then outward as the pipe advances.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL M. SCHMELTZER.

Witnesses:
LESTER M. MILLER,
N. E. RHODES.