No. 890,526. PATENTED JUNE 9, 1908.

I. W. NUMAN.

CORRUGATING MACHINE.

APPLICATION FILED DEC. 18, 1906.

2 SHEETS—SHEET 1.

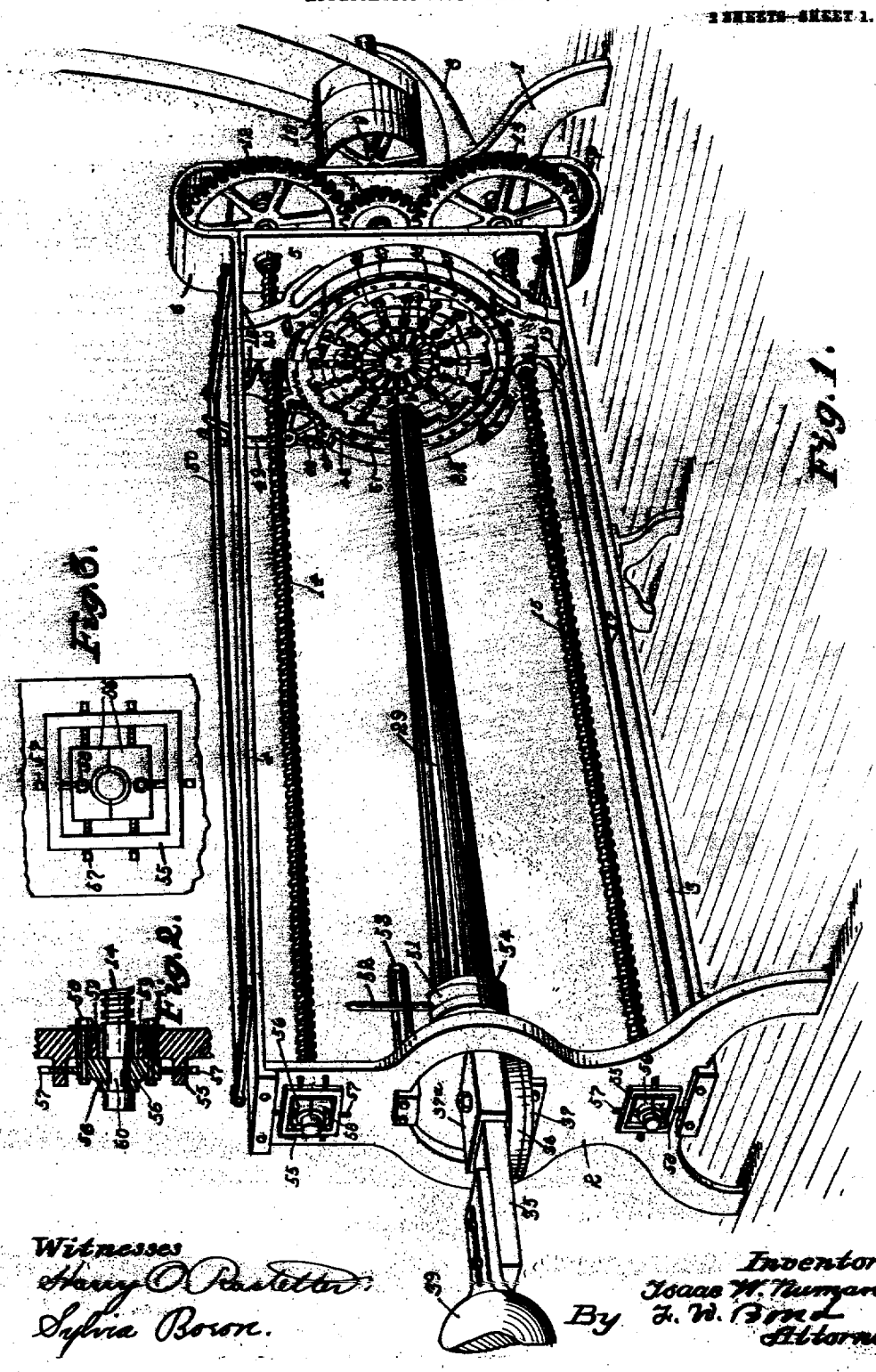


Fig. 1.

Fig. 3.

Fig. 2.

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2 SHEETS—SHEET 2.

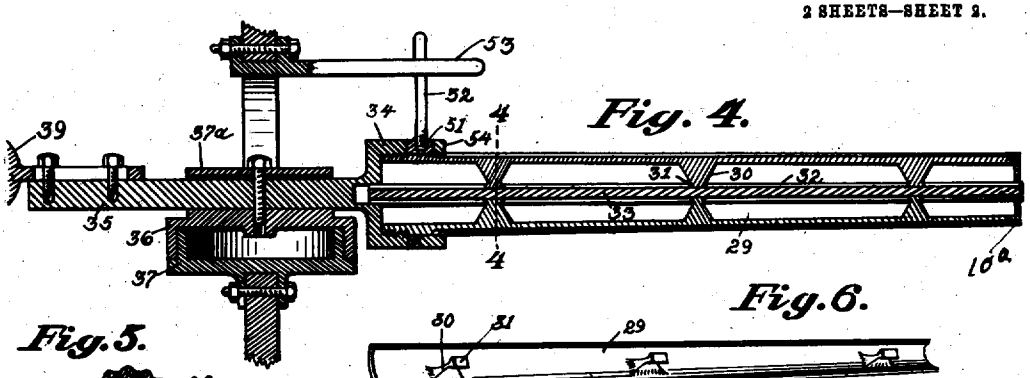


Fig. 4.

Fig. 5.



Fig. 6.

Fig. 7

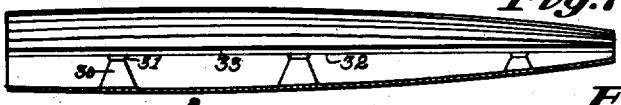


Fig. 9.

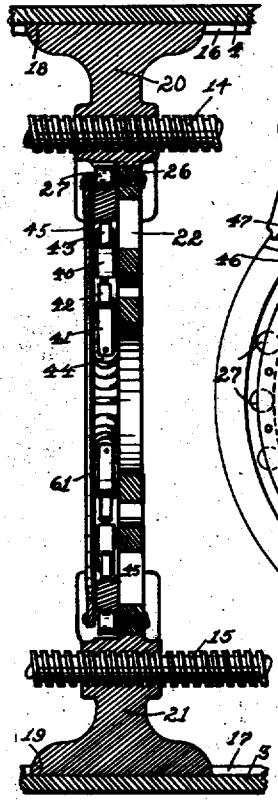


Fig. 8.

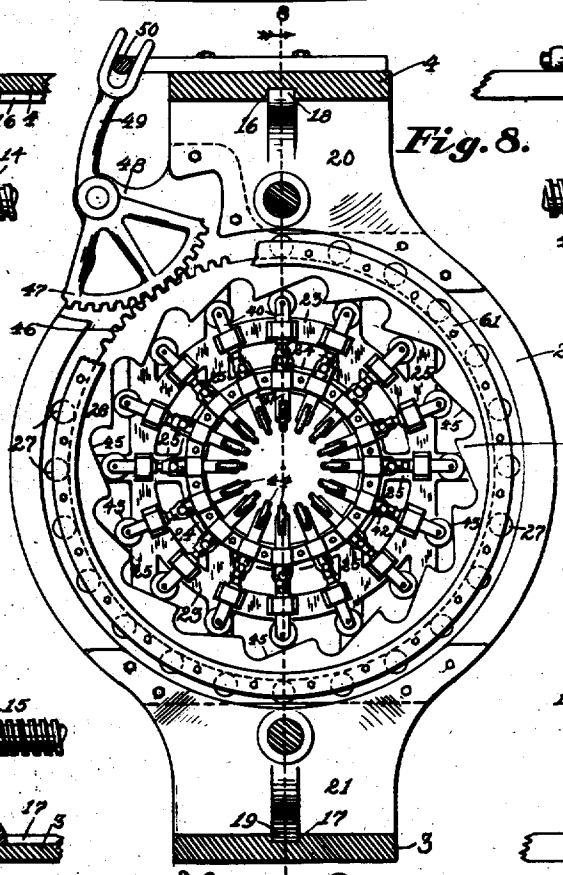


Fig. 10.

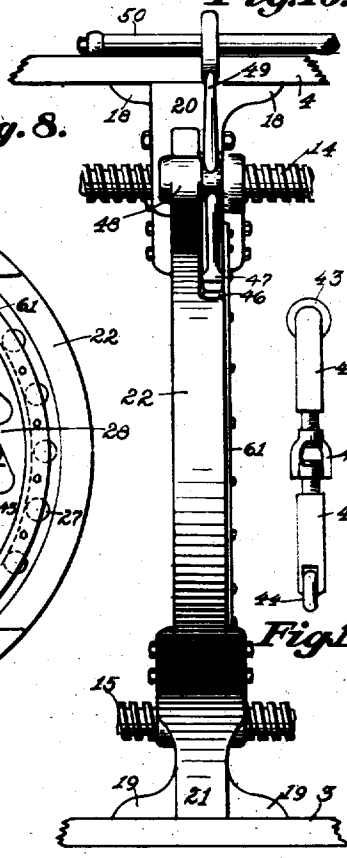


Fig. 11.

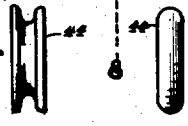


Fig. 12.

Fig. 13.

Witnesses
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UNITED STATES PATENT OFFICE.

ISAAC W. NUMAN, OF CANTON, OHIO, ASSIGNOR TO THE UNION METAL POST COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

CORRUGATING-MACHINE.

No. 890,526. Specification of Letters Patent. Patented June 9, 1908.

Application filed December 18, 1906. Serial No. 348,493.

To all whom it may concern:

Be it known that I, ISAAC W. NUMAN, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Corrugating-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, making a part of this specification, and to the numerals and figures of reference marked thereon, in which—

Figure 1 is a perspective view showing the different parts of the corrugating machine properly assembled. Fig. 2 is a view showing a portion of the journaled end of one of the screw threaded shafts, and a vertical section of its box showing the parts in proper relationship with reference to a standard. Fig. 3 is a side view of the screw threaded shaft box showing a portion of the standard and its box clamping frame. Fig. 4 is a longitudinal section of the mandrel, showing the same properly mounted upon its supporting head and illustrating the skelp removing device in proper relationship with reference to the mandrel. Fig. 5 is a transverse section of the mandrel on line 4—4 Fig. 4. Fig. 6 is a detached view of one of the mandrel sections. Fig. 7 is a view of a modified shaped mandrel showing the lower half in section. Fig. 8 is a view of the corrugating head showing its different parts properly assembled and illustrating the same properly connected to the carrying blocks. Fig. 9 is a vertical section taken on line 8—8, Fig. 8. Fig. 10 is an edge view of the corrugating head and its carrying blocks. Fig. 11 is a detached view of one of the adjustable corrugating wheel carrying bars. Figs. 12 and 13 are edge views of corrugating or fluting rolls, showing their peripheries properly formed for the work designed to be done.

The present invention has relation to corrugating machines and it consists in the different parts and combination of parts hereinafter described, and particularly pointed out in the claims.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

In the accompanying drawings, 1 represents the gear end standard or frame of the machine, and 2 represents the opposite or what might be termed rear end standard, which standards are held in spaced relationship and in proper parallel position with reference to each other by means of the grooved tie-bars 3 and 4. Between the grooved tie-bars 3 and 4 at their gear ends is inserted the plate 5 and the tie-bars provided with curved parts 6 and 7, which curved parts are securely bolted or otherwise attached to the standard 1. The standard 1 is provided with the lateral arm 8, which lateral arm is for the purpose of providing a means for locating a suitable bearing for the outer end of the power shaft 9, to which power shaft is attached the usual reverse pulleys 10, said pulleys being of the usual construction wherein it is desired to reverse the motion of a machine by belt pulleys. This construction is common and needs no specific description here. To the shaft 9 is securely attached the gear wheel 11, which gear wheel is located intermediate the gear wheels 12 and 13, said gear wheels being securely connected to the screw threaded shafts 14 and 15 respectively and are for the purpose of imparting rotary motion to the screw threaded shafts 14 and 15. The gear wheel 11 is interposed for the purpose of causing the gear wheels 11 and 12 to rotate in the same direction, thereby giving a one direction movement to the two screw threaded shafts 14 and 15. The tie-bars 3 and 4 are each provided with the grooves 16 and 17 which grooves receive the ribs 18 and 19, which ribs are preferably formed integral with the blocks 20 and 21. To the blocks 20 and 21 is attached, by means of bolts or their equivalents the head 22 which head consists of the outer and inner integral rings 23 and 24, which rings are concentric with each other, and are tied together by the integral bars 25, which bars are extended and connected to the main body of the head 22. The object of forming the bars is simply to produce an integral head and they are simply employed for the purpose of lightening the structure, as it will be understood that the same object and purpose could be carried out if instead of making an open head, a solid one was used. To the head 22 are attached a series of bearings 26 upon which bearings are mounted the rollers 27, said bearings and rollers being located concentrically with the inner and outer rings 23 and 24. The cam-ring 28 is located within the space partially inclosed by the rollers 27, and said ring being formed of such a size that

its periphery will come in contact with the peripheries of all the rollers 27, thereby holding the cam-ring 28 in proper relative position with reference to the head 22 and especially with reference to the concentric rings 23 and 24.

The mandrel 29 is composed of sections, which sections are provided with the spokes 30, which spokes are provided with wedge shaped ends 31, said wedge shaped ends being formed of a size and shape to correspond with the size and shape of the grooves 32 formed in the mandrel shaft or rod 33, said grooves being for the purpose of receiving the wedge shaped ends 31 located upon the spokes 30, thereby providing a means for producing a mandrel that is light, and at the same time have sufficient strength for the purpose for which it is designed. To the hinged end of the mandrel proper is attached the collar 34, which collar is located upon the mandrel sections or mandrel proper 29 as best illustrated in Fig. 4. The collar 34 is provided with the bar 35 which is connected to the disk 36 in any convenient and well known manner, said disk is adapted to rotate upon the base plate 37. For the purpose of better holding the mandrel bar 35, the cap 37^a is provided through which cap the lug bolt 38 is passed and connected to the revoluble disk 36.

For the purpose of counterbalancing the weight of the mandrel 29 the bar 35 is provided with the counterweight 39, which counterweight is adjustably attached to the bar 35. The mandrel 29 is tapered throughout its length and is so formed for the purpose of receiving plain round tapered skelps, from which plain round tapered skelps, a corrugated or fluted pipe column or post is to be produced as hereinafter described. To the head 22 are connected the radial bars 40 and 41, said bars being adjustably connected together by means of the turnbuckle 42, which turnbuckles are of the usual construction and are connected to the bars 40 and 41, by the usual right and left screw threads. The bars 40 are preferably provided with the anti-friction rollers 43 and the bars 41 are provided with the corrugating or fluting rollers 44. The anti-friction rollers 43 are located in contact with the faces of the cams 45, the faces of said cams being located at a tangent to a true circle described by the cam ring, the center of said cam ring being co-axial with the mandrel when said mandrel is brought into position for the coaction of said mandrel with the corrugating head proper.

It will be understood that by locating the various cams as shown that the distance from a common center is varied in proportion to the pitch and the length of each of the cam faces, by which arrangement the various bars 40 and 41, are permitted to reciprocate to and from a common center thereby providing for the proper movement of the bars together with their corrugating or fluting rolls during the time the head 22 is moved back and forth upon the mandrel.

In order that a positive pressure is brought upon the metal throughout the entire length of the article to be corrugated or fluted the bars 40 and 41 must be held against any longitudinal movement at the direct point of pressure; but as the diameter of the mandrel varies there must be and is a longitudinal movement of the bars 40 and 41, but this movement is only permitted as the bars are released as hereinafter described. The cam ring 28 is provided with a toothed segment or section 46, which toothed segment or section meshes with the toothed segment 47 said toothed segment being pivotally mounted upon the stud 48, which stud is connected to the head 22. The segment 47 is provided with the bifurcated arm 49 which arm engages the rod 50 which rod is set at an angle to the bars 3 and 4, and is so located for the purpose of imparting an oscillatory movement to the segment 47 during the time the head 22 is moved back and forth along the mandrel. It will be understood that when the head 22 moves in one direction the cam ring 28 will be moved or oscillated in a given direction, and when the head 22 is moved in the opposite direction along the mandrel the can ring 28 will be moved in the opposite direction; that is to say when the head 22 moves toward the hinged end of the mandrel, the cam ring 28 will be slowly rotated or oscillated and in the proper direction to release the bars 40 and 41, thereby compensating for the different diameters of the tapered mandrel.

It will be understood that by providing the turnbuckles 42 the distance between the extreme or contact edges of the anti-friction rollers 43 and the corrugating rollers 44 can be adjusted so that the proper pressure will be brought upon the metal, and at the same time a limited adjustment may be given whereby mandrels of different sizes can be employed and the corrugating rolls set so as to properly act, but this adjustment just above pointed out is not depended upon entirely owing to the fact that different heads may be employed and should necessarily be employed where the difference in size is quite considerable, and difference in shape in cross section. In some instances it might be desirable to make a rectangular column or a column of any other shape in section, in which event a different shaped head should be employed, but in any event the limited adjustment should be provided for so as to maintain the proper pressure under all circumstances, and at the same time so adjust the various bars carrying the corrugating rolls so that the pressure will be even in all

radial lines. It is well understood that if the column or other article has been acted upon by the corrugating or fluting rollers the finished article is more or less difficult to remove and in order to provide for the removing of the finished product a cam faced ring 51 is provided, and is located against the collar 34. The cam faced ring 51 is provided with the rod 52, which rod is extended through the slotted bar 53, which slotted bar is secured to the standard 2. It will be understood that when the mandrel is moved in a horizontal plane and as it turns upon a vertical center or the pivoted point fixed by the bolt 38 the cam faced ring 51 will be oscillated by reason of the rod 52 passing through the slotted bar 53; and against the face of the ring 51 is located a slidable ring 54, which slidable ring has a cam face corresponding with the cam face of the ring 51 so that when the cam ring 51 is rocked or oscillated the slidable ring 54 will be moved a short distance upon the mandrel, thereby moving with it the finished column or pipe. It of course being understood that the end of the pipe when moved must be and is against the face or edge of the ring 54. It therefore follows that when the mandrel is swung in a horizontal plane the finished product will be moved endwise along the mandrel, thereby starting the finished product after which it can be easily removed in the usual manner. It will be understood that in order to prevent the carrying blocks from binding as they are moved back and forth along the screw threaded shafts 14 and 15, said screw threaded shafts must be set in true parallelism with reference to each other, and in order to provide for the proper adjustment of the bearings the standard 2 is provided with the rectangular flange 55, which rectangular flange is for the purpose of providing a means for properly clamping the partible boxes 56, which partible boxes after they have been properly adjusted are held by means of the set screws 57 and are clamped to the standard or standards 1 and 2 by means of the clamping bolts 58.

It will be understood that the apertures formed in the standards through which the screw threaded shafts are located should be of a greater diameter than the diameter of the shafts; in order to provide for the limited adjustment necessary to bring the screw threaded shafts 14 and 15 into proper parallelism. The apertures 59 should also be of a greater diameter than the diameter of the bolts 58 so that said bolts can be free to move during the time the adjustment of the boxes 56 is being made.

It will be understood that there will be a pull and push strain upon the screw threaded shafts 14 and 15 during the time the head and the different parts carried thereby is moved, and in order to prevent any end movement of the screw threaded shafts, the boxes 56 are set in the recessed or annular flanged portion 60 of the screw threaded shafts.

For the purpose of holding the cam ring 28 against any lateral displacement the ring 61 is provided and is bolted or otherwise attached to the head 22.

For the purpose of assisting in holding the ends of the mandrel sections together at the free and of the mandrel proper the cap or collar 10^a is provided.

Having fully described my invention what I claim as new and desire to secure by Letters Patent, is—

1. In a corrugating machine of the class described, a frame, a tapered mandrel carried by the frame, a head adapted to move along the mandrel, a series of bars carried by the head, a series of corrugating rolls journaled to said bars, a cam ring carried by the head and adapted to oscillate with the movement of the head along the mandrel, and the bars carried by the head adapted to be actuated by the oscillation of the cam ring, substantially as and for the purpose specified.

2. In a corrugating machine of the class described, a frame, a tapered mandrel adapted to swing in a horizontal plane, a head movable along the mandrel, a series of adjustable radial bars, said bars carried by the movable head and provided with corrugating rolls, a cam ring carried by the head and located around the radial bars and means for imparting an oscillating movement to the cam ring during the movement of the head upon the tapered mandrel, substantially as and for the purpose specified.

3. In a corrugating machine of the class described, a frame, a mandrel tapered throughout its entire length and adapted to swing in a horizontal plane, a head movable along the mandrel, a series of adjustable bars, said bars carried by the movable head and provided with corrugating rolls and anti-friction rolls, a cam ring carried by the head and located around the radial bars, said radial bars provided with anti-friction rollers, and said cam ring provided with cams adapted for engagement with the anti-friction rollers, and means for imparting an oscillating movement to the cam ring during the movement of the head upon the mandrel, substantially as and for the purpose specified.

4. In a corrugating machine, a frame, a mandrel adapted to swing in a horizontal plane, a cam faced ring located upon the mandrel, means for holding said cam faced ring against longitudinal movement upon the mandrel, a ring located against the cam faced ring, and means for oscillating the cam faced ring by the swinging movement of the mandrel, a head adapted to move along the mandrel, said head provided with a series of radial bars, corrugating rolls carried by the radial bars, and a ring provided with tan-

gent cam faces, said cam faces adapted to actuate the radial bars, and means for oscillating the ring provided with the tangent cam faces, substantially as and for the purpose specified.

5. In a corrugating machine, the combination of a frame, a mandrel, carried by the frame, said mandrel adapted to swing in a horizontal plane, a bar provided with a counterbalance, bars provided with grooves, blocks slidably mounted in the grooves, a head carried by the blocks, said head provided with a series of bars, corrugating rolls journaled at the inner ends of the bars and means of adjusting the length of the bars carrying the corrugating rolls, substantially as and for the purpose specified.

6. In a corrugating machine a frame, a mandrel carried by the frame, said mandrel adapted to swing in a horizontal plane, a head connected to blocks, said head and blocks adapted to move along the mandrel, radial bars provided with corrugating rolls and anti-friction rolls respectively, a cam ring circumferentially located around the radial bars and means for oscillating the cam ring, substantially as and for the purpose specified.

7. In a corrugating machine, the combination of a frame, a mandrel tapered throughout its entire length and carried by the frame, a head movable along the mandrel, means for imparting movement to the head along the mandrel, said head provided with a series of bars, each bar of the series provided with a corrugating roll, and each bar of the series elongated lengthwise, a cam ring adapted to oscillate, and the cams of the ring adapted to impart simultaneous longitudinal movement to the bars carrying the corrugating rolls, substantially as and for the purpose specified.

8. In a corrugating machine of the class described, a frame, a mandrel tapered throughout its entire length, said mandrel carried by the frame, a head movable along the mandrel, said head provided with a series of bars, provided with corrugating rolls and anti-friction rolls, an oscillating ring adapted to release the corrugating bars when moved in one direction and impart longitudinal movement when moved in the opposite direction, substantially as and for the purpose specified.

9. In a corrugating machine, the combination of a mandrel formed in sections, a rod provided with grooves, headed arms adapted to be seated in the grooves formed in the rod, and a collar located along the mandrel sections and connected thereto, substantially as and for the purpose specified.

10. In a corrugating machine, the combination of a mandrel formed of sections, a rod provided with grooves, headed arms adapted to be seated in the grooves formed in the rod, and a collar located around and connected to the mandrel sections, and a corrugating head provided with radial bars carrying corrugating rolls, said head, bars and rolls adapted to move along the mandrel, substantially as and for the purpose specified.

11. In a corrugating machine, the combination of a frame and a mandrel carried by the frame, a corrugating head provided with a series of radial bars, said bars consisting of inner and outer members and the inner and outer members adjustably connected together, substantially as and for the purpose specified.

12. In a corrugating machine, the combination of a frame, a mandrel tapered throughout its entire length and carried by the frame, a corrugated head provided with a series of radial bars, said bars consisting of inner and outer members, the inner and outer members adjustably connected together, and a cam ring adapted to actuate the bars toward a common center, substantially as and for the purpose specified.

13. In a corrugating machine, the combination of a frame, a mandrel carried by the frame, a corrugated head provided with a series of radial bars said radial bars provided with corrugating rolls, a cam ring adapted to actuate the radial bars and provided with a toothed section upon its periphery, a toothed segment meshing with said toothed section, a bifurcated arm and a rod located at an angle to a perpendicular line with the movement of the corrugating head, substantially as and for the purpose specified.

14. In a corrugating machine, the combination of a frame, and a mandrel carried by the frame, said mandrel provided with a fixed collar, a cam shaped ring located against the fixed collar, a ring located against the cam faced ring and adapted to move longitudinally upon the mandrel, an arm connected to the cam faced ring and a fixed slotted plate adapted to receive the arm connected to the cam faced ring, substantially as and for the purpose specified.

15. In a corrugating machine of the class described, the combination of a tapered mandrel adapted to swing in a horizontal plane, a counterbalance for said mandrel, mechanism adapted to move a pipe upon the mandrel longitudinally, substantially as and for the purpose specified.

16. In a corrugating machine of the class described, the combination of a tapered mandrel adapted to swing in a horizontal plane, a counterbalance for said mandrel, mechanism adapted to move a pipe upon the mandrel longitudinally by the swinging of the mandrel, substantially as and for the purpose specified.

17. In a corrugating machine, a frame, a mandrel carried by the frame, a corrugating head provided with corrugating devices

adapted to move along the mandrel, an oscillatory element carried by the head, said element adapted to be oscillated in opposite directions by the opposite movement of the corrugating head along the mandrel, substantially as and for the purpose specified.

18. In a corrugating machine of the class described, the combination of a frame, a tapered mandrel carried by the frame, a corrugating head provided with corrugating devices adapted to move along the mandrel, an oscillatory element carried by the head, said element adapted to be oscillated in opposite directions by the opposite movement of the corrugating head along the mandrel, substantially as and for the purpose specified.

19. In a corrugating machine of the class described, the combination of a frame, a swinging mandrel, a ring located upon the mandrel, means for sliding the ring by the swinging of the mandrel, substantially as and for the purpose specified.

20. In a machine of the class described, the combination of a frame, a mandrel adapted to swing in a horizontal plane, means carried by the mandrel adapted to move a pipe longitudinally upon the mandrel by the swinging movement thereof, and a corrugating head adapted to move along the mandrel, substantially as and for the purpose specified.

In testimony that I claim the above, I have hereunto subscribed my name in the presence of two witnesses.

ISAAC W. NUMAN.

Witnesses:
J. A. JEFFERS,
F. W. BOND.