

(No Model.)

3 Sheets—Sheet 1.

G. S. STRONG.

MACHINE FOR CORRUGATING PLATES OR TUBES.

No. 324,608.

Patented Aug. 18, 1885.

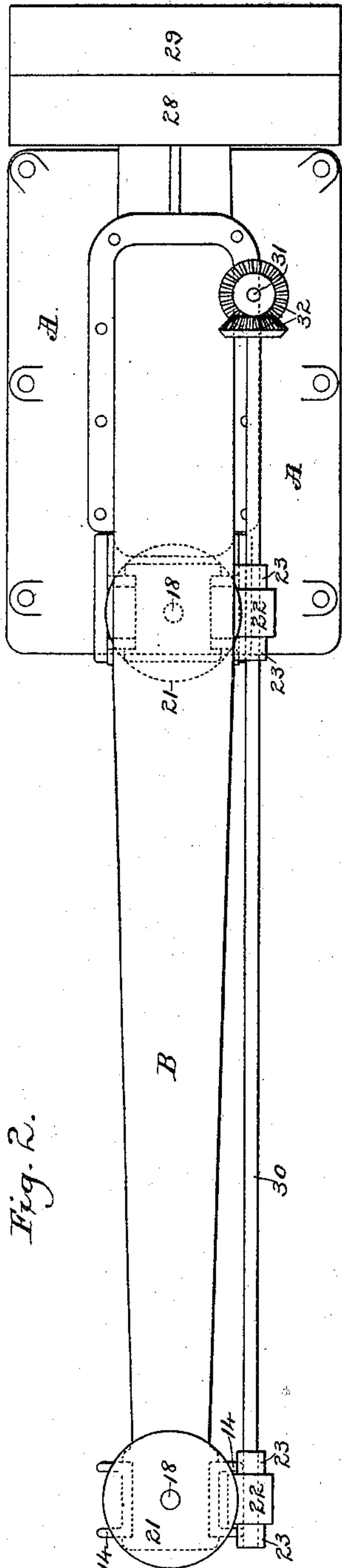


Fig. 2.

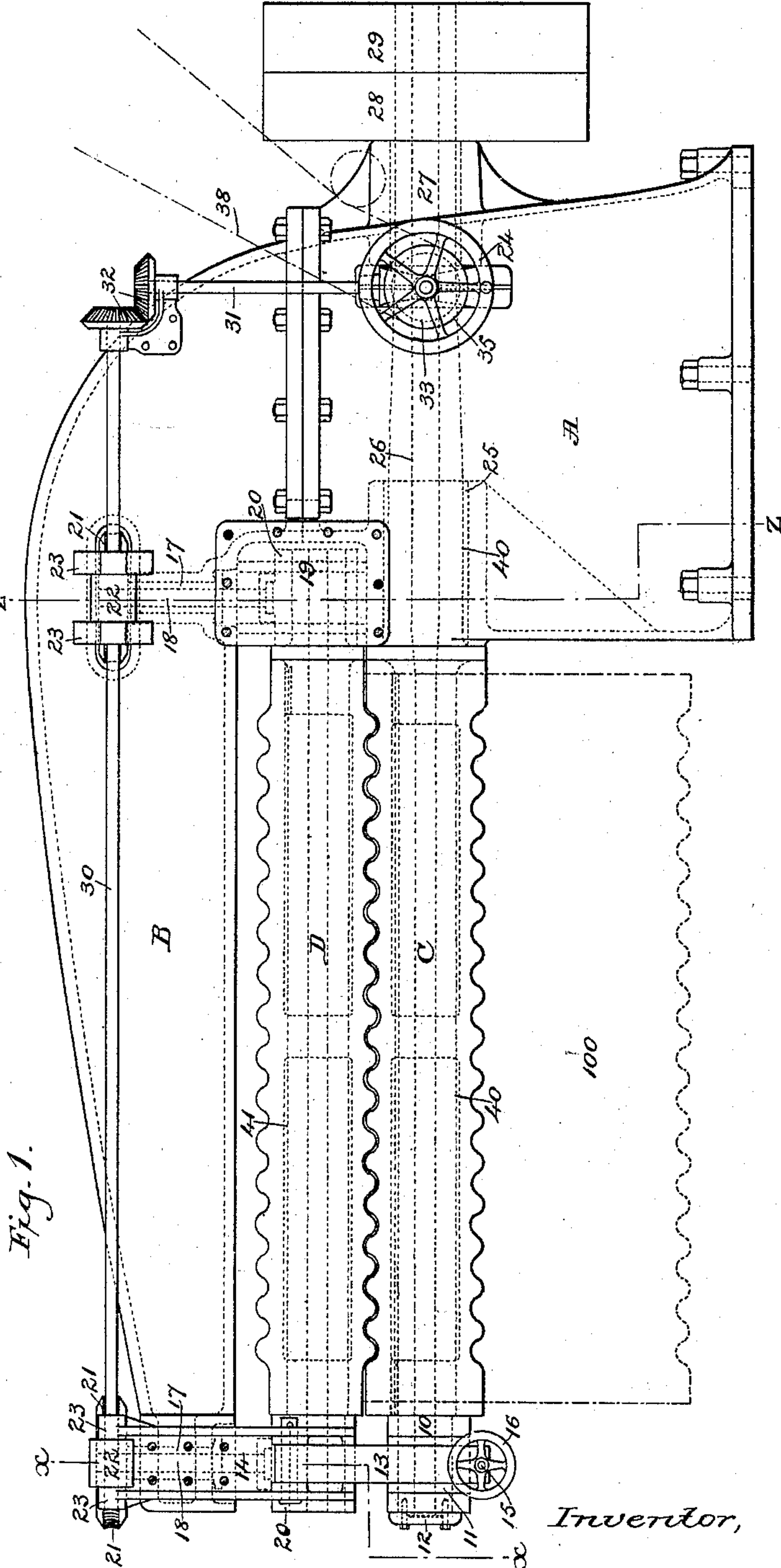


Fig. 1.

Attest:

A. St. Jasbera  
J. C. Hooy

Inventor,

George S. Strong  
by Murray Phillips

Attest

(No Model.)

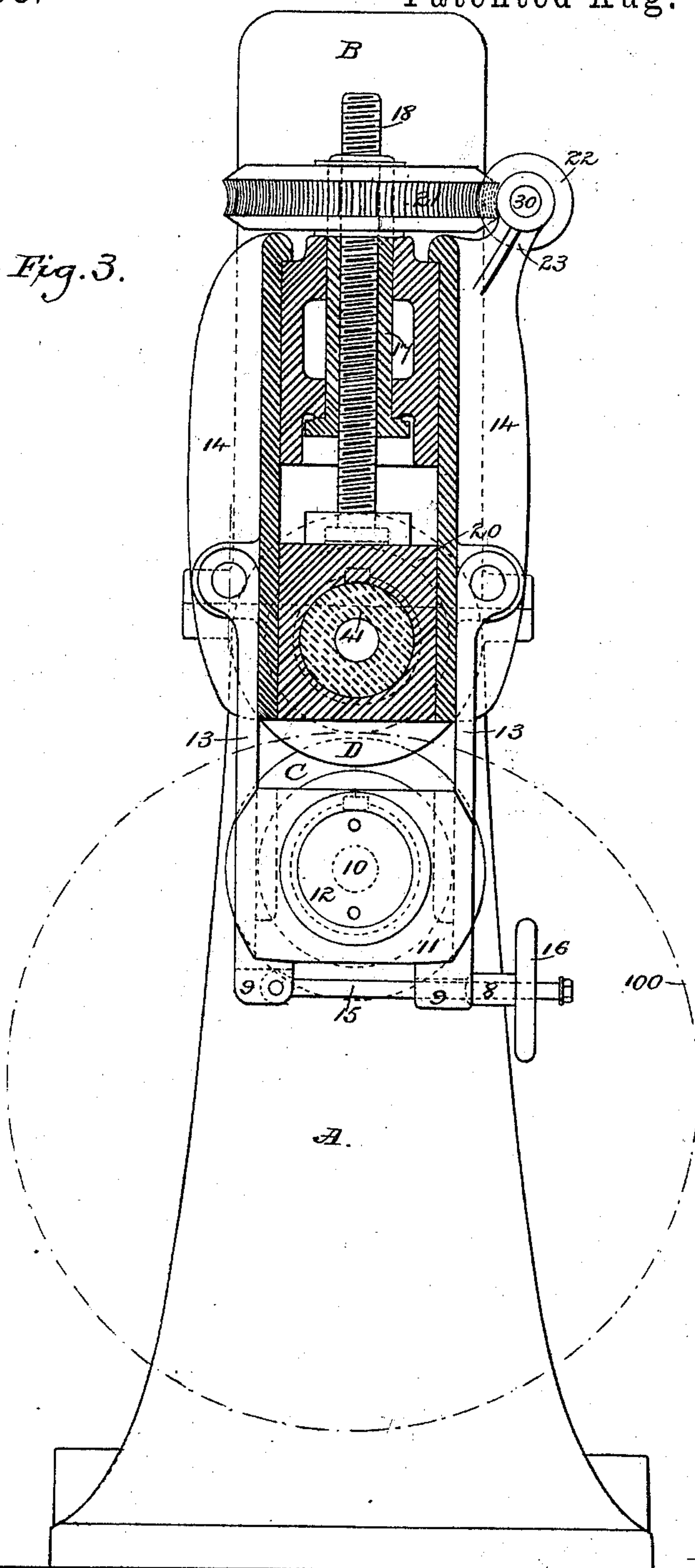
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Attest:

*A. A. Jasbera*  
*J. A. Hooy*

Inventor,

*George S. Strong*  
*by Marcus Philipp*

*Atty.*



(No Model.)

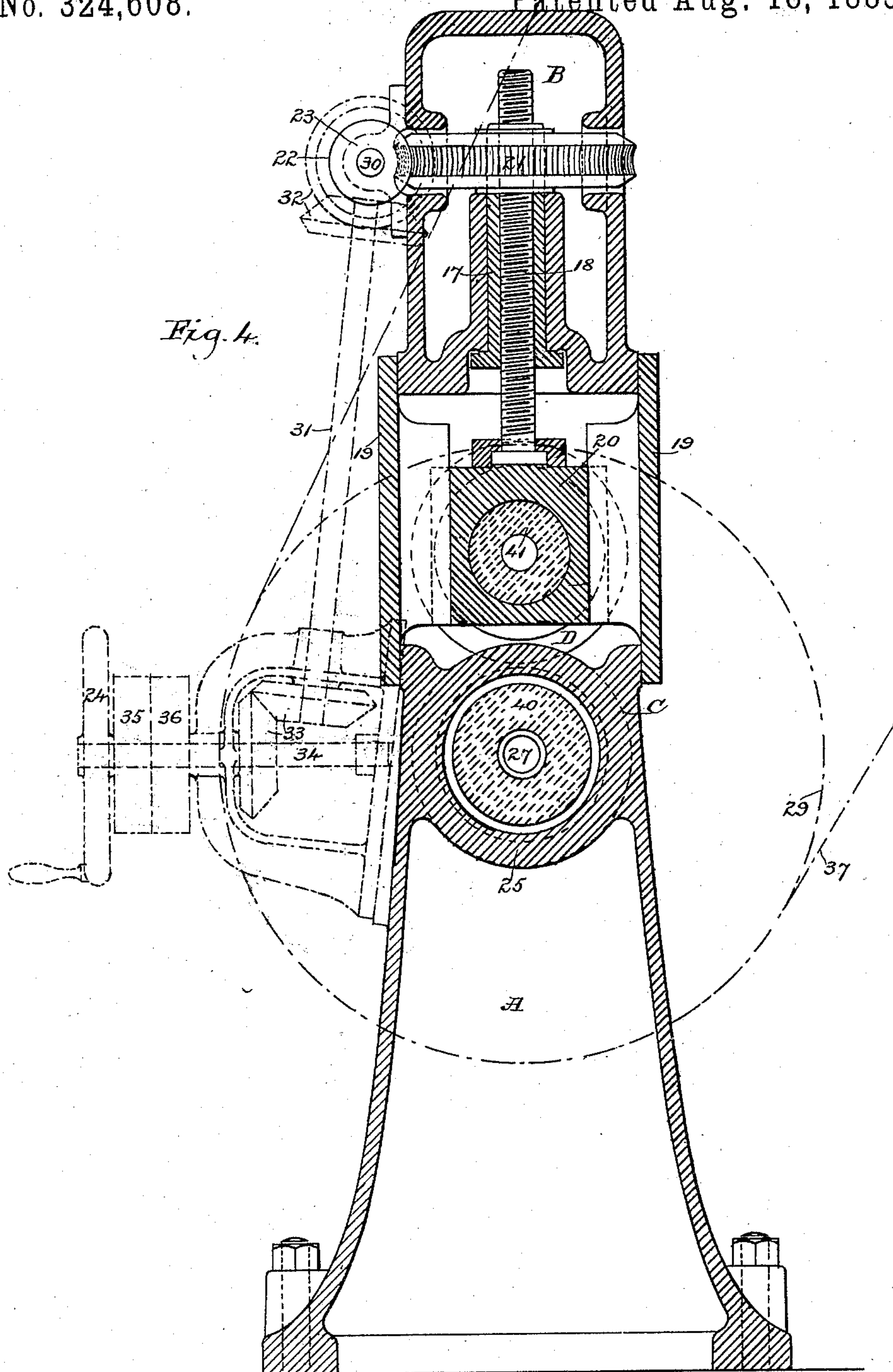
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Patented Aug. 18, 1885.



Attest:

A. H. Jasbera  
J. A. Hovey

Inventor,

George S. Strong  
by Minna Philippi  
Atty.



# UNITED STATES PATENT OFFICE.

GEORGE S. STRONG, OF PHILADELPHIA, PENNSYLVANIA.

## MACHINE FOR CORRUGATING PLATES OR TUBES.

SPECIFICATION forming part of Letters Patent No. 324,608, dated August 18, 1885.

Application filed June 25, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE S. STRONG, a citizen of the United States, residing in the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Corrugating Metal Tubes, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to a mechanism which is designed for use in corrugating heavy metal plates and tubes, and particularly those plates and tubes which are used for fire-boxes and other similar purposes, it being the object of the invention to provide a mechanism by which such plates and tubes can be readily corrugated, thereby not only increasing the radiating-surface, but also making the plate or tube much stronger, so that it will be capable of resisting a greater degree of pressure.

The construction and operation of the mechanism embodying the present invention are so simple that they will readily be understood without any further preliminary description.

In the accompanying drawings, Figure 1 is a side elevation of a corrugating-machine constructed according to the present invention. Fig. 2 is a partial plan view of the same. Fig. 3 is a cross section, upon an enlarged scale, taken upon the line *x x* of Fig. 1, and Fig. 4 is a similar view taken upon the line *z z* of the same figure.

Referring to said figures, it is to be understood that the base A of the machine is made of iron, and is of sufficient size and weight to properly sustain the various parts of the apparatus. This base is provided at its top with a horizontal arm, B, which is of a length somewhat greater than the length of the longest plate or tube which it is desired to operate upon.

At a point some distance below the arm B the base is provided with a large bearing, 25, in which rests a shaft, 40, upon which is mounted a circumferentially-corrugated roll, C. The shaft 40 is provided with a reduced extension, 26, which passes through to the opposite side of the base, where it is supported in a bearing, 27, and is provided with ordinary fast and loose pulleys 28 29. The shaft 40, which is also of a length somewhat greater

than the length of the plate or tube to be operated upon, extends beyond the end of the roll C, and is provided at its outer end with a journal, 10, upon which is mounted a loose journal-box, 11, which is held in place by means of a disk, 12, bolted to the end of the journal. The journal-box 11 is supported between a pair of arms, 13, which rest in recesses formed in the sides of the box, and are hinged to a pair of plates, 14, bolted to the sides of the arm B. The arms 13 are provided at their lower ends with inwardly-projecting lugs 9, which extend directly beneath the box 11, and are held in position by means of a rod, 15, which is hinged to one of said lugs, and is arranged to swing upward into a recess formed in the bottom of the other of said lugs, as shown in Fig. 3. The rod 15 is threaded at its outer end, and is provided with a threaded sleeve, 8, which is operated by a hand-wheel, 16, and is arranged to enter a recess formed in the side of the arm 13, so as to hold the rod 13 locked together.

Just above the shaft 40 there is located a second shaft, 41, upon which is mounted a second roll, D, which is provided with circumferential corrugations similar to those of the roll C, but arranged to match or fit into the latter, as shown in Fig. 1. The shaft 41 is provided at its ends with journals, which are supported in journal-boxes 20, which are arranged to move freely up and down between the plates 14 and a similar pair of plates, 19, which are bolted to the sides of the arm B and base A, as shown in Figs. 1, 3, and 4. The boxes 20 are secured to the lower ends of a pair of vertical threaded rods, 18, which work in a pair of nuts, 17, located in the opposite ends of the arm B. The rods 18 are provided at their upper ends with worm-gears 21, which are engaged by a pair of worms, 22, secured to a shaft, 30, which is supported in brackets 23 and operated from a hand-wheel, 24, through rods 31 34 and bevel-gears 32 33.

The operation of the mechanism just described is as follows: The roll D having been raised a sufficient distance from the roll C, the tube or plate 100, which is to be operated upon, will be inserted over the roll C and between the rolls C D, as indicated by dotted lines in Fig. 1. The arms 13 will then be



turned down to the position shown in Fig. 3, and locked together by the rod 15 in the manner already described, so as to support the outer end of the roll C. The belt 37 will then  
 5 be shifted from the loose to the fast one of the pulleys 28 29, so as to set the roll C in motion, and thus cause the tube or plate 100 to pass between the rolls C D. The hand-wheel 24 will then be operated so as to gradually move  
 10 the rods 18 downward, thereby causing the rolls C D to gradually approach each other as the operation progresses, so that when the operation is complete a series of corrugations will be formed in the tube or plate corresponding  
 15 ing to the corrugations in the rolls C D. When the operation is complete, the belt 37 will be shifted back to the loose pulley, so as to stop the rolls, after which the hand-wheel 24 will be turned in the opposite direction, so as to  
 20 raise the roll D. The arms 13 will then be unlocked and raised and the completed tube removed.

The shaft 34 may, if desired, be provided with fast and loose pulleys, as 35 36, which  
 25 may be connected by a belt, as 38, with the source of power, so that by shifting said belt as soon as the corrugating operation commences the roll D will be forced downward automatically.

30 It will readily be seen that by organizing the machine in the manner described the sheet or tube while being operated upon is wholly supported by the roll C, so that all necessity for providing auxiliary rolls to guide and support the sheet or tube is obviated and the  
 35 mechanism correspondingly simplified.

The rolls C D are, as will be observed, made capable of removal from the shafts 40 41, so that they can be removed, when desired, and  
 40 other rolls having corrugations of a different size or pitch substituted.

In conclusion, it is to be remarked that many modifications may be made in the details of the mechanism just described without departing  
 45 from or losing the advantages of the invention. The adjustment of the roll D, instead of being effected by means of the screw-rods 18, may be effected by means of levers operated either by a screw or by a hydraulic or steam driven piston; or, in fact, any other suitable mechanical  
 50 device may be employed for this purpose so long as both ends of the roll are uniformly adjusted.

Different means from that shown may also be  
 55 employed for locking the arms 13 together. Instead of the screw-sleeve 8 a simple key or other similar device may be used to hold the rod 15 in its raised position. The arms 13 may also be arranged in a different manner from that  
 60 shown. Instead of being arranged to swing out from the sides of the plates 14, they may be made to swing out from the ends of the rolls, and

may be connected at their lower ends, so as to form a yoke, which will pass under and support the box 11; or, in fact, any other suitable  
 65 device may be substituted for these arms so long as the box 11 is rigidly connected to the arm B during the operation of the machine.

The journal-box 11, instead of being permanently secured to the journal 10, may, if preferred, be made in two parts, one of which  
 70 may be secured to each of the arms 13, so that when said arms are locked together in the position shown in Fig. 3 the journal 10 will be surrounded by the box. 75

What I claim is—

1. The combination, with the positively-driven corrugated roll C, provided at its outer end with a journal-box, as 11, which is supported from the arm B, of the similarly-corrugated  
 80 roll D, located above the roll C, and supported at each end in movable journal-boxes, and means for adjusting said boxes so as to vary the position of said roll, substantially as described.

2. The combination, with the shaft 40, carrying the corrugated roll C, and having the journal-box 11 permanently secured to its outer end, of the similarly-corrugated roll D, located  
 85 above the roll C and supported at each end in movable journal-boxes, means for adjusting said boxes so as to vary the position of said roll, and means for supporting the box 11 from the arm B, substantially as described. 90

3. The combination, with the positively-driven corrugated roll C, mounted in fixed  
 95 bearings, of the similarly-corrugated roll D, supported at each end in movable journal-boxes, the arm B extending outward from the base above the roll D, means for adjusting the position of the roll D, and means for supporting  
 100 the outer end of the roll C from the arm B, substantially as described.

4. The combination, with the shaft 40, carrying the removable corrugated roll C, and provided at its outer end with the journal-box 11,  
 105 of the shaft 41, carrying the removable corrugated roll D, and supported at each end in movable journal-boxes, means for adjusting the position of the roll D, and means for supporting the box 11 from the arm B, substantially  
 110 as described.

5. The combination, with the rolls C D and arm B, of the journal-box 11, arms 13, and rod 15, journal-boxes 20, screw-rods 18, gears and  
 115 worms 21 22, and shaft 30, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GEORGE S. STRONG.

Witnesses:

T. H. PALMER,  
 J. A. HOVEY.