

No. 615,933.

Patented Dec. 13, 1898.

E. G. WATROUS & H. A. RILEY.

GUTTER FORMER.

(Application filed Apr. 28, 1896.)

(No Model.)

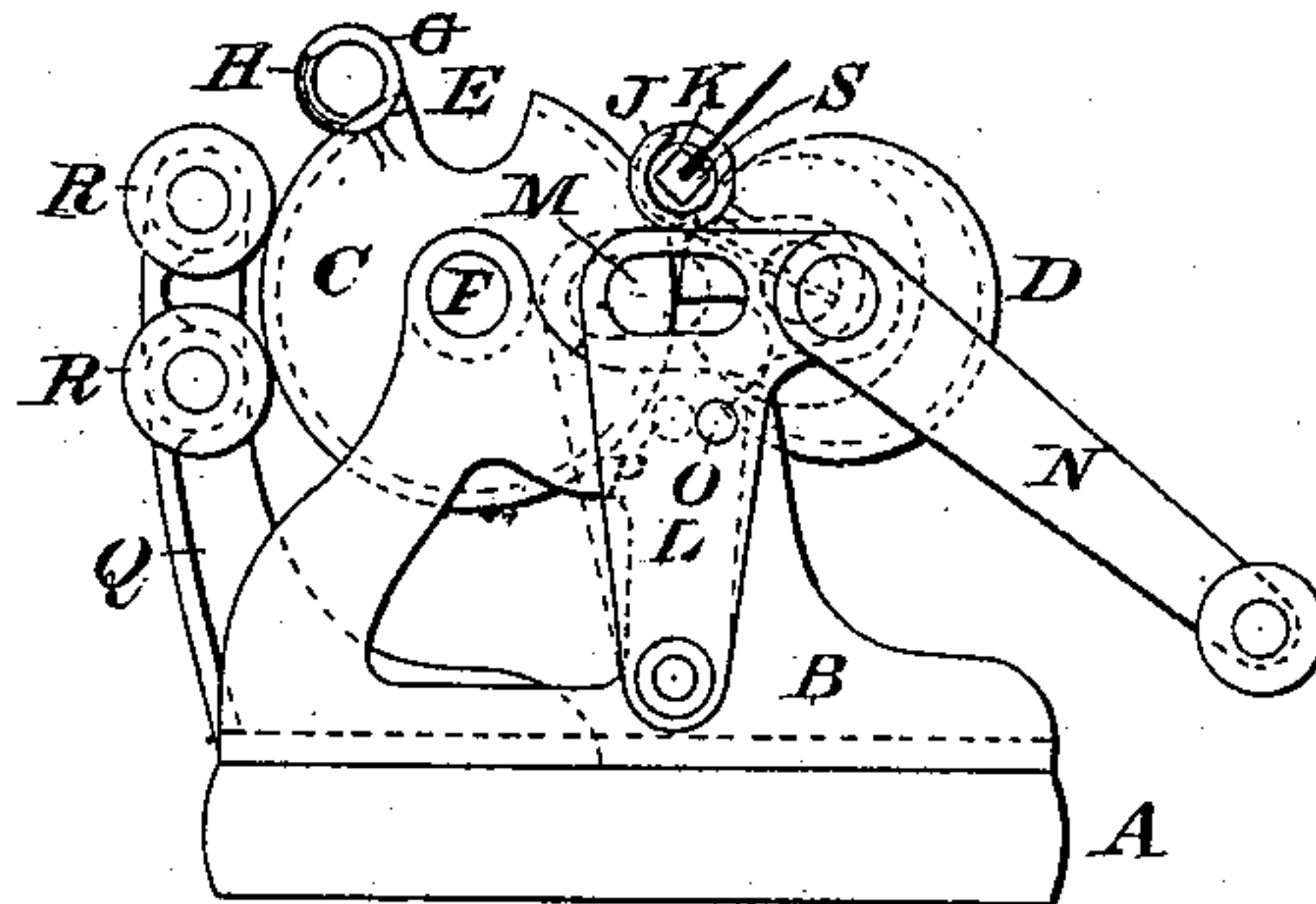


FIG. 2.

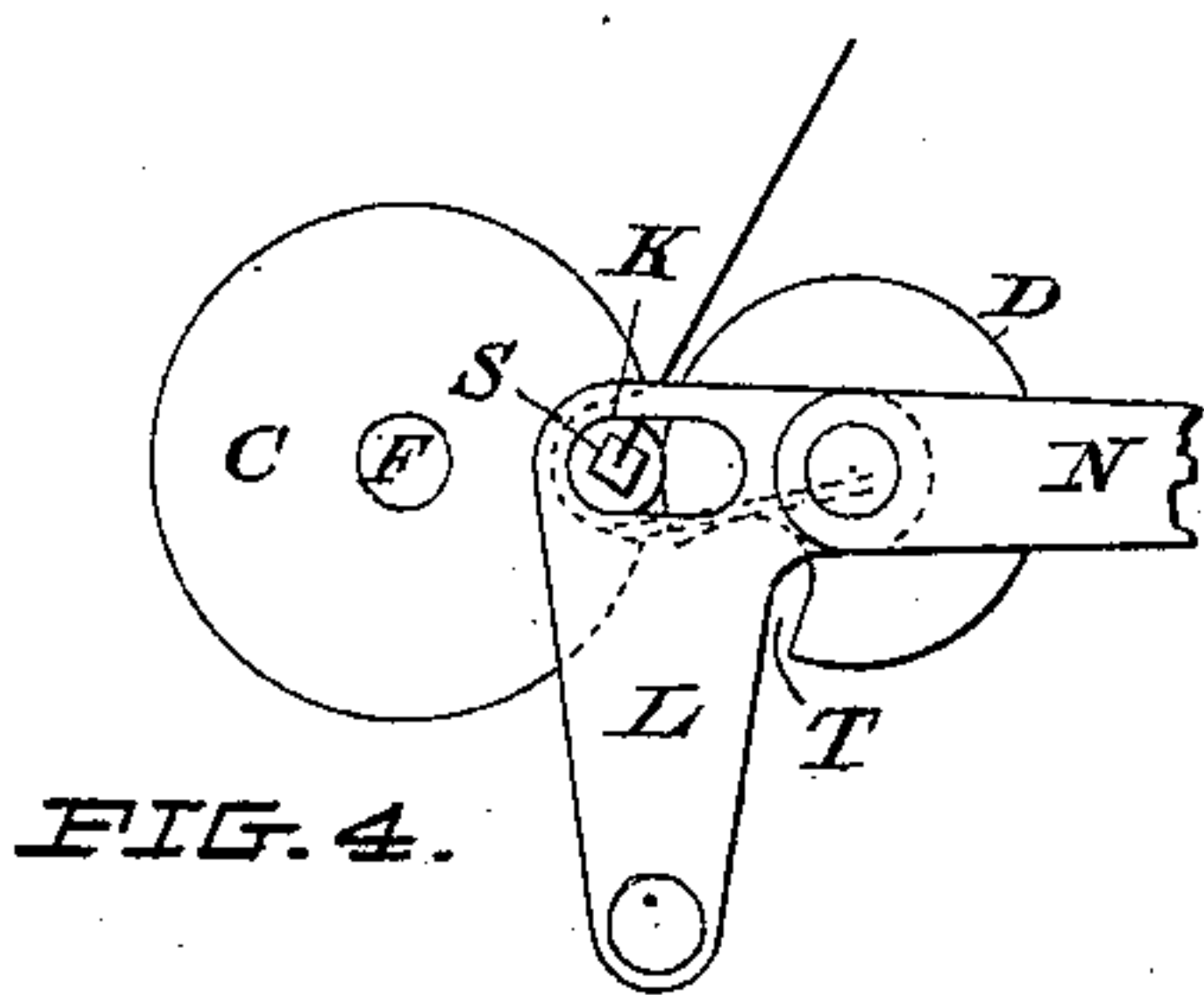


FIG. 4.

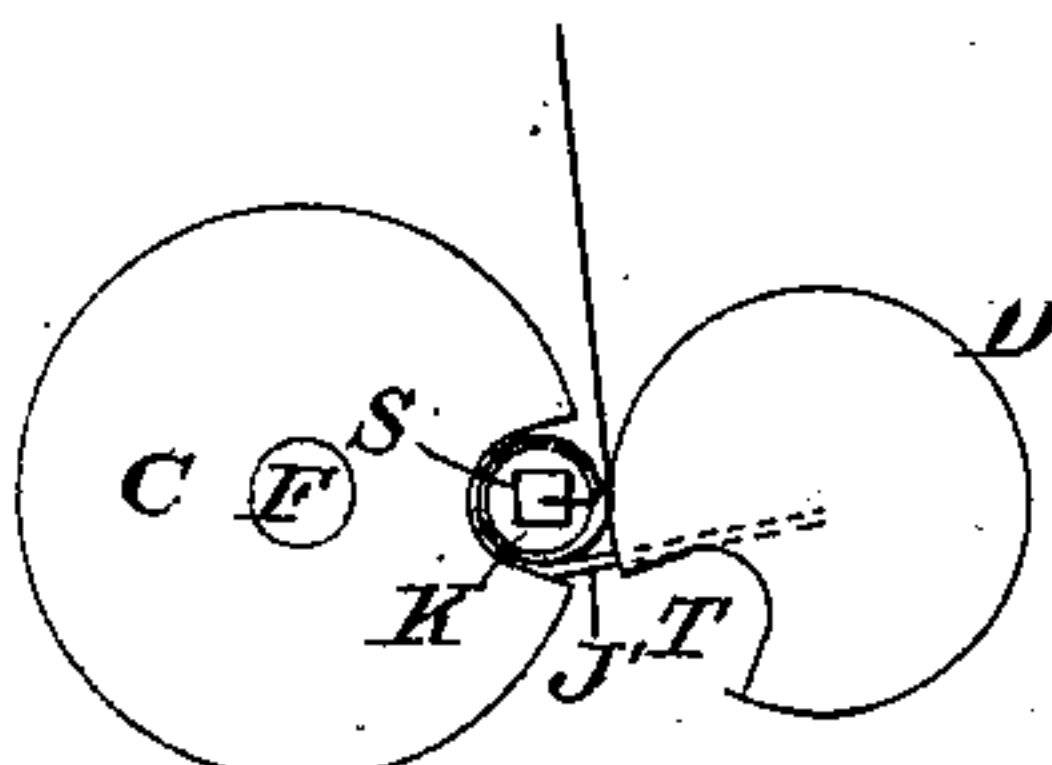


FIG. 5.

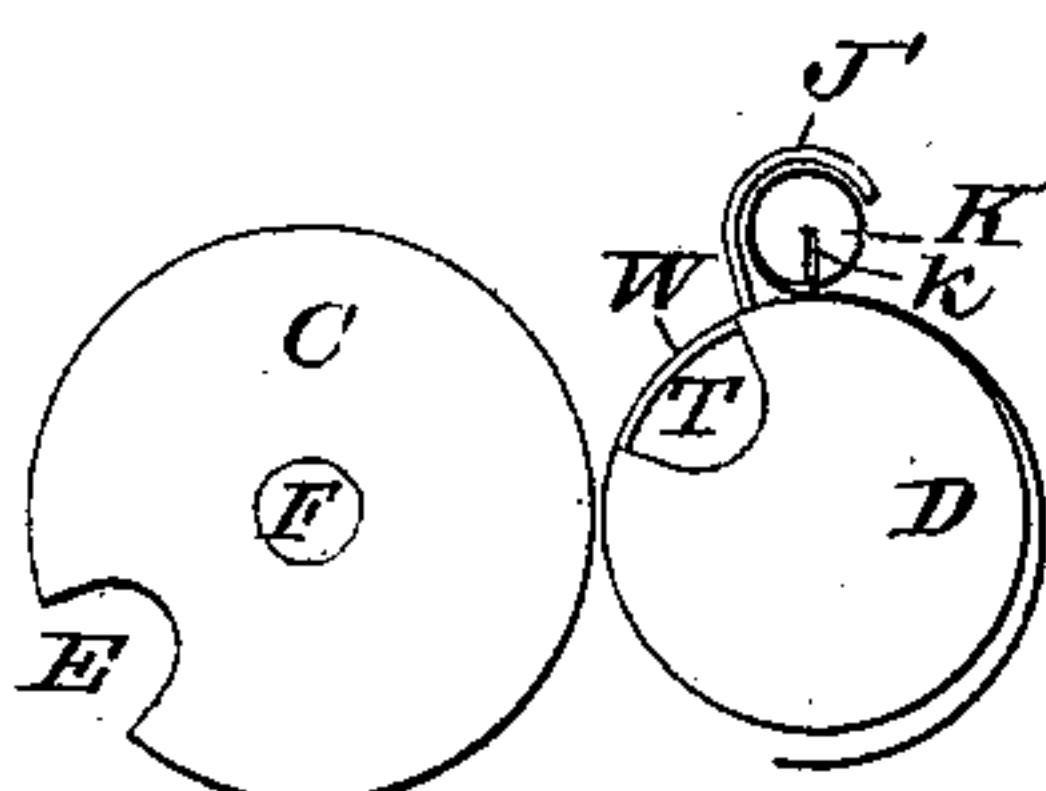


FIG. 6.

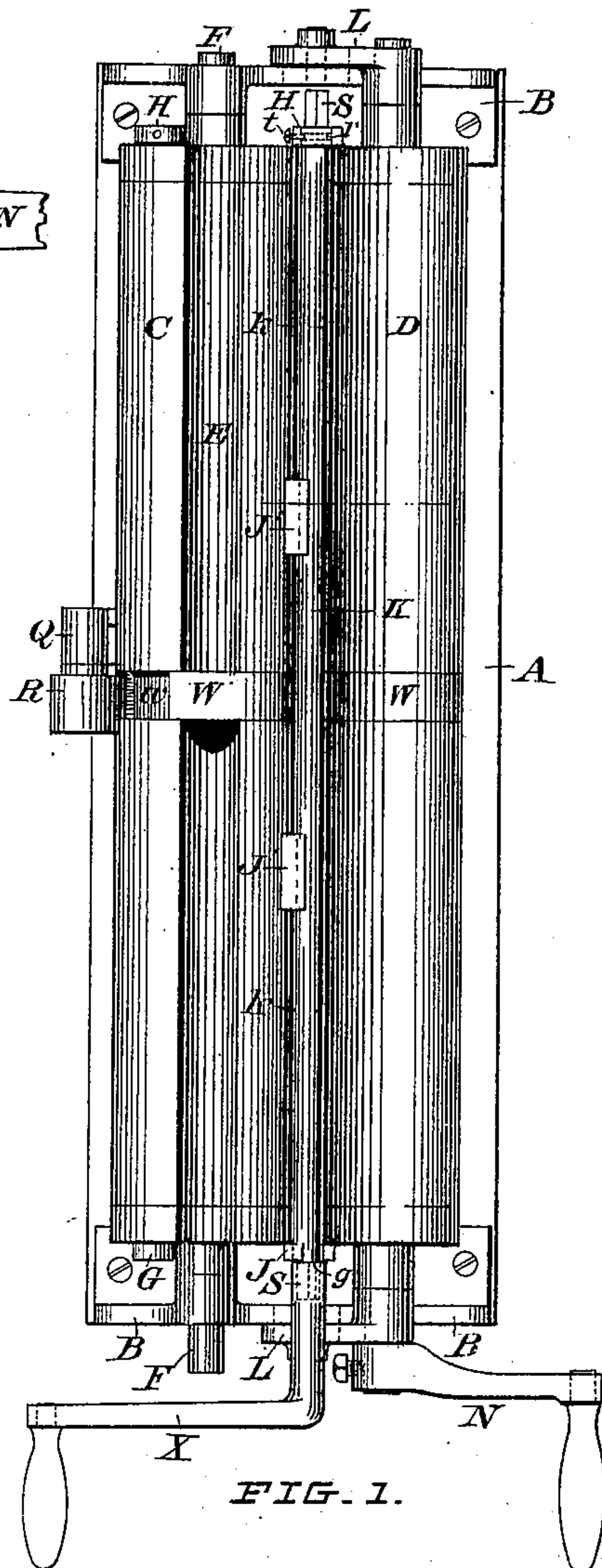


FIG. 1.

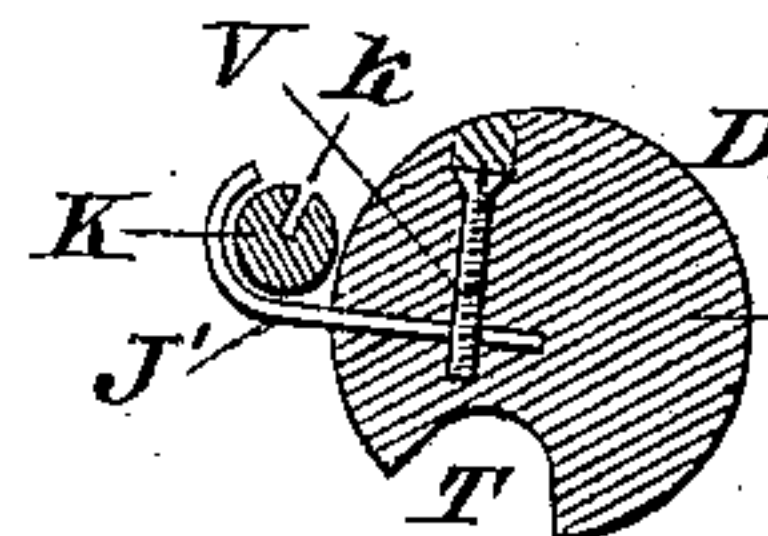


FIG. 3.

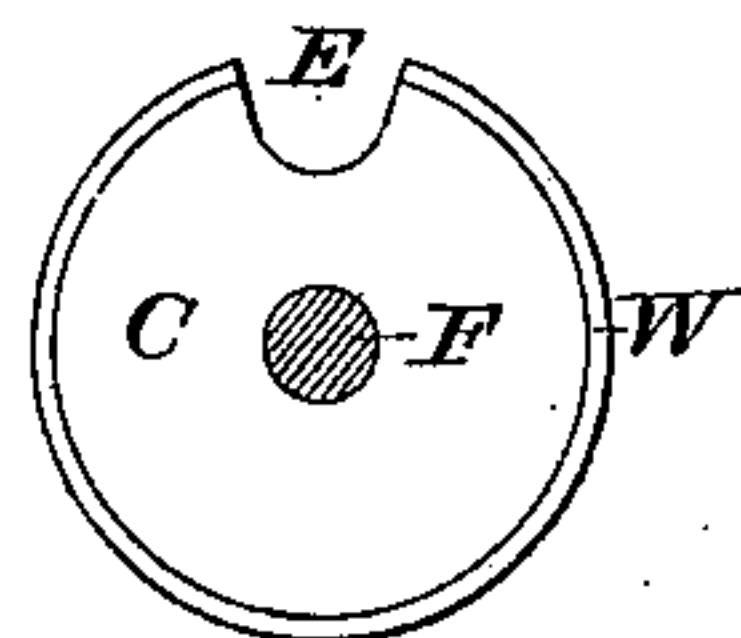


FIG. 7.

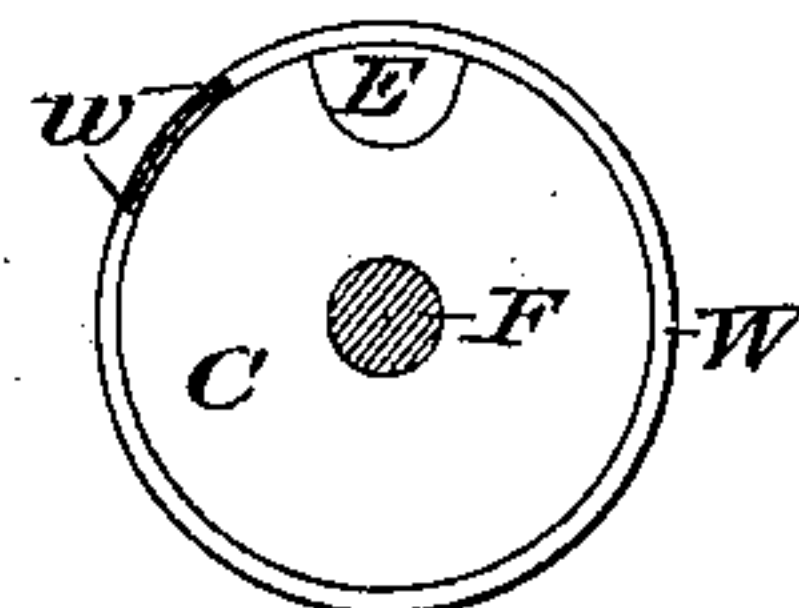


FIG. 8.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

EARL G. WATROUS, OF LANSINGBURG, AND HUGH A. RILEY, OF HOOSICK FALLS, NEW YORK; SAID WATROUS ASSIGNOR TO DENNIS J. WHELAN, OF TROY, NEW YORK.

## GUTTER-FORMER.

SPECIFICATION forming part of Letters Patent No. 615,933, dated December 13, 1898.

Application filed April 28, 1896. Serial No. 589,382. (No model.)

*To all whom it may concern:*

Be it known that we, EARL G. WATROUS, of Lansingburg, and HUGH A. RILEY, of Hoosick Falls, in the county of Rensselaer and State of New York, citizens of the United States, have invented certain Improvements in Gutter-Formers; and we hereby declare that the subjoined description, in connection with the accompanying drawings, constitutes such a full, clear, and accurate description of said invention as will enable others versed in the art to which it most closely relates to construct and use the same.

This invention relates to mechanism for constructing common gutters or eaves-troughs in long lengths from sheet-metal plate by successive processes of, first, beading the front edge, and, second, in rolling the sheets of metal into the desired shape, the operation being carried on continuously from the moment when the metal is inserted in the machine until the finished product is turned out.

This invention embodies improvements upon our former patent, No. 494,936, dated April 4, 1893, and embraces the following changes and additions: In that machine it was necessary to remove the beading-mandrel to remove the formed section of gutter from the machine. In this the mandrel remains attached to the machine in its working position. In this the gears shown in that patent have been dispensed with. In this machine one of the mandrel-bearings has been left open at one end of the machine, which enables the finished gutter to be slipped out of the machine endwise without disturbing or disarranging any of the parts. In order to make long lengths of gutter, retaining-clips to confine the beading-mandrel and the bead in proper position during the rolling process have been provided.

The drawings fully illustrate the invention, wherein—

Figure 1 shows a top plan of our machine. Fig. 2 is an elevation of the working end of the same. Fig. 3 is a transverse section taken through one of the rolls, as at *xx*, Fig. 1. Fig. 4 is a diagram showing the position of the rolls after a sheet has been entered and

the parts have been moved into position for the beading-mandrel to receive the beading-crank preparatory to rolling the bead. Fig. 5 is a diagram showing the relation of the parts after the bead has been turned. Fig. 6 is another diagram which shows the relation of the parts at the completion of the operation for forming the valley of the gutter and exhibits the machine in such position as will enable the finished gutter to be drawn out of the machine. Fig. 7 is a transverse section taken through the middle of the large roller and shows a slip-band in position to leave the longitudinal groove of the roller open, so as to receive the beading-mandrel. Fig. 8 is a view of the same section with the band slipped around so it will bridge the groove for the purpose of permitting the abutment-rollers, which are employed to resist and correct the bending-spring of the rollers in use, to traverse the groove.

The machine consists of a base A, on which are erected two end frames or standards B B. These furnish bearings for the stationary roller C, and to each one is pivoted a swinging journal-arm L. This arm has bearings for the journals of the removable roller D and is also perforated with a guiding-slot M, through which the beading-crank X is inserted to turn the beading-mandrel when it is in the position seen in Fig. 4. As the swinging arm L is provided so that rollers of different diameters may be used in the same machine in connection with the stationary roller C, holes O in the arm and P in the standard are provided, into which pins are inserted when the position of the arm is changed to accommodate different diameters of rollers. The rollers C and D are ordinarily made of wood, capped at each end with a cast head which carries the journal and also ring-bearings H G and H J, in which the beading-mandrel finds bearings.

The ring-bearings H H at the rear end of the machine are integral; but bearings G and J are open toward the top, as seen at J in Fig. 1. This opening is to permit the finished sheet to be drawn off the mandrel instead of pulling the mandrel out of the sheet,



as is ordinarily done. The beading-mandrel K is a small steel rod of suitable size to form the lip of the gutter and has a radial groove  $k$  running the whole of its length to receive the edge of the sheet of metal which is to be operated on. Both ends of this mandrel are squared or otherwise fitted to receive a crank X, of which in use one is provided at each end. The mandrel is grooved at  $r$  where it passes through the ring H at the rear end of the machine, and a set-screw  $t$  passes through the ring-bearing into this groove, being so fitted that the mandrel can turn, but cannot be slipped endwise. A set of retaining-clips J' J' are attached to the operative roller or the one on which the gutter is formed, which serve to support the mandrel in its true working position and to keep the bead straight. These clips are not essential in making short sections of gutter or where the torsional or other task imposed on the mandrel is light. They may be inserted and used as seen in Fig. 3. The cooperative roller opposite to the one on which the gutter is shaped should be grooved, as shown at E, to form a seat for the reception of the beading-mandrel and the sheet metal, which is wrapped around the same in use. This use is seen in Fig. 5.

In working machines of great length there will be more or less spring to the rollers. In order to overcome this difficulty, we have provided a supporting-bracket Q, which can be attached to the base by bolts or in any other convenient way and can be used on either side of the machine, so as to support either roller. This bracket carries two bearing-rollers R R, which in use bear against the outside of the working roller. In Fig. 1, however, it is shown in connection with the other rolls. When these supporting-rollers are used, it becomes necessary to bridge over the mandrel-groove in the supported roller. This is accomplished by circumferentially grooving the roller at about the middle of its length, as seen at  $w$ , and letting into such groove a band or section of a hoop W, the ends which fail to meet by just the breadth of the mandrel-groove. When it is necessary to use the mandrel, the hoop W is slipped into the position seen in Fig. 7, but at other times it is slipped into the position shown in Fig. 8. In the latter position, which is the same as that shown in Fig. 1, the bearing-rollers R R can pass over it without difficulty.

The operation of the machine is as follows: Assuming that gutter is to be formed on roller D, the swinging arms L L are swung to the right and fastened by the pin O. This brings slot M into position where the left end of it will be concentric with groove E of roller C when it is revolved around into apposition with the slot. The rollers are then turned into the position seen in Fig. 2. The grooved side of the mandrel is then upturned to receive the edge of the sheet metal, which is

inserted by entering one corner of the edge at  $g$ , Fig. 1, and sliding it through the opening in ring-bearing J into the groove  $k$  until its whole length is entered in that groove. Next the rollers are turned toward each other until the groove E of roller C has passed under the mandrel, when the two are rolled into mesh, as in Fig. 4, which position leaves the squared shank of the mandrel opposite the slot M and in position where the crank X can be attached through said slot. A crank is then applied to each end of the mandrel, and by them it is turned toward roller D until a full turn or a little more has been made, which leaves the sheet in the form shown in cross-section in Fig. 5 or with the bead fully formed. The cranks X X are then removed, and by means of crank N the roller D is revolved against the sun or up over toward the other roller until the whole sheet has been drawn between the rollers. During this performance the mandrel will have been held to its duty in connection with roller D by means of retaining-clips J' J'. After the roller D has been turned up so as to release the free end of the sheet it can be withdrawn by pulling it off the mandrel through the opening in the ring-bearing J, the mandrel being held meanwhile by the set-screw  $t$  and necking  $r$  in the mandrel.

To form gutter on the roller C, change crank N to the shaft F. Set slip-band W on roller C so that its gap  $w$  will come over the groove E, and the slip-band W of the other roller so that it will bridge groove T. Insert the mandrel in ring-bearings H G and fasten it with the set-screw  $t$ , inserted in its position in bearing H of roller C. Then operate as before by reversing the motions.

What we therefore claim as new, and desire to secure by Letters Patent, is the following:

1. The combination in a gutter-former of a grooved roller journaled in fixed bearings upon standards, with a pair of adjustable swinging arms pivoted on the standards and each fitted with a roller journal-bearing, and provisions between the standards and the swinging arms whereby the arms may be fixed in definite positions to accommodate forming-rollers of different diameters.

2. In a gutter-former the combination of a forming-roller provided at its ends with one open and one closed mandrel-bearing, a grooved beading-mandrel longitudinally fixed but revoluble in said bearings, and means for rotating said roller and mandrel, with an abutment-roller longitudinally grooved to mesh with the beading-mandrel and the bead which may be formed thereon.

3. The combination of the forming-roller having retaining-clips gapped for the insertion of the plate to be bent attached thereto with the longitudinally-grooved beading-mandrel carried in said clips and revoluble therein.



4. In a gutter-former employing two rollers adapted to cooperate with a beading-mandrel and with each other in the manner set forth, the combination with such rollers of a beading-mandrel which is grooved to receive the edge of the plate to be wrought, and is journaled in bearings connected with one of the rollers, of which one is open so that after the bead has been rolled up the beaded sheet can be withdrawn from the machine endwise of

the mandrel through the gap in the open journal-bearing.

In testimony whereof we have hereto subscribed our names this 18th day of April, A. D. 1896.

EARL G. WATROUS.  
HUGH A. RILEY.

In presence of—

FRANKLIN SCOTT,  
EMILY SCOTT.