No. 610,593. Patented Sept. 13, 1898.

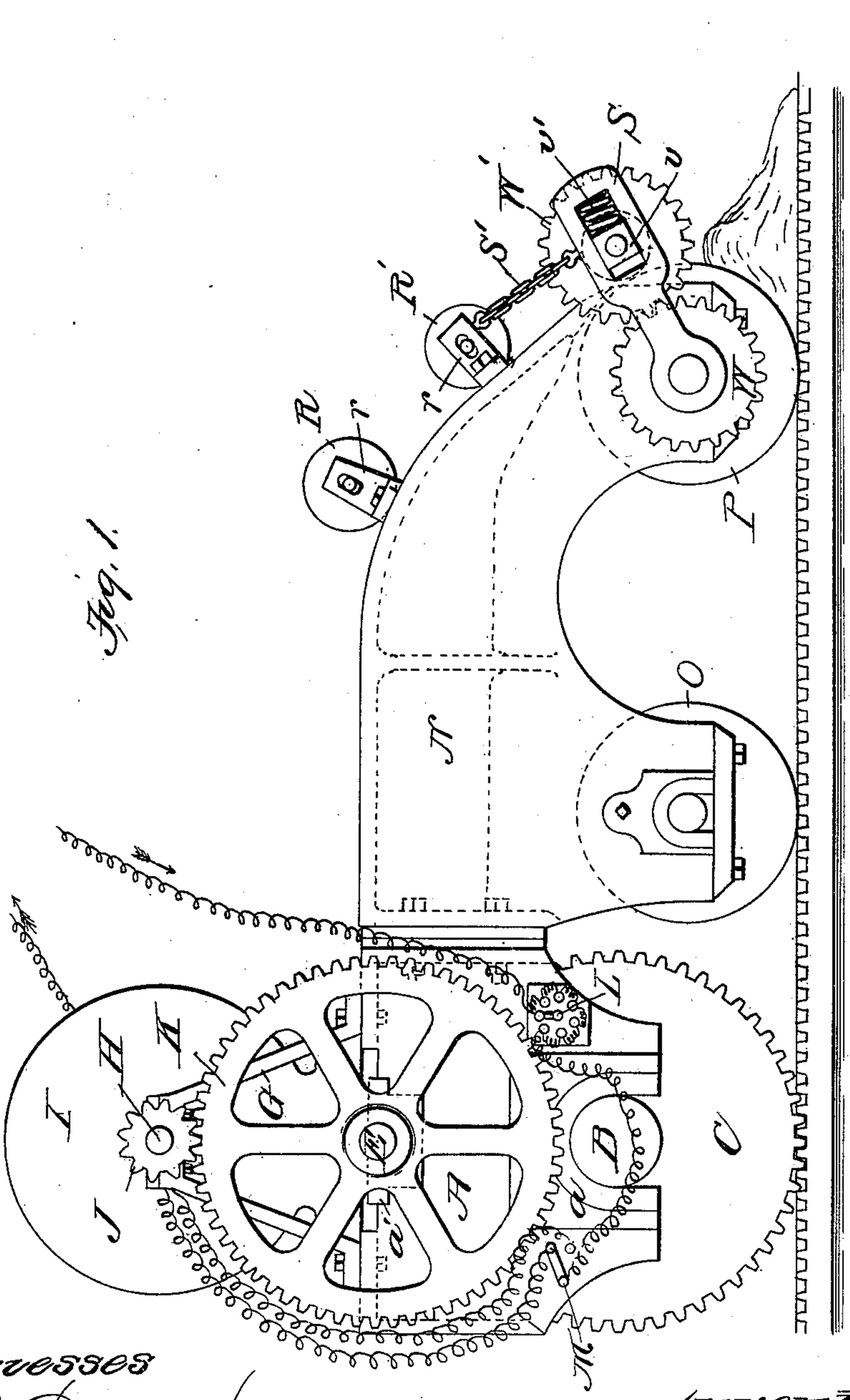
# E. WALSH, JR.

## MACHINE FOR AND METHOD OF ROLLING WIRED GLASS.

(Application filed Oct. 22, 1894.)

(No Model.) 5 Sheets—Sheet 1.

Fig. 1.

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Hugh K. Wagner.

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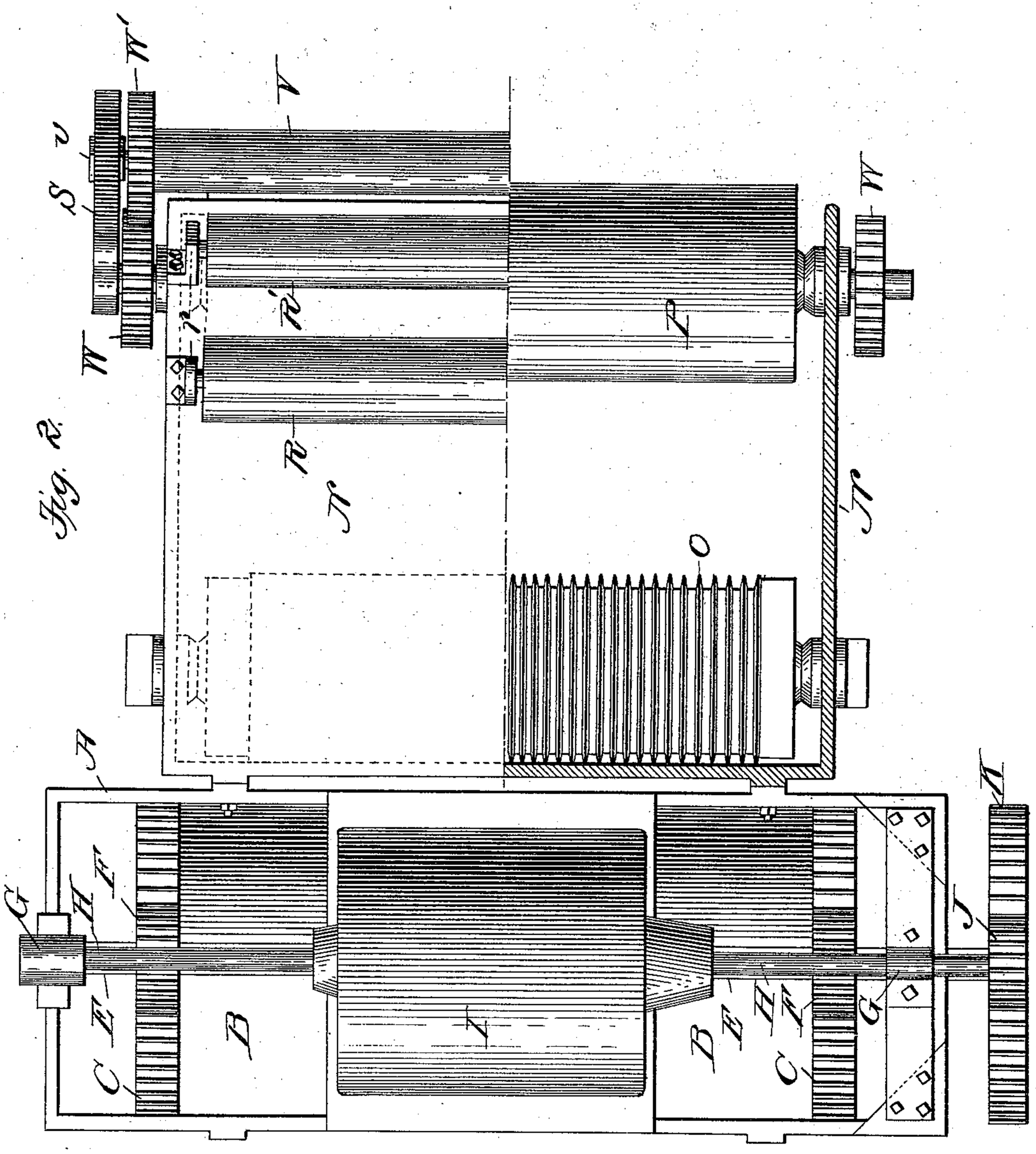
(No Model.) 5 Sheets—Sheet 2.

Fig. 2.

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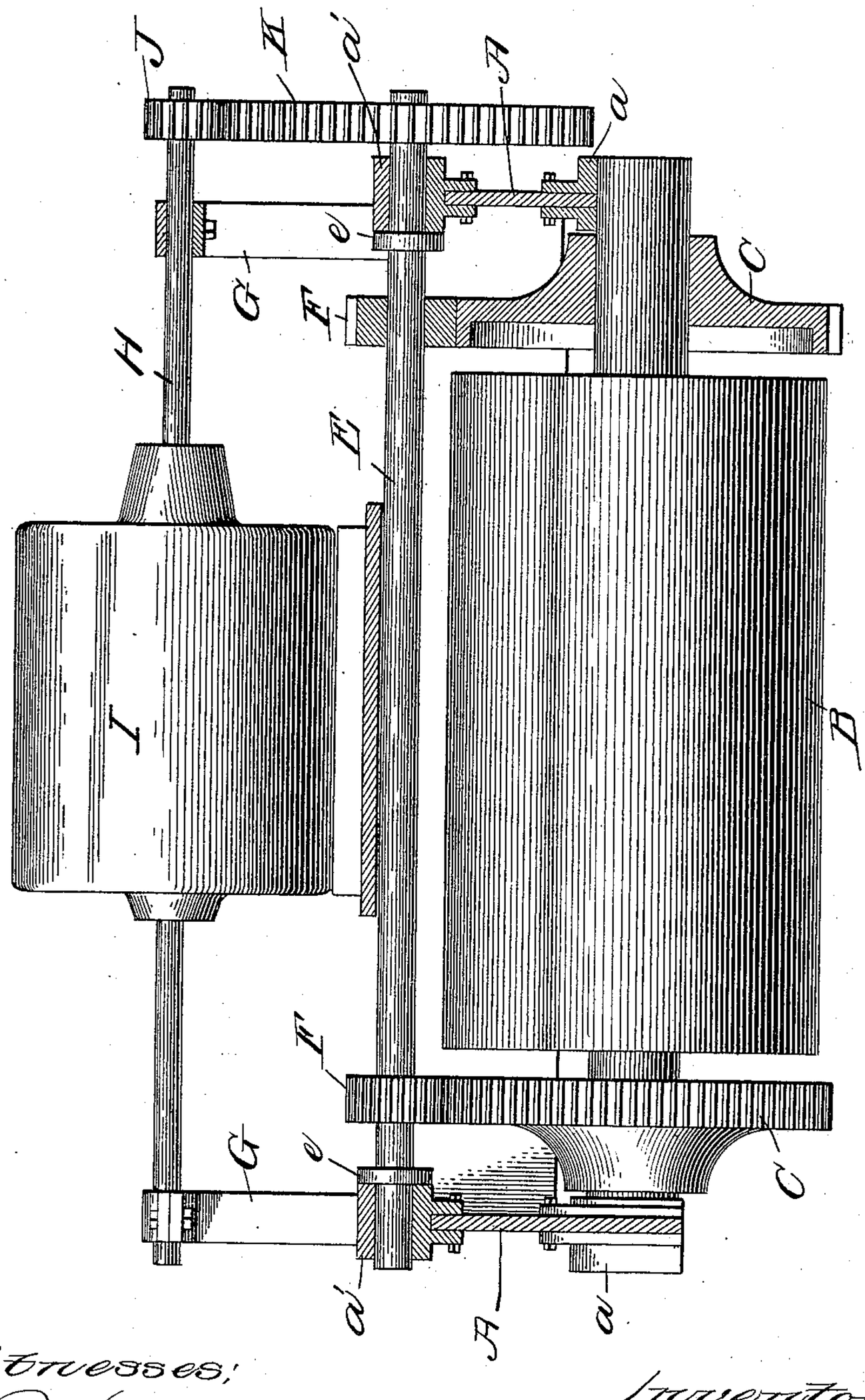
(No Model.) 5 Sheets—Sheet 3.

Fig. 3.

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(No Model.) 5 Sheets—Sheet 4.

Fig. 5.

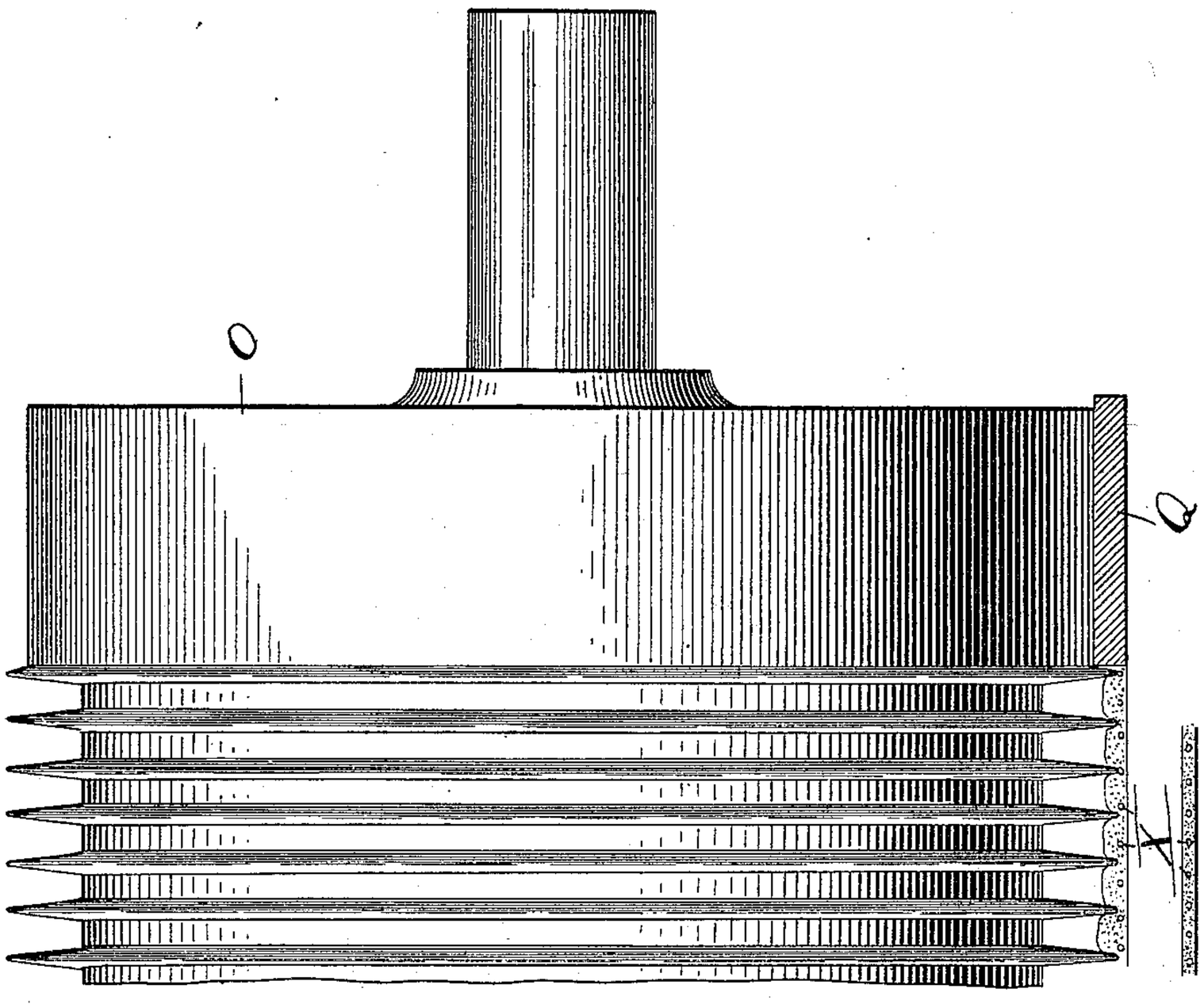
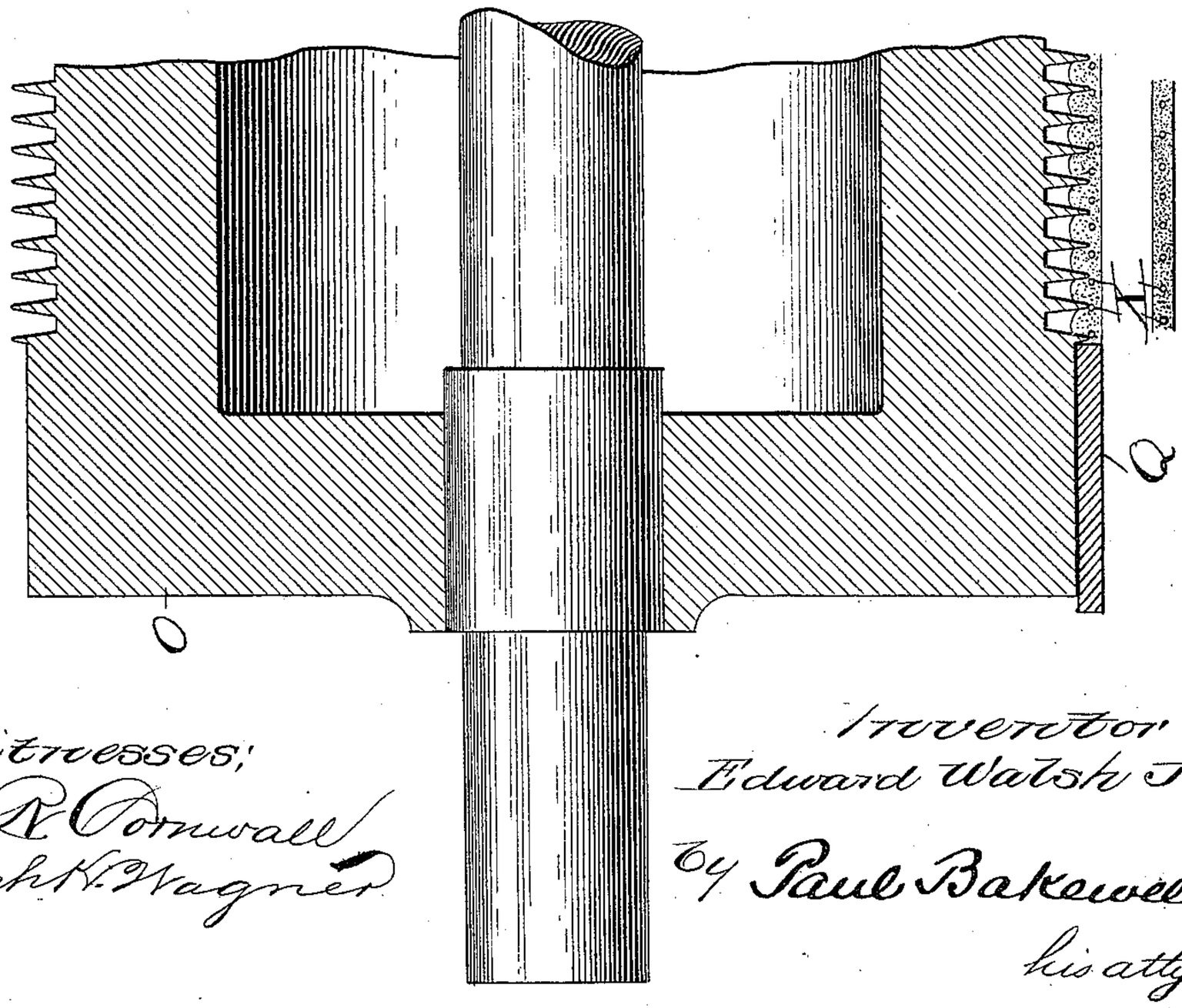



Fig. 4.

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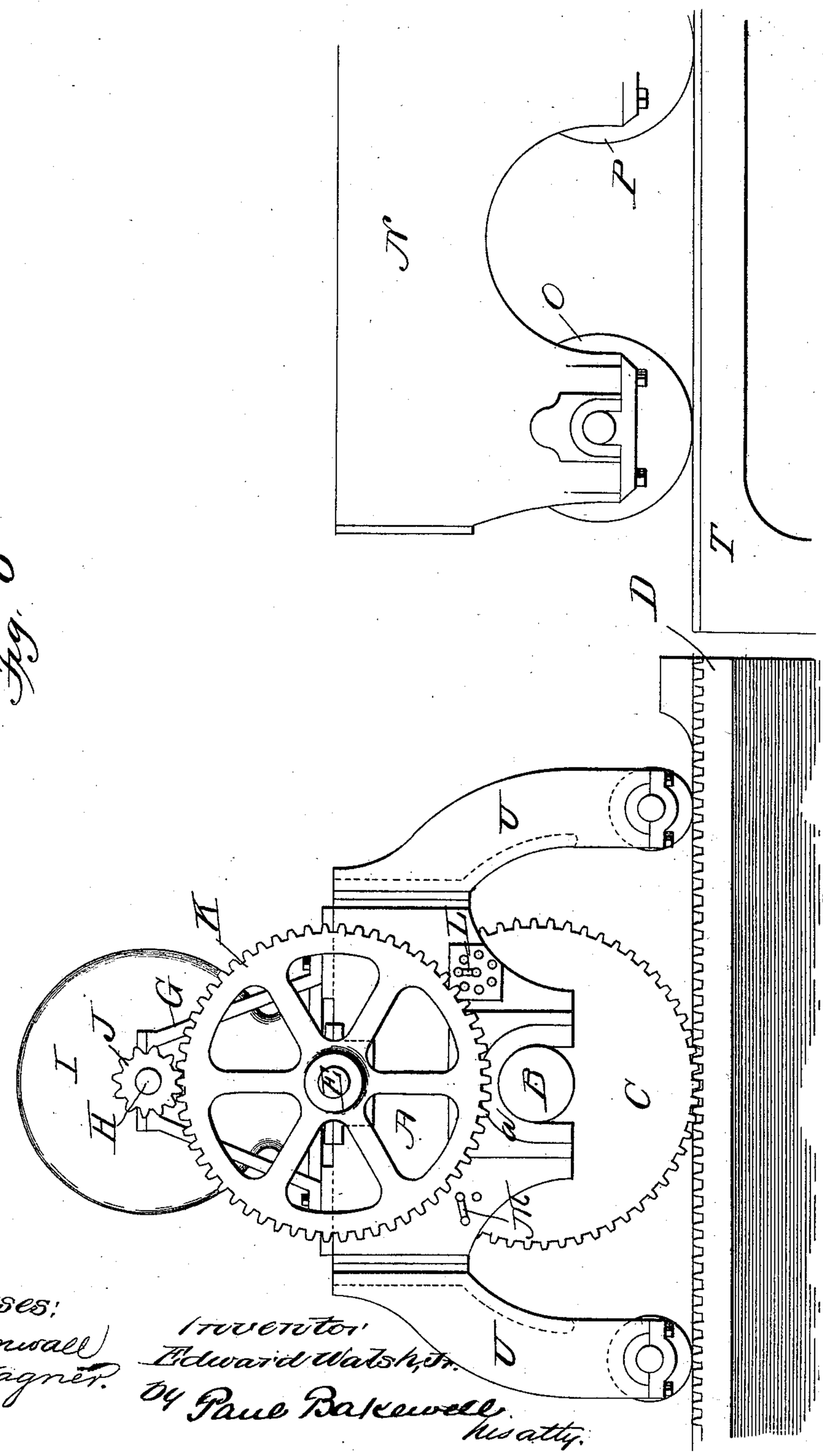
(No Model.) 5 Sheets—Sheet 5.

Fig. 9.

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# UNITED STATES PATENT OFFICE.

EDWARD WALSH, JR., OF ST. LOUIS, MISSOURI.

## MACHINE FOR AND METHOD OF ROLLING WIRED GLASS.

SPECIFICATION forming part of Letters Patent No. 610,593, dated September 13, 1898.

Application filed October 22, 1894. Serial No. 526,579. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD WALSH, Jr., a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Machines for and Methods of Rolling Wired Glass, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, wherein—

Figure 1 is a side elevation of my improved machine. Fig. 2 is a top plan view. Fig. 3 is an end view, partly in section. Figs. 4 and 5 are detailed views of corrugated rolls, and Fig. 6 is a side elevational view of my improved machine adapted for use in rolling plain plate-glass.

This invention relates to a new and useful improvement in machines for rolling wired plate-glass—that is, a machine which embeds in a rolled plate of glass a wire mesh for the purpose of strengthening the glass.

A feature of the invention relates to an improved machine for rolling wired glass comprising means for positively feeding the glass during the operation of rolling.

Another feature resides in the method of treating the wire mesh before it is embedded and the method of embedding the same.

Other features of invention reside in the peculiar construction, arrangement, and combination of the several parts comprising my invention, all as will hereinafter be described and afterward pointed out in the claims.

In the drawings, A indicates the main frame, which is preferably open at its top and bottom, said frame being recessed at the lower edges of its end walls to receive bearing-boxes *a*, in which is journaled the shaft of the main or finishing roller B.

Mounted on the shaft of roller B, preferably within the walls of the frame A, are two driving-gears C, which engage with suitable racks D at the sides of the glass-rolling table, as is common.

At the top of the end walls of frame A are preferably mounted bearing-boxes *a'*, in which is journaled a shaft E, extending across the machine. Pinions F on shaft E engage with roller C and drive the same. Collars *e* are strung on the shaft E to prevent longitudinal movement of the same.

G indicates standards or risers mounted upon the ends of frame A, at the upper ends of which are formed bearing-boxes in which is journaled a shaft H, forming the armature-shaft of a motor I, mounted upon the frame A. On one end of the armature-shaft H is a pinion J, which meshes with the spur-wheel K, mounted upon the end of shaft E. If desired, the opposite ends of shafts H and E can also be provided with pinion and spurs J and K, respectively.

Located at some convenient point on the frame A is a controller L, which may be in the form of a rheostat or other suitable controlling device, and in the length of the main line to the motor a switch M is introduced to change the polarity of the field or armature coils, as the case may be, which thereby reverses the direction of movement of the carriage.

The motor designated by the letter I is preferably an electric motor of low speed, and the switch M is for controlling the direction of movement of the carriage in either direction. It is obvious, however, that other forms of motors can be employed, and the direction of movement as imparted by said motor may be changed by a reversing-gearing, sliding coupling or clutch, or other convenient form of common knowledge.

Bolted to the frame A is an extension of the carriage in the form of a frame N, in which are journaled in suitable bearings rollers O and P, the former of which, O, being corrugated, as shown in Figs. 4 and 5, for the purpose of embedding into the plate of glass initially rolled by roller P a wire mesh X, the corrugations of said roller O forcing the wire mesh into the body of the plate of plastic glass. The ends of roller O are preferably formed plain, which plain surfaces act as treads to bear upon guide-rails Q on the glass-rolling table. The treads of roller O are of less diameter than the crown of the corrugations, and the diameter of the treads relative to the corrugations determines the depth to which the wire mesh will be embedded in the semi-molten glass to make a thin or a thick sheet, as illustrated in Figs. 4 and 5.

The upper face of the frame N forms a table upon which the wire mesh is introduced previous to its being embedded in the glass.

Bearing upon this table are lazy-rollers R and R′, which are loosely mounted in slots in bearings *r*, projecting up from the table. The object of these lazy-rollers is to hold the wire mesh taut while it is being fed on the initially-rolled plate of glass, at the same time keeping said mesh straight.

On the axles of roller P are loosely mounted links S, the outer ends of which are slotted to receive bearing-boxes *v*, which are normally forced inwardly by springs *v′*.

Journaled in the boxes *v* is a feed-roller V for the wire mesh, which is yieldingly held in contact with the face of roller P, between which rollers V and P the wire mesh is fed to the glass and is forced under roller P by the advance movement of the machine. Roller V is driven by gear-wheels W and W′, the former of which is fixedly mounted on the axle of roller P and the latter mounted upon axle of roller V. This feeding mechanism for the wire mesh is held in an upright position by any suitable means, but preferably by a chain S′, which may be removed or adjusted by introducing or removing a link to regulate the position of roller V relative to roller P.

The operation of the machine, as above described, is as follows: The wire mesh, in being prepared to be embedded in the plate of glass is initially cleaned of adhering foreign particles—such as moisture, rust, &c.—by being passed under a rapidly-revolving brush, or it may be dipped in acid or oil and dried. This wire mesh is previously cut to the dimensions it is desired to make the sheet of wired glass, which obviates the necessity of sawing the glass after it is rolled. Assuming now that the machine is on a suitable table and the wire mesh prepared as above described, the ladleful of semimolten glass is placed in front of the roller P and, if desired, within the walls of a suitable gun. The wire mesh is placed on table N beneath the rollers R and R′ and between rollers P and V. Controller M is now operated so as to start the machine, and as the same advances the wire mesh will be fed down and hugging the roller P (the semimolten glass being banked in front thereof will force it in its proper position) will be carried thereunder and come out at the back of said roller on top of the initially-rolled plate of glass. The wire mesh will remain on top of this initially-rolled plate of glass, expanding and having all adhering foreign particles burned off preparatory to being embedded by corrugated roller O. The corrugated roller O now embeds the mesh, and the finishing-roller B, which is a very heavy roller and greater in dimension than either of the rollers O and P, brings up the rear, finally rolling the semimolten glass so as to mash down those portions of the plate which protruded through the meshes of the wire, as shown by the small views beneath Figs. 4 and 5. After the plate has been rolled controller M cuts out the current and causes the machine to come to a standstill. Switch L can now be operated so as to reverse the direction of travel of the carriage, when the current can be again admitted and the machine returned to its first position ready for another operation.

The above-described machine is especially designed for use in making wired glass; but for purposes of economy in the operation of a glass plant it is desirable that the machines be constantly in use. In order to adapt the propelling power on frame A for other purposes than rolling wired glass, I detach the frame N, as shown in Fig. 6, to carry the same off on a suitable truck or other device T to some point where it will be out of the way. On the frame A, I then mount brackets U, which carry trundle-rollers to support the frame in an upright position. The carriage now consists of the roller B, propelling-motor, means for controlling the propelling-motor, and means for reversing the direction of travel of the carriage, whereby the carriage can be utilized to roll a plain or configured unwired plate of glass, thus saving the wear of carriage N and rollers O and P.

The advantages of feeding the wire mesh under advance roller P are that when the wire mesh comes in contact with the semimolten glass it is heated and expanded and while in this condition is partially embedded in the hot and unchilled glass. While thus partially embedded and before the roller O acts upon it all foreign particles remaining after the mesh is first cleaned are burned off, so that when the mesh is entirely embedded there are no bubbles or flaws in the plate of glass due to the formation and expansion of the gases of combustion under the surface of the plate. It will be noted that by so partially embedding the mesh in the hot glass not only will the gases of combustion pass off, but the glass immediately beneath the lines of the mesh, having been protected from chilling, will readily receive the mesh, and in this manner the objection of forcing the wire mesh through a chilled surface (as has heretofore been the practice and which is unsatisfactory, as so many bad sheets result) is overcome.

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

1. In a glass-rolling machine, the combination with a table, of a plain roller mounted in one end thereof, a corrugated roller mounted in the other end of said table, means for feeding a wire mesh from said table, and a lazy-roller which is mounted so as to bear upon said wire mesh while it is being fed, substantially as described.

2. In a glass-rolling machine, the combination with a table, of rollers mounted therein for embedding a wire mesh into a plate of rolled glass, and a feeding device on the table for positively feeding the wire mesh to the rollers, substantially as described.

3. In a glass-rolling machine, the combina-

tion with a carriage-table, of rollers mounted therein for embedding a wire mesh into a plate of glass while it is being rolled, and a feeding device which is driven by the movement of the carriage, for positively feeding the wire mesh to the molten glass by the action of the rollers, substantially as described.

4. The method of forming wired plate-glass consisting in subjecting the wire and a body of heated glass to compression, to level the glass and expand the wire, forcibly embedding the wire into the glass, and finally leveling and finishing the plate by subjecting the same to pressure, substantially as described.

5. In a glass-rolling machine, the combination with a carriage, of two leveling-rolls connected therewith, an interposed embedding-roll, and a wire-feeding device on the carriage in advance of the forward roll for positively feeding the wire to the molten glass, substantially as described.

6. In a machine for making wired plate-glass, the combination with a carriage, of two leveling-rolls connected therewith, a wire-feeding device on the carriage, and means for positively driving the feeding device, substantially as described.

7. The method of forming wired glass consisting in first forcibly embedding the wire in the surface of a heated body of glass, permitting the wire to remain in the surface until it is properly expanded and cleansed, embedding the wire into the body of the glass to a point below the surface thereof, and finally applying pressure to the upper surface of the glass, substantially as described.

8. In a glass-rolling machine, the combination with a carriage, of leveling-rolls, an intermediate embedding-roll, and means for positively feeding wire onto the glass in advance of the forward leveling-roll, substantially as described.

In testimony whereof I hereunto affix my signature, in presence of two witnesses, this 4th day of October, 1894.

EDWARD WALSH, JR.

Witnesses:
F. R. CORNWALL,
HUGH K. WAGNER.