

No. 698,273.

Patented Apr. 22, 1902.

W. J. GLOVER.

WIRE DRAWING.

(Application filed June 12, 1901.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.

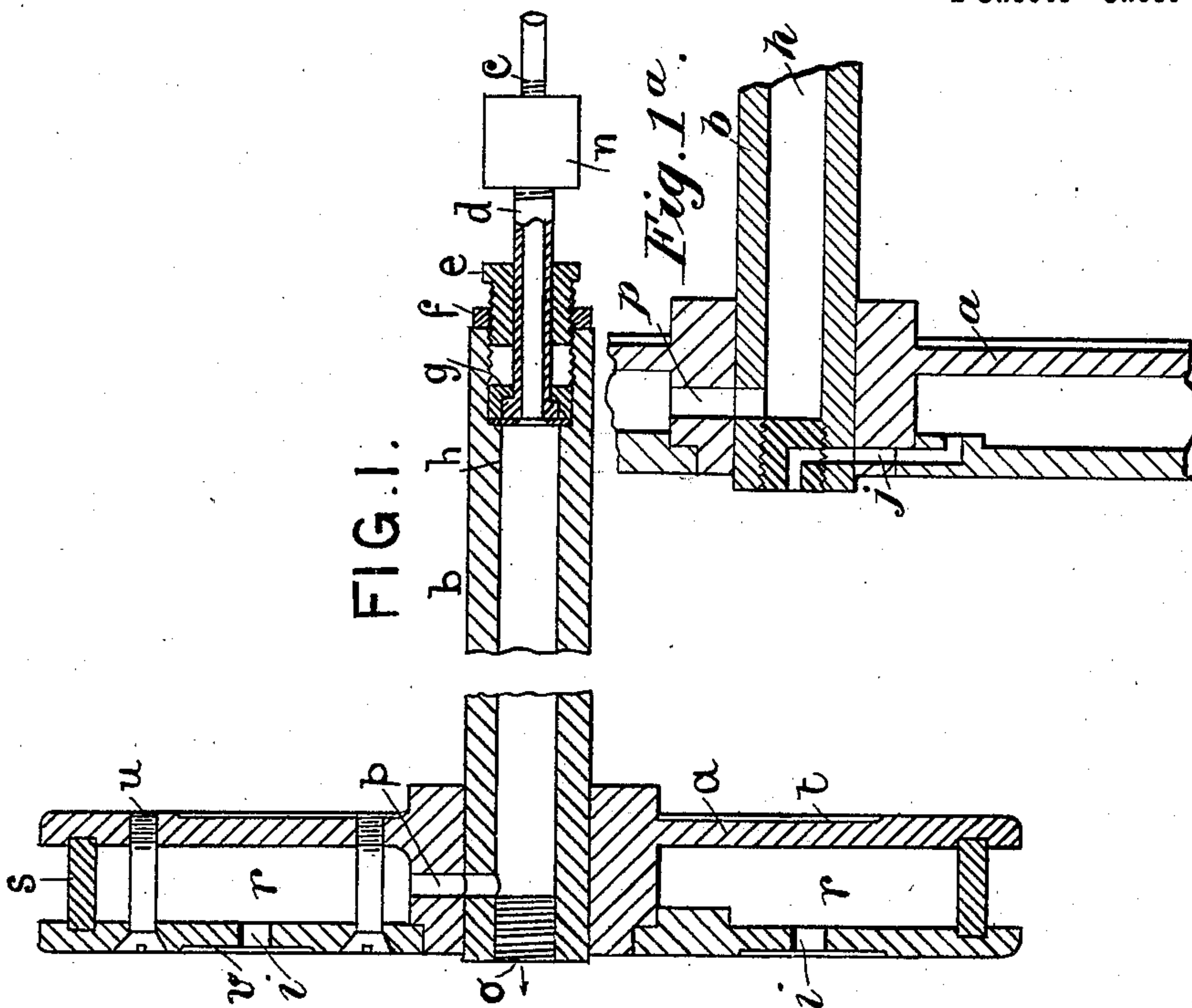
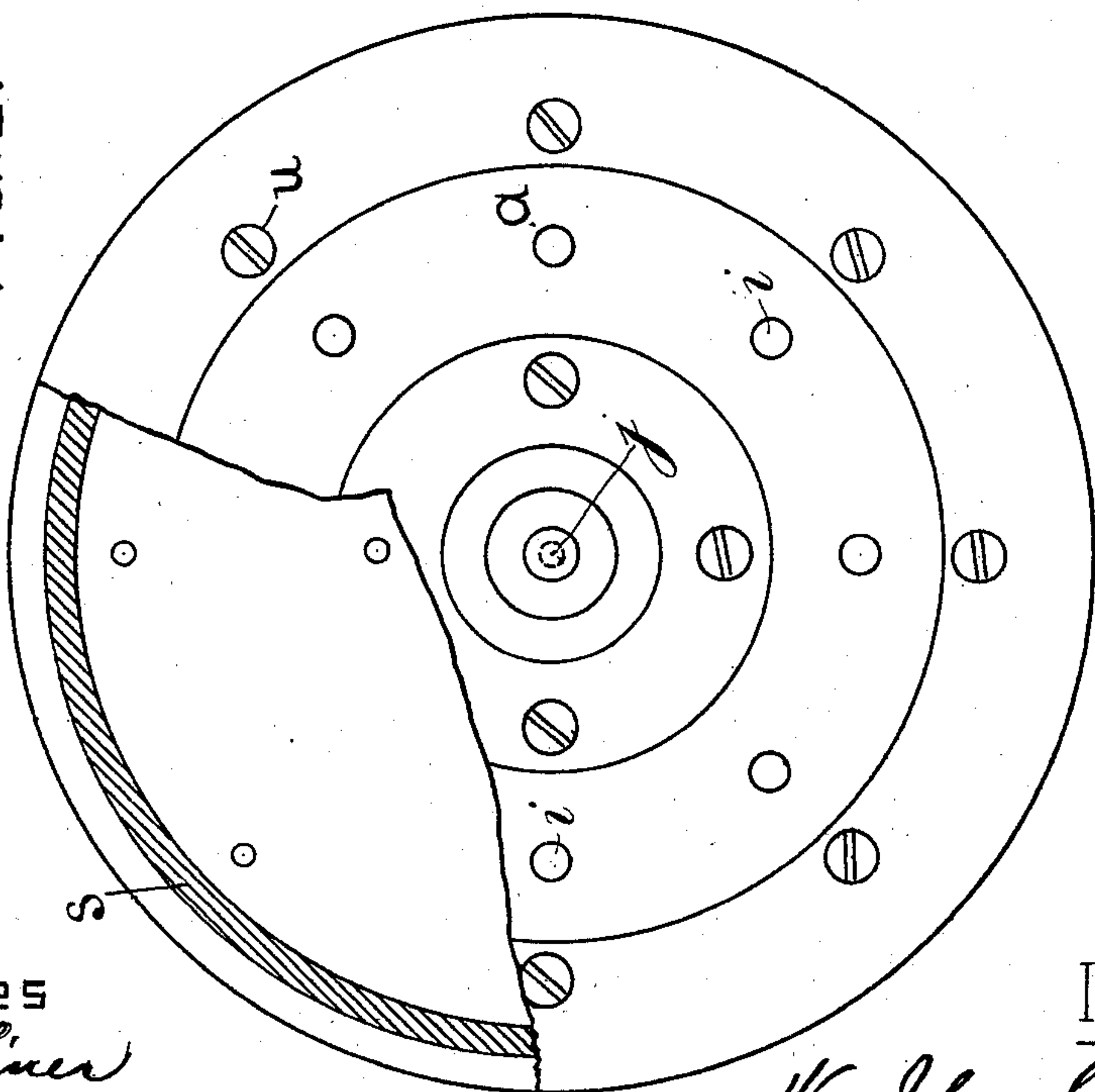


FIG. 2.



Witnesses

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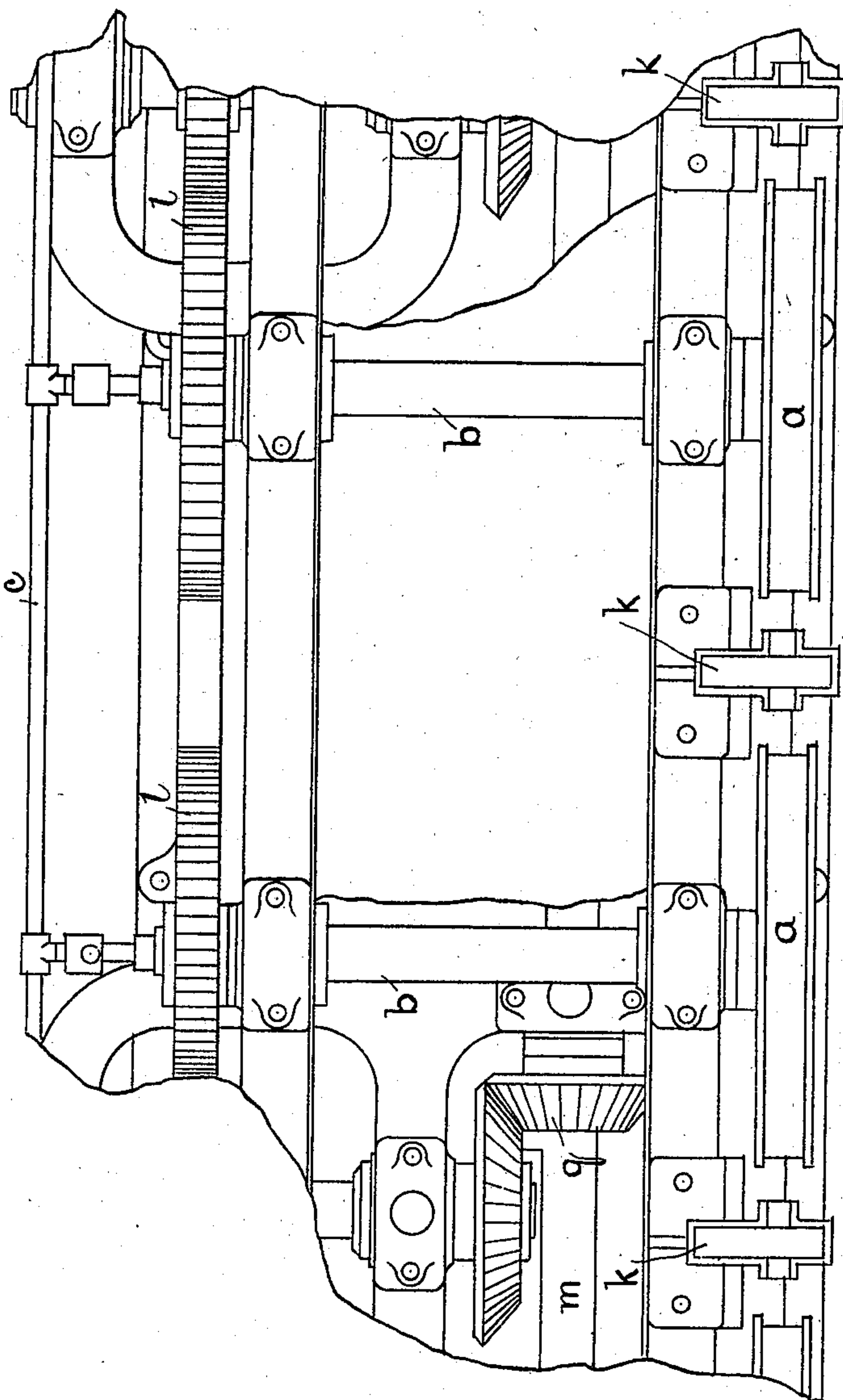
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2 Sheets—Sheet 2.

FIG. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM JOHN GLOVER, OF ST. HELENS, ENGLAND.

WIRE-DRAWING.

SPECIFICATION forming part of Letters Patent No. 698,273, dated April 22, 1902.

Application filed June 12, 1901. Serial No. 64,330. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JOHN GLOVER, engineer, a subject of the King of Great Britain, residing at St. Helens, in the county of Lancaster, England, (whose full postal address is St. Helens Cable Works, St. Helens,) have invented certain new and useful Improvements in or in Connection with Wire-Drawing, (for which application for patent has been made and provisional protection obtained in England, No. 22,959, dated December 15, 1900, and in Germany, filed February 5, 1901,) of which the following is a specification.

In drawing steel and iron wire it is important to avoid injuring the hydrooxidized coating or film on the wire, which is usually produced by exposing it to the action of the atmosphere after having been treated in the pickling-tank, as this coating forms an admirable lubricant when passing through the dies, thus facilitating the perfect drawing of the wire. By the ordinary process of continuous drawing it is usual to cool the wires between the successive draw plates or dies by a partial immersion of the drawing-reels in a cooling and lubricating solution. This, however, is rather liable to injure the hydrooxidized film to which I have referred. Now the present invention is designed to avoid this defect in the process of drawing the wire, and the manner in which I proceed to carry out my invention is as follows: I dispense altogether with immersing the wire by a partial immersion of the drawing-reels in a cooling and lubricating solution, and in place thereof I make the drawing reels or drums hollow and subject the inside thereof to the action of a suitable cooling medium—such as compressed air, water, or other fluid—which has the effect of cooling the reels or drums, and consequently the wire which is wound or passed around them. In this way the cooling medium does not come in contact with the wire at all, and there is no necessity of immersion of the wire in a cooling solution.

In the accompanying drawings, Figure 1 is a longitudinal section of one of the drawing-reels. Fig. 1^a is a detail longitudinal section of the same, illustrating a modification; Fig. 2, an end view thereof, partly in section; Fig.

3, a plan view of a portion of the wire-drawing machine.

In the arrangement shown, *a* represents the drawing-reels, which are made with a hollow chamber *r* inside, formed by the steel rim *s* and side checks *t*, which are fastened together by the cross-screws *u*.

b represents shafts on which the reels are mounted and secured. These are also hollow or tubular, but closed at the end *o*, so that compressed air can be forced through the said shafts *b* and passages *p* into the chambers *r* of the drawing-reels *a*, and thus act to cool the reels and the wire which is passed around them. Each shaft *b* is coupled to the pipe *c*, supplying cooling fluid, in such a manner as to permit the shafts rotating in their bearings while the supply-pipe *c* remains stationary. For this purpose the hollow shafts are enlarged somewhat at the end, and into this is fitted the chambered collar *g* and washer *h*. Also the gland *e* is screwed into the shaft and locked therein by means of the nut *f*. The hollow stationary spindle *d* is mounted within the collar *g* and gland *e*, with its enlarged end engaged in the chamber between the washer *h* and the shoulder in the collar *g*, so as to resist longitudinal movement, and is secured to the supply-pipe *c* by a union or coupling device *n*. The pipes *c* and *d* can thus remain absolutely stationary while the reels and shafts revolve. It is preferable to provide an escape for the air, so that a continuous current is set up through each reel or drum *a*, and for this purpose outlets *i* are provided, by which the cooling fluid is discharged through the side plates of the reel, so as not to come in contact with the wire. For use with compressed air the position of these outlets in the side plates is immaterial, and they may be at any radial distance from the center of the reel.

Instead of air any other suitable cooling medium may be used, such as water; but if a liquid be used the outlet is preferably arranged as indicated at *j* in Fig. 1^a, so as to discharge the liquid in the center or axis of the reel, from whence it may be readily conducted away.

The cooling of the reels or drums by circulation of a cooling fluid through them suffices

to cool the wire as it passes around them between the drawing-dies.

The general construction of a part of the machine is shown in Fig. 3, in which *k* are drawing-dies arranged at intervals between each pairs of reels *a*. *ll* indicate gearing for driving the reels *a* from the main shaft *m* and bevel-wheels *q*. Adjacent to each die *k* a suitable block of lubricating material may be used, through which the wire passes.

In action the wire to be reduced is passed to the first draw-plate, from which it passes to the first rotary reel or drum of the series, on which it is wound and cooled in the manner described, to be again drawn through the next draw-plate or die, which has a smaller hole, and cooled in the succeeding rotating reel, and so on down until it is attenuated to the required size. The shafts of the respective reels are rotated by shafts and gearing *m q l*. I can arrange for each succeeding reel or drum to be rather larger than the preceding one, so as to allow for the increased speed of travel of the wire due to its attenuation by the drawing-dies, or, if preferred, each succeeding reel is arranged to revolve quicker than its predecessor. I do not of course confine myself to the cooling fluid being admitted to the inside of the reels or drums through the hollow shafts, as other means may be adopted for admitting it.

The invention can equally well be employed for drawing wire of other metal besides steel or iron—such, for example, as copper, lead, &c. The drums or reels are made of a boss provided with a side disk *t*, a steel rim *s*, let into an annular cavity therein, and side cheek *v*, which is fastened to the disk *t* by cross-screws and is fitted on the boss and against the rim *s*. The boss of this drum is mounted on and secured to the shaft.

I declare that what I claim is—

1. In a wire-drawing machine, a drawing-roll constructed in the form of a hollow drum having a closed periphery and means for introducing cooling fluid to the hollow of said drum and discharging it therefrom without its coming in contact with the wire to be drawn, substantially as described.

2. In the drawing-roll of a wire-drawing machine, the combination of a boss, a side disk forming part of and projecting from said

boss, a steel rim let into an annular cavity in the side of said disk, a facing-disk forming with said side disk and rim a peripherally-closed drum, and means for admitting a cooling fluid to the interior of said drum without said fluid coming in contact with the wire to be drawn, substantially as described.

3. In a wire-drawing machine the drawing-rolls of which are formed as hollow peripherally-closed drums, an arrangement for conveying a cooling fluid to the interior of said drums which consists of a hollow shaft, means of communication between said shaft and the interior of the hollow drum mounted thereon, and a stationary pipe passing through a gland into the interior of said shaft, whereby a cooling fluid may be introduced into said shaft while it is in rotation, substantially as described.

4. In a wire-drawing machine, the drawing-rolls of which are formed as hollow peripherally-closed drums, an arrangement for conveying a cooling fluid to the interior of said drums which consists of a hollow shaft, means of communication between said hollow shaft and the interior of the hollow drum mounted thereon, a stationary supply-pipe inserted in the end of said hollow shaft, a collar within said shaft at the end of said supply-pipe, and a gland in the end of said hollow shaft surrounding said supply-pipe, whereby rotation of the hollow shaft about the supply-pipe is permitted, and leakage of the cooling fluid is prevented, substantially as described.

5. In a wire-drawing machine, the drawing-rolls of which are formed as hollow peripherally-closed drums, an arrangement for circulating a cooling fluid in said drums, which consists of a hollow shaft, passages communicating between said hollow shaft and the interior of said hollow drums, and means for permitting the outflow of said fluid from said drums without said fluid coming in contact with the wire to be drawn, substantially as described.

In witness whereof I have hereunto signed my name, this 23d day of May, 1901, in the presence of two subscribing witnesses.

WILLIAM JOHN GLOVER.

Witnesses:

JOHN HAMMILL,
ROBERT ANTWIS.