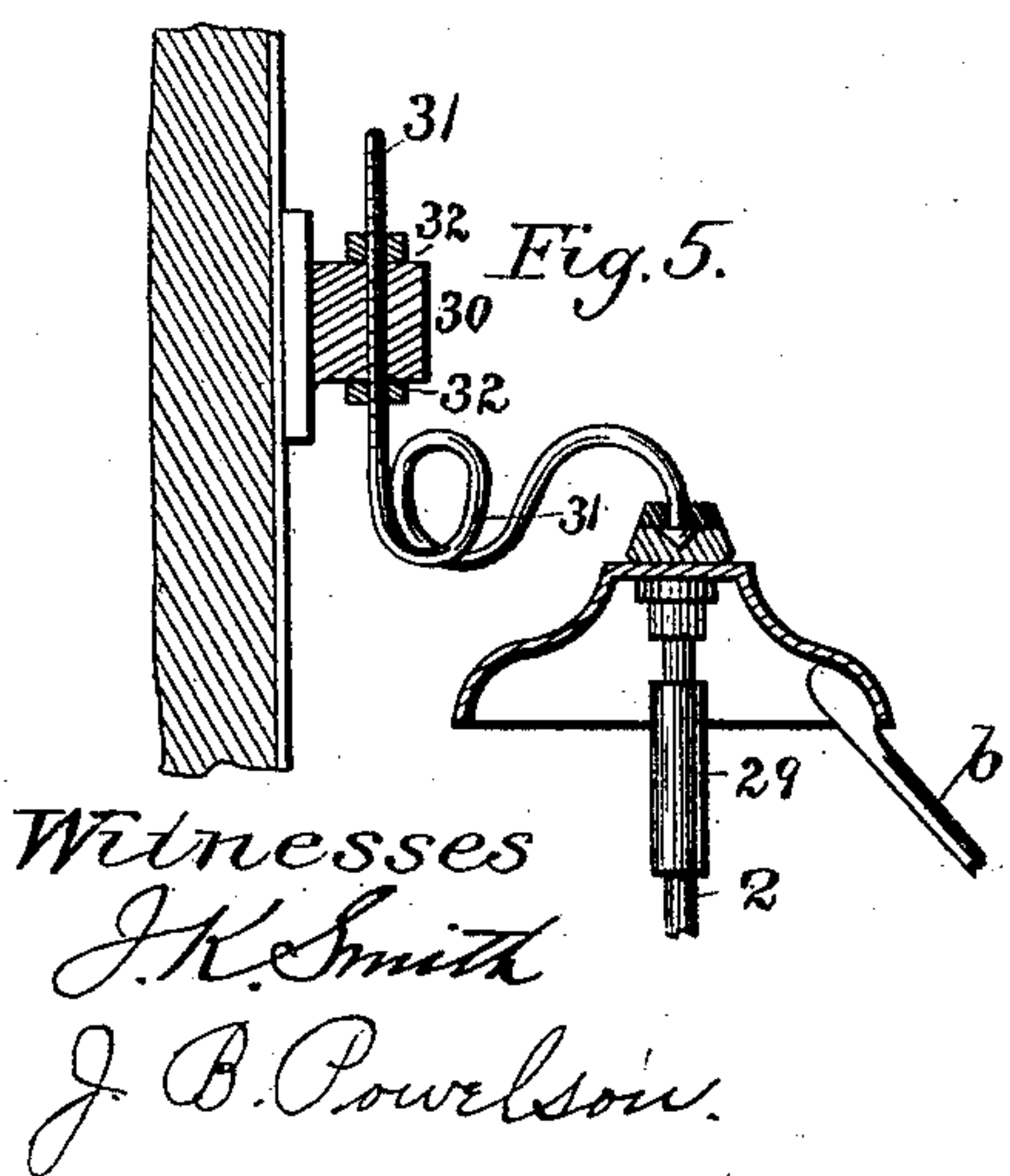
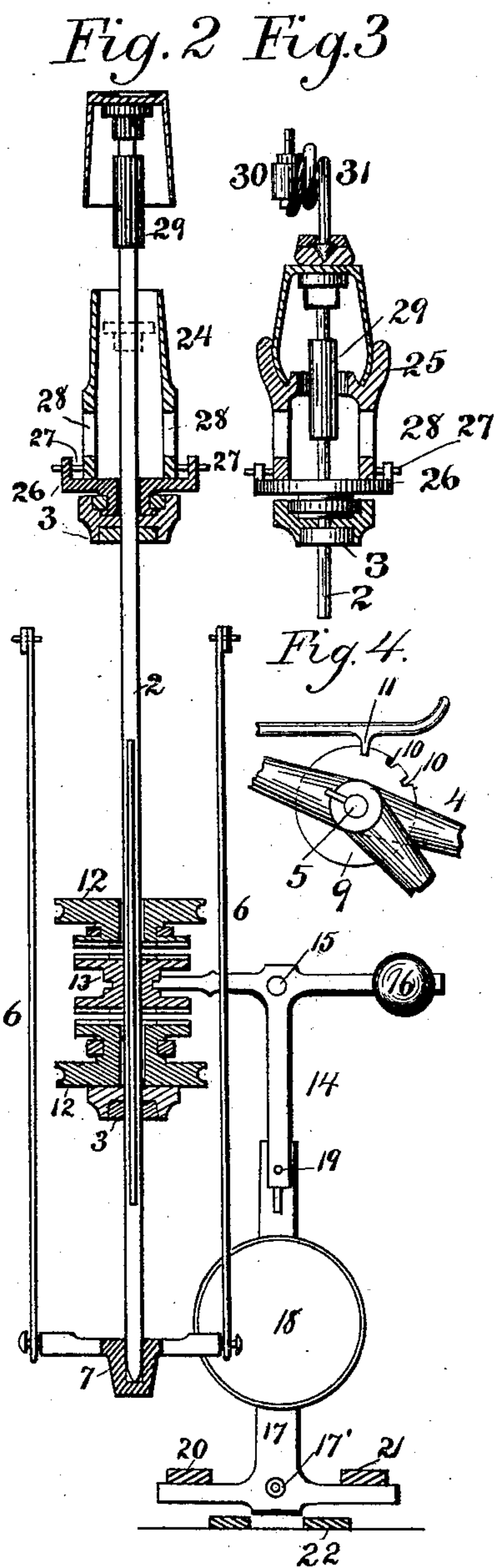
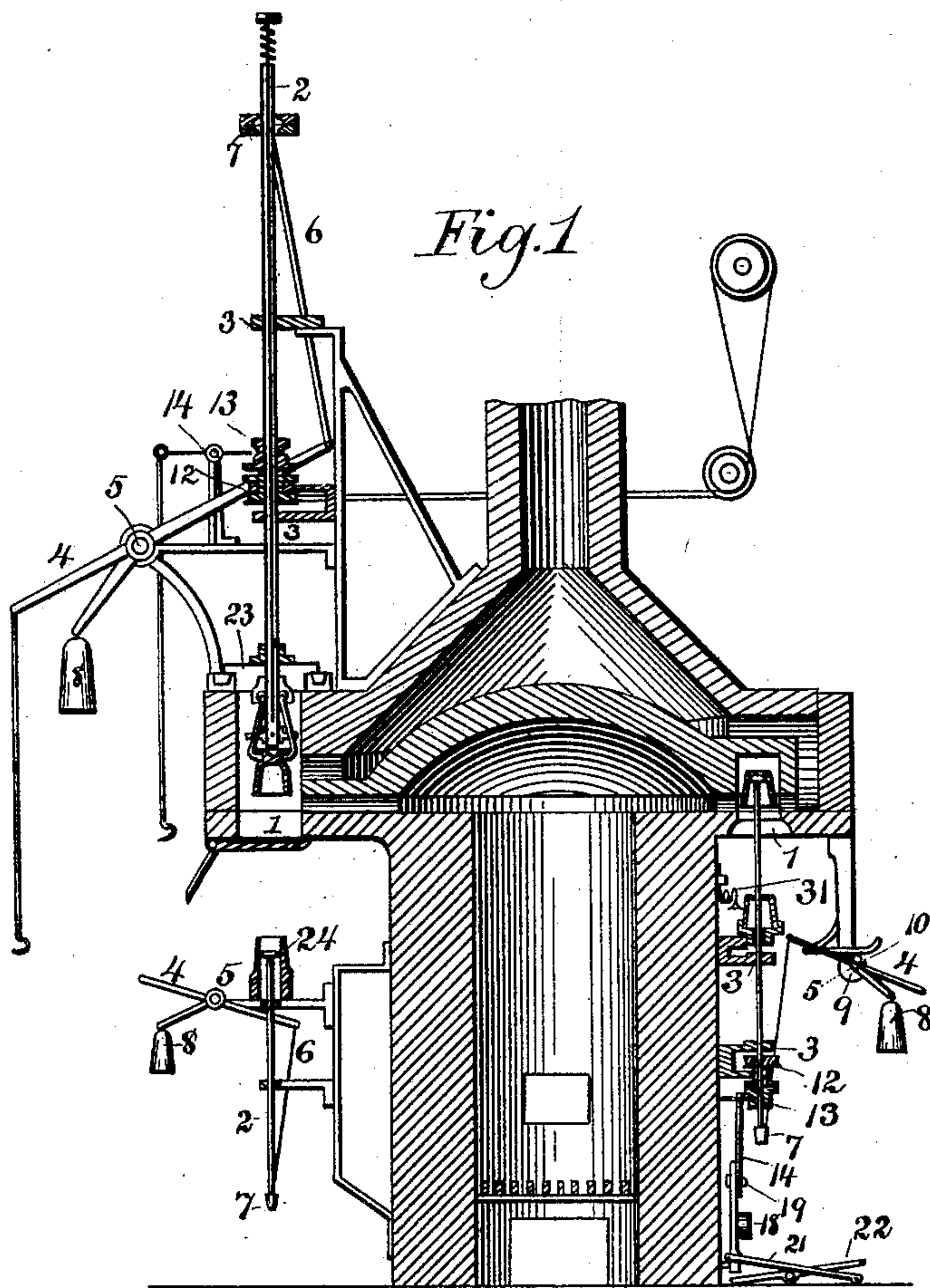


(No Model.)

H. SCHULZE-BERGE.  
APPARATUS FOR REHEATING GLASSWARE.

No. 411,132.

Patented Sept. 17, 1889.



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# UNITED STATES PATENT OFFICE.

HERMANN SCHULZE-BERGE, OF ROCHESTER, PENNSYLVANIA.

## APPARATUS FOR REHEATING GLASSWARE.

SPECIFICATION forming part of Letters Patent No. 411,132, dated September 17, 1889.

Application filed December 31, 1888. Serial No. 295,103. (No model.)

*To all whom it may concern:*

Be it known that I, HERMANN SCHULZE-BERGE, of Rochester, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Reheating Glassware, of which the following is a full, clear, and exact description.

My invention relates to an improvement in apparatus for reheating and finishing glassware; and it consists, principally, in tools for receiving and holding the article, together with a glass-reheating furnace and means for altering or changing the shape of the article.

My improvement is illustrated in the accompanying drawings, in which—

Figure 1 represents a vertical section through the furnace provided at its left side with the tools for holding, handling, and finishing the glass articles. Fig. 2 is a front view, partly in section, of a modification of the tools shown on the right side of the furnace. Figs. 3, 4, and 5 are detail views.

Like symbols of reference indicate like parts in each.

As is well known, most articles of glass after being pressed or blown need the additional operation of finishing to obliterate the seams and other mold-marks. This operation consists in reheating the article or parts thereof to the melting-point, and then giving to the article its final shape. This operation is generally performed by attaching the article to a rod or handle, placing the article horizontally into a reheating-furnace, and when heated sufficiently removing it from the furnace to the glassmaker's chair, and while resting the handle upon the railing of the chair a revolving motion is imparted to the article by the handle with one hand of the finisher while the other hand manipulates the finishing-tool.

My improved finishing apparatus is designed to perform the various steps of prior methods of finishing; but it facilitates the operation of finishing the articles by affording a more suitable construction of the reheating-furnace and of the tools used for the purpose of reheating and finishing. These tools are adapted to slide vertically and to revolve around a vertical axis of rotation in bearings stationary with relation to an opening or openings in the floor or in the top of the re-

heating-furnace. By this arrangement I dispense with some intermediate operations—such as sticking-up and the repeated handling of the article while attached to the rod—thus saving time and labor, and by the use of the vertically-sliding tool journaled in stationary bearings in connection with the furnace the finisher has the additional advantage of having the free use of both of his hands to manipulate the article which moves by machinery in front of him.

As represented in Fig. 1, the reheating-furnace consists of a fire-place from which the gases of combustion and the heat pass off through flues into the chimney. The flues are provided with openings 1 in the bottom or in the top, through which the articles of glass may be introduced or withdrawn while attached to sliding revoluble supporting-rods 2. The supporting-rod slides in two or more bearings 3, stationary with relation to the opening into which the article is to be introduced. The supporting-rod is provided at one of its ends with means for receiving and holding the glass article, which means may consist of a common snap-catch—such as illustrated in the drawings at the left side of the furnace—or they may be a flat piece of metal in the shape of a disk or otherwise to receive the article, as at the right side of the furnace, where a tumbler is shown supported on the inside bottom.

The article attached to the supporting-rod is raised and lowered in the heating-flue by means of the levers 4, which rotate around an axle 5. The levers 4, acting on the pitmen 6, transfer the motion to the cross-heads 7, which form a movable bearing or socket for the supporting-rod. The weight of the supporting-rod is counterbalanced on the axle 5 by the counter-weight 8. The axle 5 is also provided with a stop arrangement consisting of a disk 9, attached to the axle by set-screws, which disk has on its periphery several notches or catches 10, (shown in Figs. 1 and 4,) with which the pawl 11 engages to arrest the axle until the pawl is raised. The supporting-rod may be made so as to be raised or lowered, as described, and may also be made to be capable of being revolved simultaneously with its vertical motion or otherwise. The mechanism for the latter arrangement



consists of grooved pulleys 12, revoluble in stationary bearing around the axial line of the carrying-rod, and bored or drilled out so as not to touch the carrying-rod directly.

5 The carrying-rods in Fig. 1 are each provided with one pulley, while the carrying-rod shown on a larger scale in Fig. 2 is provided with two pulleys, which may be revolved by the belt at different rates of speed. To the  
10 neck on which the pulley revolves is connected a disk provided on its face with a few teeth, which engage a clutch 13, operated by the levers 14, and can thereby be set to engage with the pulleys at any time or at any  
15 position of the carrying-rod. The clutch is connected to the carrying-rod by a feather and spline, so that when the clutch is caused to revolve the carrying-rod is turned also. Thus the carrying-rod can be revolved as  
20 well when the glass article is raised or lowered in the heating-flue as when it is removed from the flue. The lever 14, actuating the clutch, can be operated as represented in Figs. 1 and 2, by causing the lever to oscillate on  
25 the pivot 15.

16 represents a weight to counterbalance the weight of the clutch-disk. The lever 14 has an arm extending downward from the pivot 15 and engaging a similar arm of a  
30 lever 17, which turns around the pivot 17', and is connected to the lever 14 by a key 19. The lower arms of the lever 17 are provided with step-boards 20, 21, and 22. If the operator steps upon one of these, the lever 17 is  
35 thrown out of position either toward the right or left, causing the lever 14 to be changed likewise and the clutch 13 to engage either the upper or the lower pulleys 12, which can be made to revolve at different rates of speed.  
40 A weight 18, attached to the lever 17, holds it in position until changed by stepping upon the other step-board. The presence of two pulleys running loosely at different speeds around the carrying-rod, which can be put  
45 into gear with the rod, is advantageous, for the reason that the article cannot revolve in the heating-flue at a high speed, since when it becomes heated nearly to the melting-point it is apt to flare out too much, and thus to  
50 lose its shape entirely, while if the object is removed from the heating-flue it sometimes must be revolved more rapidly in order to shape it with the finishing-tool and to rub or polish the surface with a buffer *b*, as indicated in Fig. 5.  
55

For some purposes the finishing-tool, which consists, generally, of a piece of partly-charred wood, can conveniently be replaced by metallic molds or shaping-forms placed in the  
60 axial line in which the article moves while attached to the supporting-rod. Thus hollow article which taper on the inside—such as tumblers, goblets, measuring-jars, &c.—after being reheated may be lowered for a  
65 moment upon a metallic former corresponding in shape to the inside of the article. If the reheated glass article is allowed to cool

while resting on the shaping-tool, it is liable to become wavy in appearance, owing to non-uniform chilling of the glass.

70 At the left side of the furnace shown in Fig. 1 is represented a construction in which the article (a measuring-jar) is attached to the revoluble supporting-rod 2 by means of a common snap-catch. It is introduced into  
75 the flue from above through a hole which is closed by the lid 23, which in raising the rod lifts up with it, and on lowering the rod drops with its lower rim into an annular U-shaped casting, thus closing said opening. The bot-  
80 tom of the flue is formed of a drop door or flap, which, if opened, allows the object to be lowered and deposited upon the shaping tool or plug 24, from which it is lifted by the carrying-rod 2, which is actuated by the lever 4,  
85 and the other parts in the manner explained before. When the article has cooled sufficiently, it is removed from the carrying-rod 2 by prongs or forks or otherwise. At the  
90 right side of the furnace in Fig. 1 I illustrate a similar shaping-tool placed around the carrying-rod, so that if the carrying-rod, with the tumbler hanging upon it, is lowered the  
95 tumbler meets the inside shaper on its descent. This is represented on a larger scale in Fig. 2. The shaping-tool 24, corresponding to the inner shape of the tumbler, is placed centrally around the carrying-rod 2,  
100 and stands on a disk 26, to which it is fastened by set-screws 27. The disk 26 is revoluble in a neck in the same casting, which forms the bearing 3, in which the carrying-rod 2 revolves and slides. Openings 28 allow access of air to the inside of the shaping-  
105 tool to keep it moderately cool. That part of the carrying-rod 2 directly below the rim of the tumbler which is exposed to the direct action of strong heat in the reheating-flue is preferably covered with a sheathing of asbestos pipe or other non-conductor of heat,  
110 as indicated at 29 in Figs. 2, 3, and 5.

The glass article while being lowered upon the shaping-tool acts merely with its own weight. It is desirable, however, to apply to it some pressure, in order to impart a cor-  
115 rect shape to the finished article. For this purpose a slight pressure with a finishing-tool upon the bottom of the tumbler causes it to be depressed completely upon the shaping-tool. This is facilitated and more uni-  
120 form results are obtained by means of an easily-applicable spring-pressure, especially if the object is caused to assume a different shape on the shaping-tool, as indicated in Fig. 3, in which case the shaping-  
125 tool does not directly touch the inside of the tumbler, but crimps or narrows its rim. This spring-arm attachment is represented in Fig. 1 and on a larger scale in Figs. 3 and 5. It consists of a lug 30, attached to the fur-  
130 nace, in which lug is journaled a spring-arm 31, capable of vertical adjustment by nuts 32. The spring-arm 31 can be turned against the stack of the furnace so as to be out of the way



of the carrying-rod, as shown in Fig. 1, and if the carrying-rod, with the article, is lowered it can be swung directly over the article, so that the swivel-jointed end of the spring-arm shall be in the axial line of the carrying-rod, as represented in Figs. 3 and 5. In such position it exerts a certain spring-pressure upon the carrying-rod, and does not interfere with its revolution. In the case represented in Fig. 3 it allows a repeated raising and depressing of the article upon the shaping or finishing tool while the object is revolving.

I claim—

1. In apparatus for reheating and finishing glassware, the combination of a vertical supporting-rod, a vertically-movable bearing in which it is suspended, and stationary bearings in which it is revoluble and vertically movable, substantially as and for the purposes described.

2. In apparatus for reheating and finishing glassware, the combination, with a heating flue or furnace provided with an opening or openings admitting of the introduction of articles in a vertical direction, of a suspended carrying-rod adapted to slide vertically in bearings stationary with relation to the said opening or openings and a shaping-tool, substantially as and for the purposes described.

3. In apparatus for reheating and finishing glassware, the combination, with a heating flue or furnace provided with an opening or openings admitting of the introduction of articles in a vertical direction, of a suspended revoluble carrying-rod adapted to slide vertically in bearings stationary with relation to the said opening or openings, a shaping-tool, and means for revolving the carrying-rod,

substantially as and for the purposes described.

4. In apparatus for reheating and finishing glassware, the combination, with a heating flue or furnace provided with an opening or openings admitting of the introduction of articles in a vertical direction, of a suspended revoluble carrying-rod adapted to slide vertically in bearings stationary with relation to the said opening or openings, a shaping-tool, means for revolving the carrying-rod, and means for interrupting the rotation thereof, substantially as and for the purposes described.

5. In apparatus for finishing glassware, the combination of a vertically-movable carrying-rod, a shaping-tool, and a spring-arm for pressing the article on the shaping-tool, substantially as and for the purposes described.

6. In apparatus for finishing glassware, the combination of a vertically-movable carrying-rod, a shaping-tool, and a spring-arm for pressing the article on the shaping-tool, said spring-arm having a swivel-jointed end, substantially as and for the purposes described.

7. In apparatus for finishing hollow articles of glassware, a supporting-rod and a former in the path of the rod, said rod being vertically movable to cause the former to receive and shape the article, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 22d day of December, A. D. 1888.

HERMANN SCHULZE-BERGE.

Witnesses:

THOMAS W. BAKEWELL,  
W. B. CORWIN.