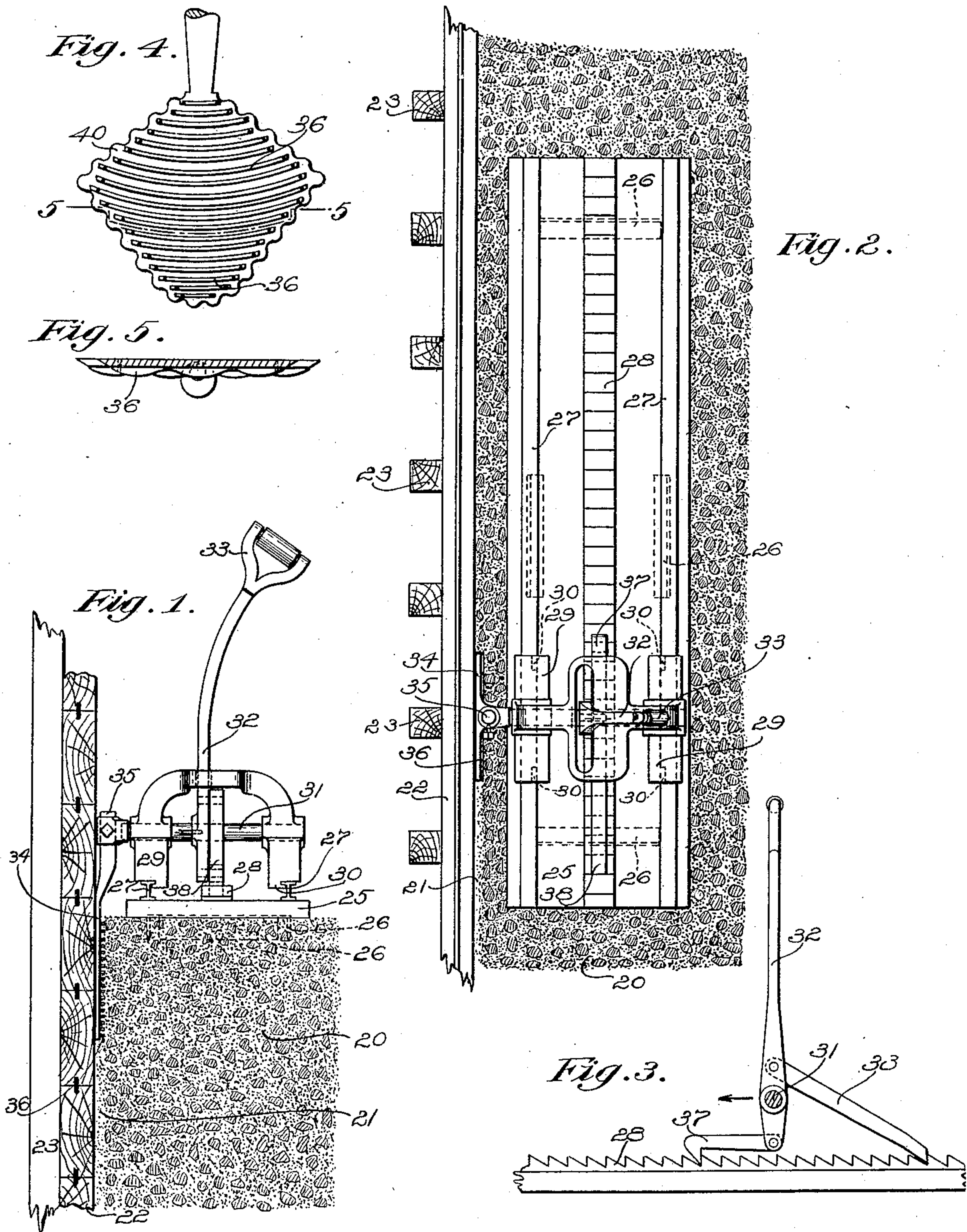


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 APPLICATION FILED MAR. 9, 1908.

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 2 SHEETS—SHEET 1.



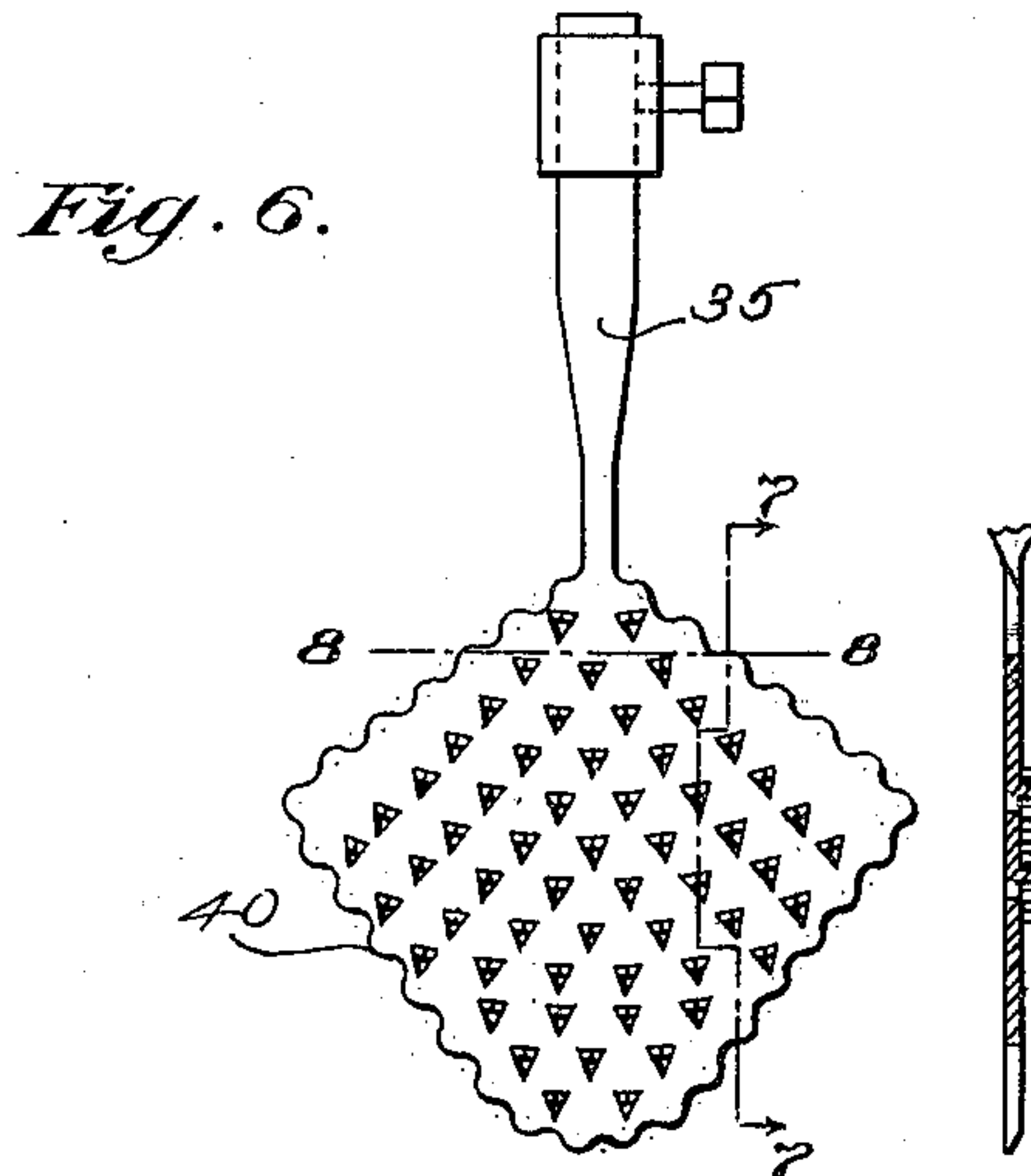
Witnesses  
 Oliver Mitchell.  
 Joseph T. Bruman.

Inventor:  
 Joseph F. Ross.  
 by Everett Kent Atty

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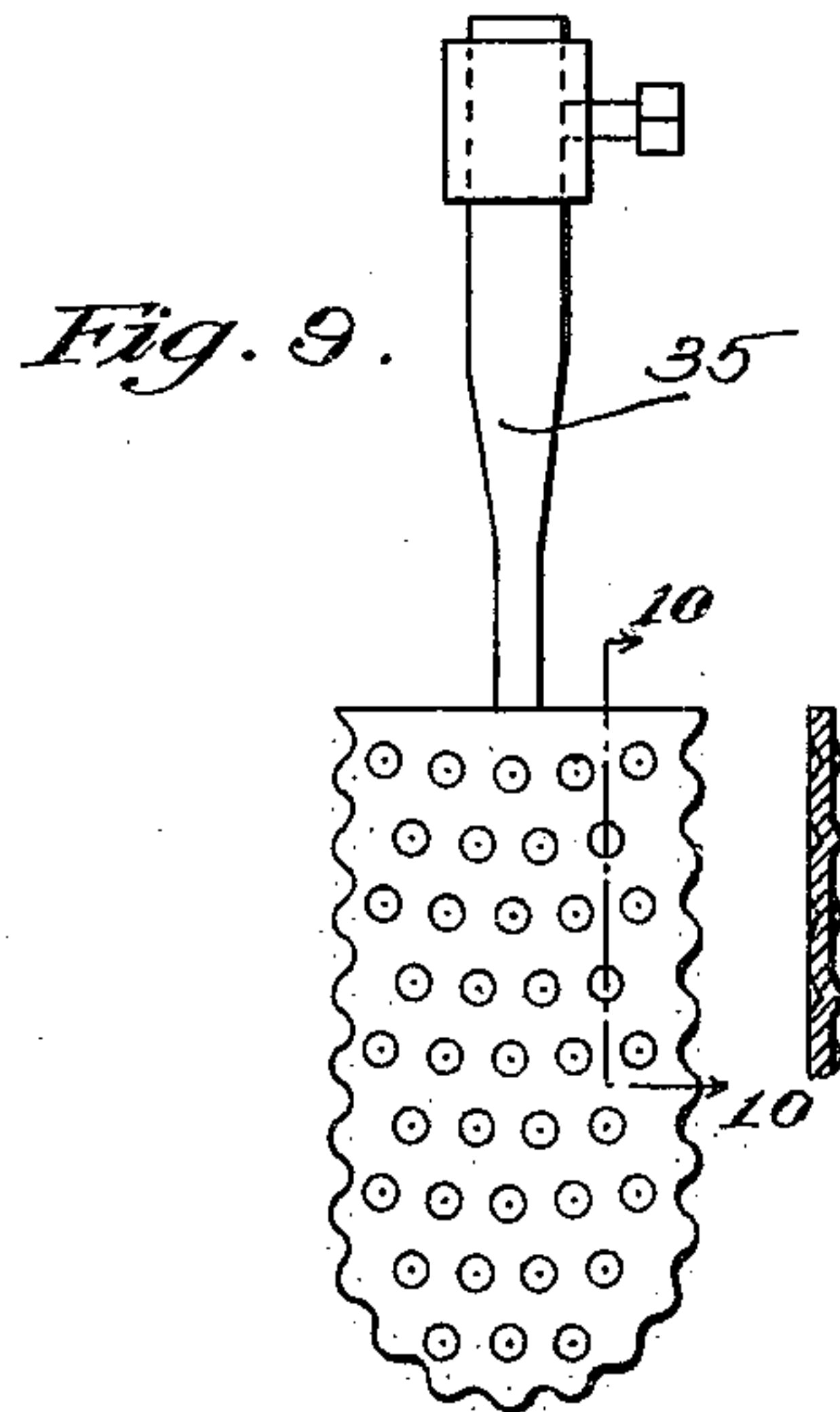
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*Fig. 7.*

*Fig. 8.*



*Fig. 10.*

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR MOLDING CONCRETE.

No. 917,141.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed March 9, 1908. Serial No. 419,886.

*To all whom it may concern:*

Be it known that I, JOSEPH F. ROSS, of Ipswich, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Molding Concrete, of which the following is a specification.

This invention relates to improvements in apparatus for molding concrete.

More particularly it is intended for use when an abutment or other structure is being built of concrete in which broken stone or screened gravel is to be employed in the main body of the structure but which is to have a smooth facing such as is formed by a more liquid mixture composed of sand mixed with the cement without stone. In such work it has heretofore been customary to deposit the concrete mixture containing stone within the form and afterward to insert a common shovel or spade between the face of the form and the mixture thus deposited and to press it back from the form, at the same time supplying a liquid grouting which being more liquid runs into the space thus made and solidifies in contact with the face of the form, thus leaving a smooth, finished surface for the work without stones projecting to the surface. The manipulation of a spade in this manner is rather laborious, as a considerable mass of stone has to be displaced at each position and the results are uneven and the process slow.

The object of the invention herein described is to produce apparatus in which this work may be done more easily, with less expenditure of strength, more rapidly, more accurately and completely; and at a reduced labor cost.

The apparatus comprises a blade having a peculiar surface which forces the stones back from the form by an economical application of power; which does not require repeated extraction from the work and reinsertion; which automatically propels itself along the abutment while in operation; which is adjustable for use on courses of different thicknesses and which has the other advantages incidental to the structure hereinafter described.

One embodiment of the invention by which these objects may be accomplished is shown in the accompanying drawings, in which,

Figure 1 is an end elevation representing the apparatus in place on a bed of concrete which is to form an abutment; Fig. 2 is a plan of the same; Fig. 3 is a side elevation of a detail; Fig. 4 is a side elevation of another detail, showing the shape of the face of the blade; Fig. 5 is a plan in section on the line 5—5 of Fig. 4; Fig. 6 is a side elevation of an alternative form of blade; Fig. 7 is an edge elevation of the same; in section on line 7—7 of Fig. 6; Fig. 8 is a view of the same in section on line 8—8 of Fig. 6 looking upward; and Figs. 9 and 10 are views similar to 6 and 7 of another alternative form of blade.

Referring to the drawings:—A mass of concrete is represented in process of construction, having a portion 20 which forms the main body of the mass in which broken stone is used, a portion 21 which forms the face or grouting between the mass and the form 22, this form consisting of a series of sheathing plank laid one above the other and supported by uprights 23. After a course or layer of concrete has been applied to the top of the mass and has been leveled roughly, a plank 25 is laid thereon, the plank having plates or prongs 26 projecting downward into the mass and thus holding the plank firmly as a base while the apparatus hereafter described is in operation. The plank is laid parallel to the face-form and has on its upper surface rails 27 and a rack 28. On the rails is a carriage 29, which in the embodiment of the invention here represented slides upon the rails, although it might be placed upon rollers, or some other form of engagement might be provided in which the carriage is guided along parallel to the face-form. The carriage has lugs 30 which engage under the top flange of the rails, thus preventing the carriage from being lifted out of place when the apparatus is working. On this carriage is a rock-shaft 31 provided with a lever 32 having a handle 33 for rocking the shaft, the handle being located in any convenient position for access and use by the workman; and the rock-shaft also carries a blade 34 projecting downward close to the place where the grouting is to be performed against the face-form.

The blade has a shank 35 adjustable in a socket on the rock-shaft so that the blade projects downward to any desired depth.



The outer side of the blade is flat and is adapted to bear smoothly against the face-form. The face of the blade is provided with cam-shaped projections 36, which may be of various forms. One form is shown in Figs. 1, 4 and 5, which show respectively, the end, edge and side shapes of these projections. As there represented the projections are arranged in curved lines which are approximately arcs curving around the rock-shaft as a center. For ordinary work of the sort described they may be about one-half inch apart, as this will operate upon all the stones larger than one-half inch in size, while stones smaller than that will do no harm even if they escape the full operation of the device. The projections shown in Figs. 1, 4 and 5 may conveniently be made in strip form, of the shape shown, and fastened upon the blade by rivets. In Figs. 6, 7 and 8 another form is shown in which the projections are formed by punching through the blade and bending a triangular-shaped piece out of the stock of the blade so that it projects from the face thereof. In Figs. 9 and 10 the projections are formed by indenting the rear of the blade, thus raising the face in conical forms. The edges of the blade are preferably irregular or serrated with teeth having curved edges as shown, and it is desirable to have the blade beveled on its working face. As shown in Figs. 4 and 6 the blade has a leading point on each side, from which its edges recede to the central axis with a wavy line 40. These and the beveling facilitate the movement of the blade; and the bevel in particular tends to throw the material toward the mass rather than toward the face-form and thus holds the blade close against the face-form.

When the shaft 31 is rocked by the workman with the aid of lever 32 the blade 36 is rocked correspondingly, swinging from side to side about shaft 31 as an axis, the plate lying close against the face-form. When the blade moves thus, its cam-shaped projections encounter such of the broken stone as are lying close to the face-form and force them away therefrom, back into the main body of the mass. At the same time the workman supplies a liquid grouting which runs in after the blade and fills the space which the stones previously occupied, thus placing a face of grouting on the mass.

The invention comprises means whereby the blade may travel along the face of the abutment, this consisting of the ways or rails 27 which are laid parallel thereto; and it also comprises means whereby the apparatus travels thus automatically. The means shown comprise mechanism operated from the lever or rock-shaft and bearing on the plank. The specific arrangement shown for accomplishing this is a rack 28 and a double pawl connection between it

and the lever 32. A pawl 37 is attached to this lever on one side of the rock-shaft 31 and another pawl 38 is attached to the lever on the other side of the rock-shaft; and both are adapted to engage the rack. Consequently, when the lever represented in Fig. 3 is swung in either direction, one of the pawls pushes the apparatus forward and the other is getting into position to engage another notch in the rack; and at the same time the blade is performing its function. By successive oscillations of the lever 32 the apparatus will move from one end of the plank to the other. The plank may be of any convenient length. The blade may be adjustable to the desired depth; and when set up for action, the apparatus will travel with considerable speed from one end to the other operated by only one man and will produce a smooth and uniformly finished face of grouting from which the larger stones have been eliminated. The plank base may then be lifted and moved to the next adjoining position for performing the same operation.

It will be observed that the invention comprises several features which are capable of being used separately from the other features herein described, or in combination with other features not here described. The kind of blade here shown forms the subject of my application for United States Patent No. 419,887, except as to certain details of the operating face of the blade. A different blade or a different mode of displacing the large stones from the face-form might be employed while using the feature of my invention which provides means for causing the apparatus to travel along the work; so also the traveling apparatus may be omitted or a different form substituted while using the swinging blade here described; and the motive power may be changed and other variations made, without departing from the scope of the patent.

I claim:—

1. Apparatus for use in molding concrete, comprising an implement adapted to move in a vertical plane and operate upon a vertical face of the concrete so as to modify the structure thereof, mechanism for operating said implement, a movable base therefor, and ways thereon, said mechanism being movable on the ways.

2. Apparatus for use in molding concrete, comprising mechanism adapted to modify the structure of concrete where it abuts the mold face, a movable base therefor, means to anchor the base on the concrete mass, and ways on the base, said mechanism being movable on the ways.

3. Apparatus for use in molding concrete, comprising mechanism adapted to modify the structure of concrete at the side thereof where it abuts the mold face, a movable



base therefor, projections downward from the base adapted to enter the concrete mass, and ways on the base, said mechanism being movable on the ways.

5 4. Apparatus for use in molding concrete, comprising a device adapted to modify the structure of concrete, a support therefor adapted to rest on a concrete mass, and means to move said device over the surface  
10 of the mass, said device operating upon a side wall of the mass.

5. Apparatus for use in molding concrete, comprising mechanism adapted to modify the structure of concrete between a concrete  
15 mass and the face of a mold, a support therefor adapted to rest on the concrete mass, and means to move and guide the mechanism upon said support.

6. Apparatus for use in molding concrete,  
20 comprising mechanism adapted to modify the structure of concrete at the side of a mass thereof, a base and ways therefor, and a rack and double pawl engagement between the base and said mechanism, thereby pro-  
25 pelling said mechanism on the base.

7. Apparatus for use in molding concrete comprising a blade adapted for insertion be-  
30 tween a mass of concrete and the face of its mold, a support therefor, mechanism adapted to actuate the blade, and mechanism co-acting therewith adapted to propel said support over the concrete mass.

8. Apparatus for use in molding concrete comprising a blade adapted for insertion be-  
35 tween a mass of concrete and the face of the mold, a pivotal mounting therefor and means to swing the blade upon the pivot parallel to the face of the mold.

9. Apparatus for use in molding concrete,  
40 comprising a blade adapted for insertion between a mass of concrete and the face of its mold, a rock shaft supporting the blade and a lever actuating the rock shaft.

10. Apparatus for use in molding con-  
45 crete, including a pivotally mounted blade adapted for insertion between a mass of concrete and the face of its mold and adapted to swing parallel to said face, said blade having a cam face toward the mass, with the  
50 cam surface arranged in a curve approximately constituting an arc about the pivot.

11. Apparatus for use in molding con-

crete, including a pivotally mounted stone-  
displacing blade adapted for insertion be-  
tween the mass of concrete and the face of 55  
the mold, and adapted to swing parallel to  
said face, said blade being shaped broad  
about midway of its height, forming leading  
points in its swing, with edges retreating  
therefrom toward its center upward and 60  
downward.

12. Apparatus for use in molding con-  
crete, including a pivotally mounted stone-  
displacing blade adapted for insertion be-  
tween a mass of concrete and the face of its 65  
mold, and an adjustable fastening for the  
blade whereby its length of projection from  
the pivot may be varied.

13. Apparatus for use in molding con-  
crete, including a blade adapted for inser- 70  
tion between a mass of concrete and the face  
of its mold, said blade having a plurality  
of ridges having cam surfaces.

14. Apparatus for use in molding con-  
crete including a blade adapted for inser- 75  
tion between a mass of concrete and the face  
of its mold, said blade having a plurality  
of ridges having cam surfaces, and arranged  
with the slopes of the cam portions in the  
line of motion of the blade when in opera- 80  
tion.

15. Apparatus for use in molding con-  
crete, comprising a movable base, a carriage  
movable thereon, a rock shaft on the car-  
riage and a blade thereon adapted for inser- 85  
tion between a mass of concrete and the  
face of its mold; an operating lever on the  
shaft, a rack on said base, and double pawl  
mechanism engaged between the lever and  
rack, whereby the carriage is propelled. 90

16. An implement for working concrete  
comprising a blade one side of which is  
adapted to slide upon the face of a mold,  
and the other side of which is provided with  
a plurality of parallel, undulatory ribs, 95  
adapted to force the coarser material away  
from the mold face.

In testimony whereof I hereto affix my  
signature, in presence of two witnesses.

JOSEPH F. ROSS.

Witnesses:

JOSEPH T. BRENNAN,  
OLIVER MITCHELL.