No. 801,828. PATENTED OCT. 10, 1905.

E. FRIEH & R. NOLLENBURG.

SHAFT SINKING APPARATUS.

APPLICATION FILED OCT. 14, 1903.

2 SHEETS—SHEET 1.

Fig 1.

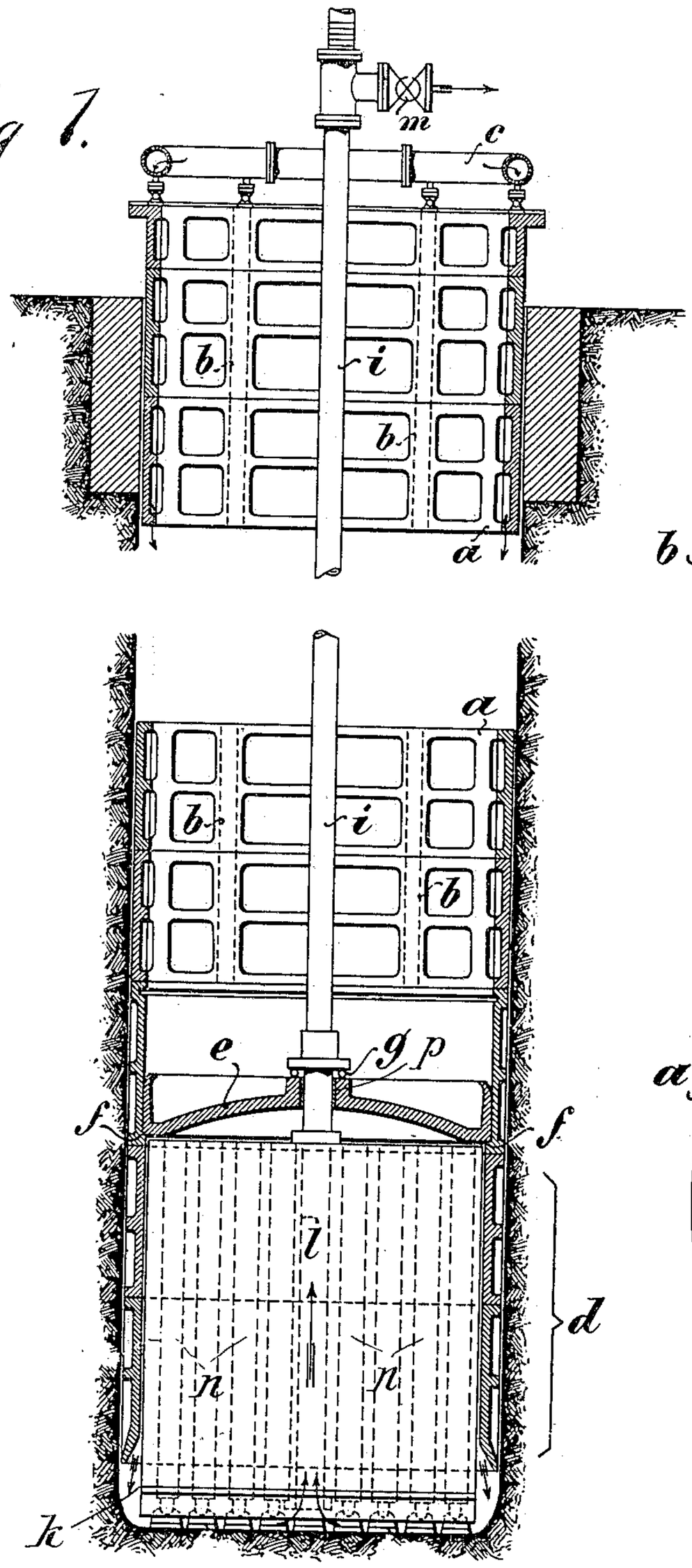


Fig 2.

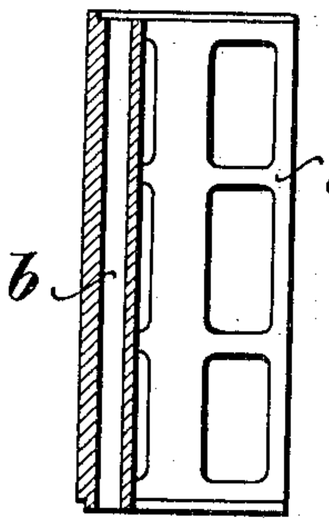
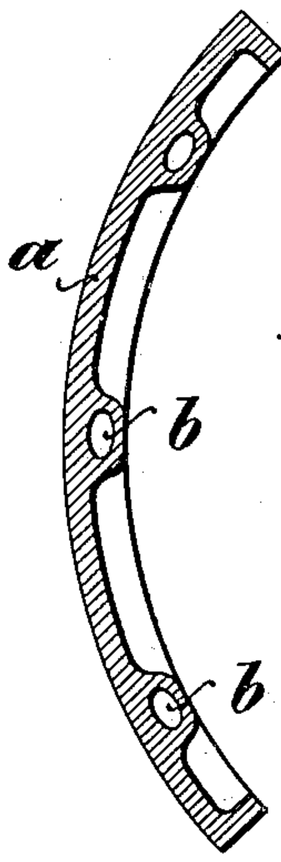


Fig 3.



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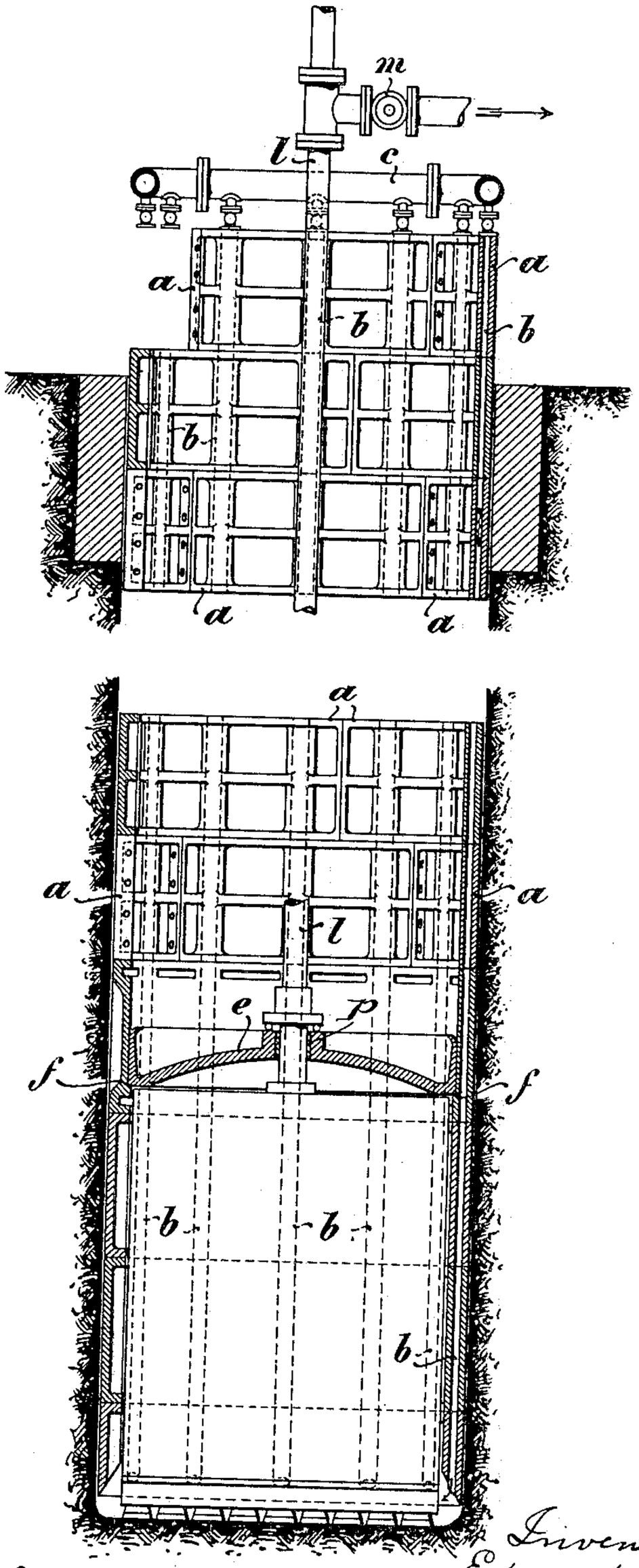
2 SHEETS—SHEET 2.

Fig. 4.



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UNITED STATES PATENT OFFICE.

EDUARD FRIEH AND RUDOLF NÖLLENBURG, OF NORDHAUSEN, GERMANY, ASSIGNORS TO DEUTSCHE TIEFBOHR-AKTIEN-GESELLSCHAFT, OF NORDHAUSEN, GERMANY, A CORPORATION OF PRUSSIA.

SHAFT-SINKING APPARATUS.

No. 801,828. Specification of Letters Patent. Patented Oct. 10, 1905.

Application filed October 14, 1903. Serial No. 177,040.

To all whom it may concern:

Be it known that we, EDUARD FRIEH, whose post-office address is No. 18 Erfurterstrasse, and RUDOLF NÖLLENBURG, whose post-office address is No. 13 Rothenburgerstrasse, Nordhausen, Kingdom of Prussia, German Empire, subjects of the King of Prussia, German Emperor, have invented a new and useful Shaft-Sinking Apparatus, of which the following is a specification.

The present invention relates to that class of apparatus for sinking shafts in which flushing-water and boring devices are employed for sinking the shaft through a water-bearing stratum or through quicksand. In the present systems of this kind of apparatus the flushing, both for loosening the ground and for bringing out the sludge, must be interrupted when the bore-rod is to be disjointed and jointed, and this prevents the sinking of the tubbing and renders it frequently necessary to prematurely reduce the diameter of the shaft.

By the improvements of the present invention a continuous flushing of the bottom of the shaft is rendered possible by the flushing-current being divided and led through a plurality of channels connected with the tubbing in such a manner that always several of such channels remain connected with the pump during the time new segments of the tubbing are inserted to build up another ring.

Another advantage connected with the present invention consists in the weight of the tubbing being considerably increased by the boring apparatus suspended from a cover at the lower part of the same and by the boring-rod, whereby the pressing down of the tubbing from above the ground, which in some difficult cases is necessary, is facilitated.

The invention is represented on the annexed drawings, in which—

Figure 1 represents a longitudinal section through a shaft, showing the tubbing provided with our improvement and a diagram of the boring apparatus; Figs. 2 and 3, a longitudinal and cross-section, respectively, of a segment of the tubbing, showing channels through which the water for flushing the bottom of the shaft is passed. Fig. 4 is a longitudinal section showing the slots in the bottom of the shoe communicating with the flushing-pipes.

The tubbing is built up of ring segments *a*, in which are cast or along which are led the separate channels or pipes *b* for the flushing-water. These channels or pipes are above the ground connected by a pipe *c* with the force-pump. (Not shown.) The lower ends of the channels or pipes *b* are open, so that the flushing-water is spread over the bottom of the shaft in order that the tubbing can easily be made to descend even if on building up new sections some of the channels or pipes are cut out.

The lower portion of the tubbing is provided with a projecting ring *f*, on which rests loosely the lid or cover *e*, through which passes the boring-rod through a packing *p*. From this cover is suspended the boring apparatus *k*, which in itself forms no part of the present invention, which, however, may consist of a number of boring-tools *n*, that are driven in any convenient manner—as, for instance, by electricity. The flushing-water takes its way, as shown by the arrows, from the pump through the channels *b* and the shoe of the tubbing to the bottom of the shaft, where it flushes the bottom and forces the sludge through the pipe *l* and the hollow boring-rod out of the shaft.

The hollow rod is over the shaft provided with a valve *m*. Whenever the tubbing jams in the shaft, this valve may be closed, so that the flushing-water is forced around the outside of the tubbing for loosening the same.

What we claim as our invention is—

1. In a shaft-sinking apparatus, the combination with tubbing-segments, of channels or pipes in said segments, a shoe at the lower end of the tubbing provided with perforations or slots in communication with the said channels or pipes.

2. In a shaft-sinking apparatus, the combination of tubbing-segments, channels or pipes in said segments, a shoe at the lower end of the tubbing provided with perforations communicating with said channels, a projecting ring at the lower portion of the tubbing, a cover or lid bearing thereon, a hollow boring-rod extending to a point near the bottom of the shaft and a packing in said cover, through which the boring-rod passes.

3. In shaft-sinking apparatus, the combination with tubbing-segments, channels or pipes therein, a shoe at the lower end of said tubbing provided with perforations communicating with said channels, a projecting ring

at the lower end of the tubbing, a cover or lid bearing on said ring, a hollow boring-rod extending to a point near the bottom of the shaft, a packing in said cover and a valve in the boring-rod above the shaft.

4. In shaft-sinking apparatus, the combination of tubbing-segments, channels or pipes in said segments, a shoe at the lower end of the tubbing provided with perforations or slots, a projecting ring at the lower portion of the tubbing, a cover or lid bearing thereon, a hollow boring-rod and boring-tools suspended from said cover.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

EDUARD FRIEH.
RUDOLF NOLLENBURG.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.