

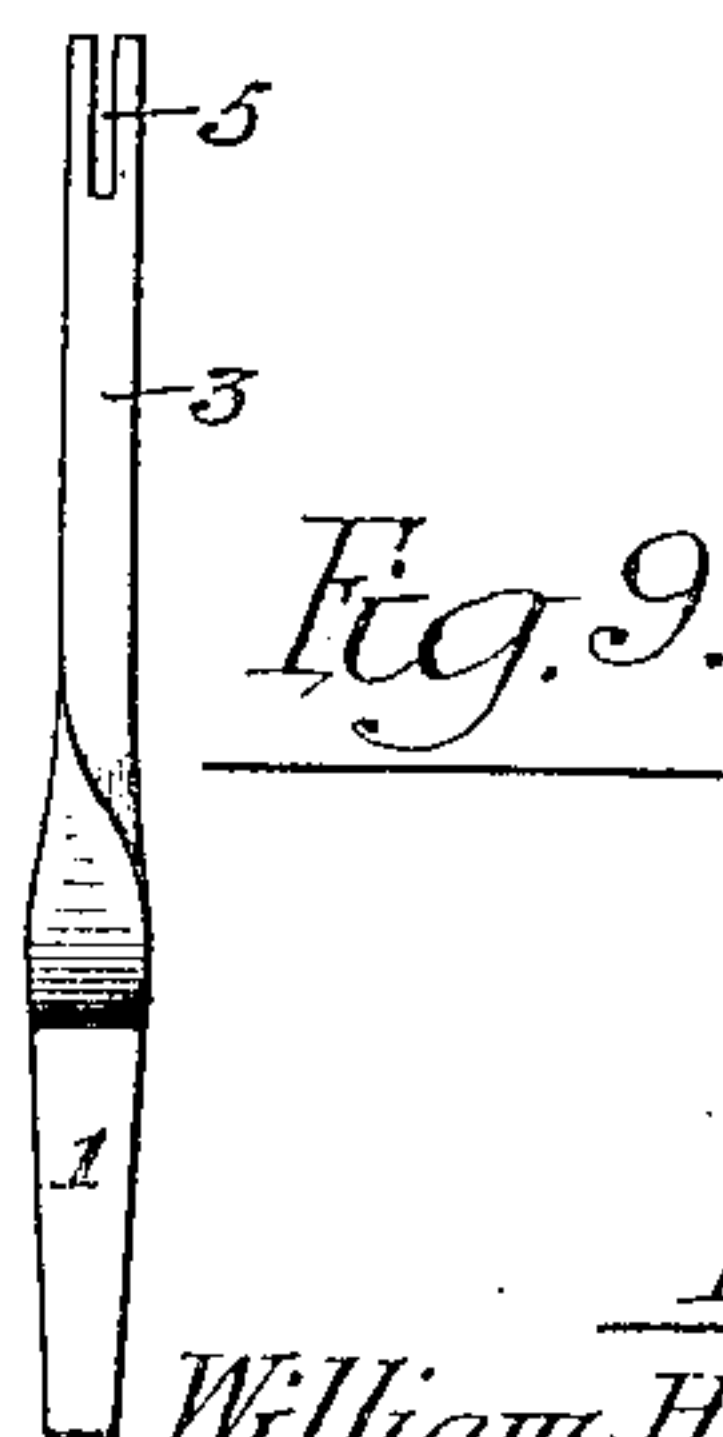
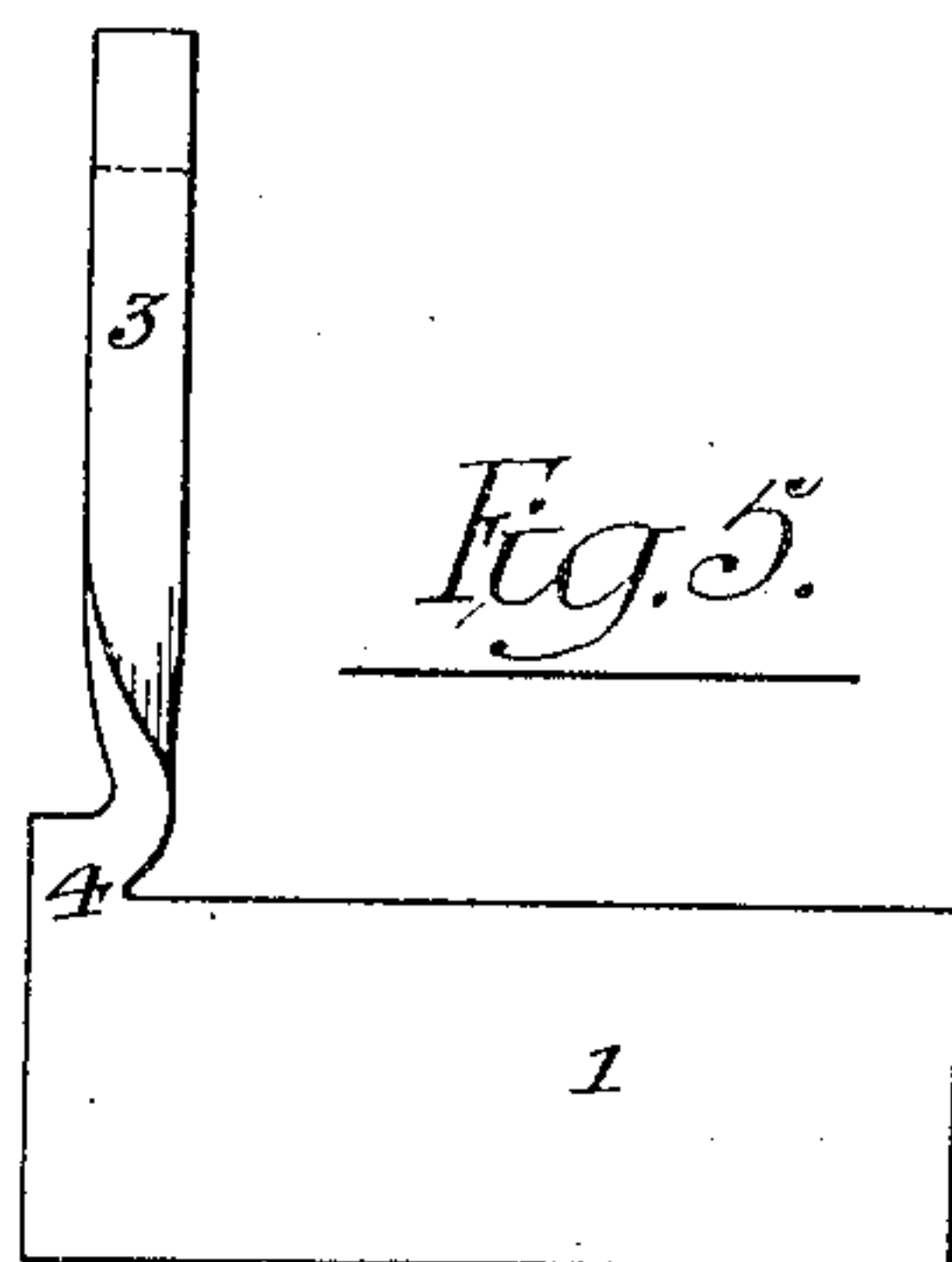
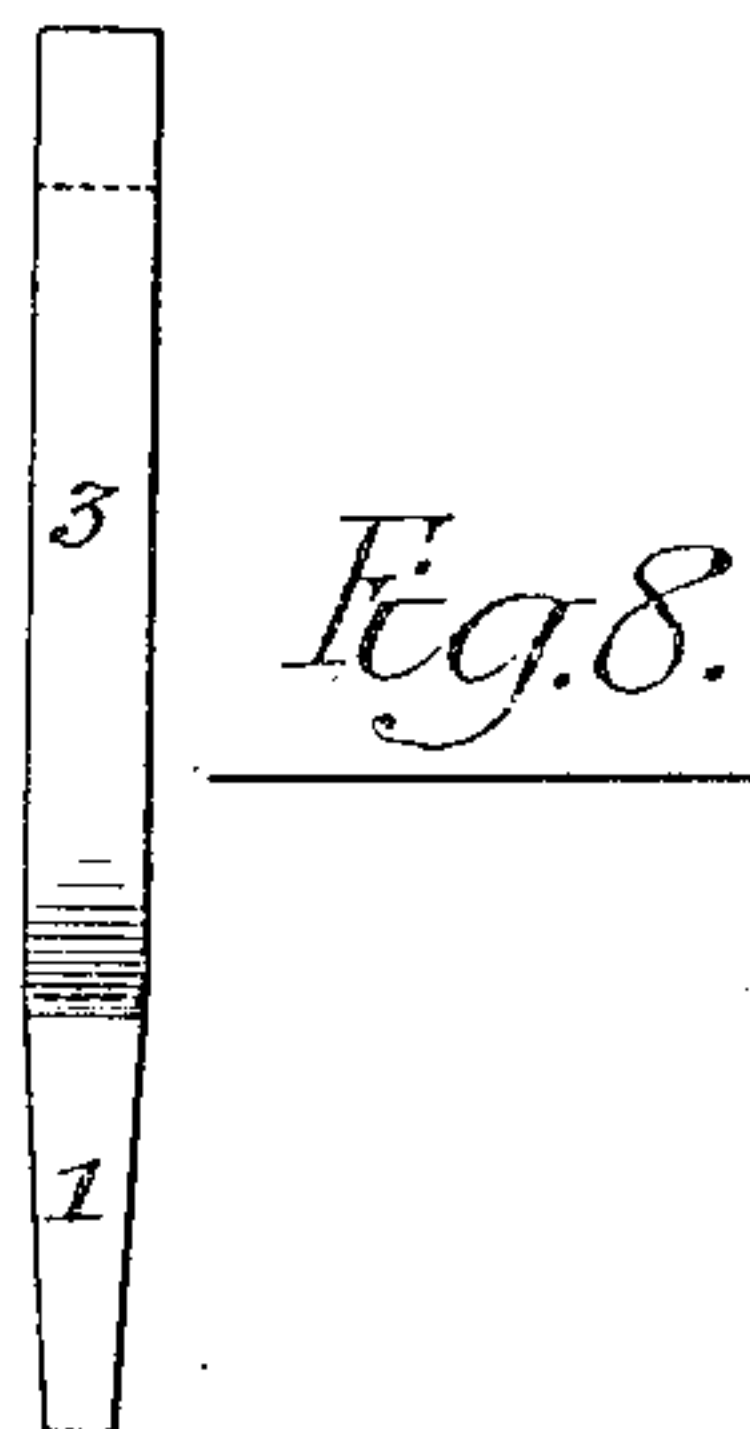
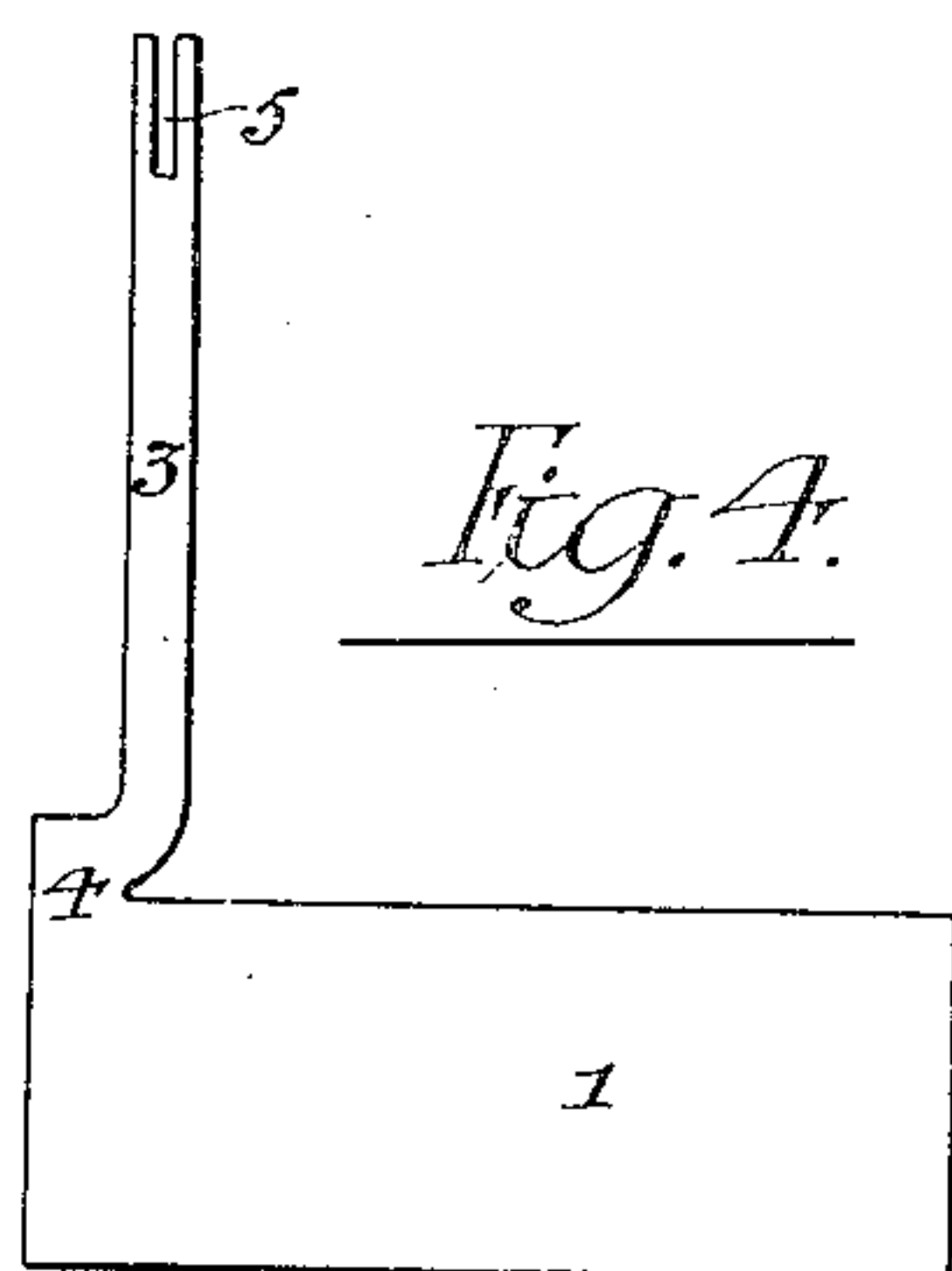
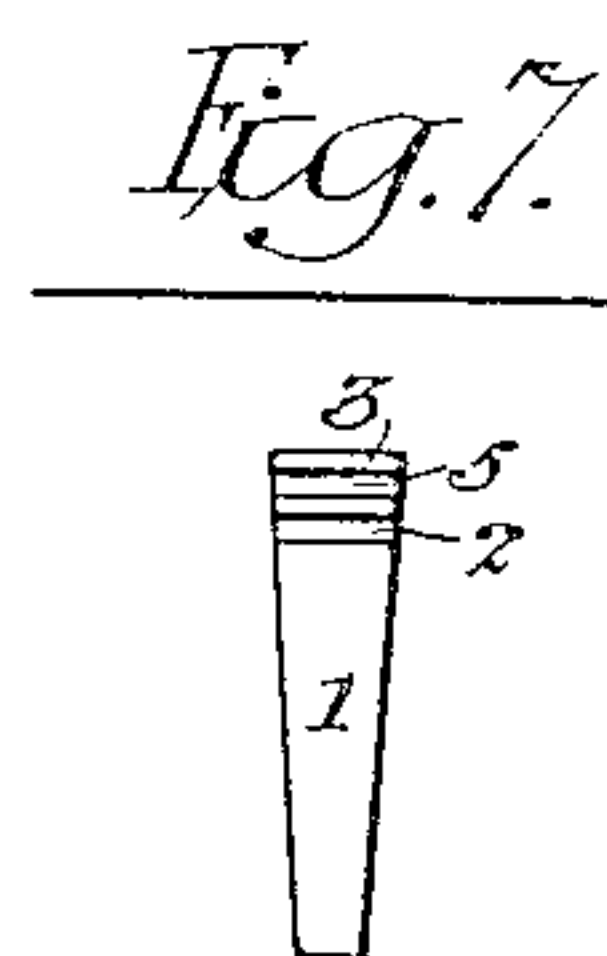
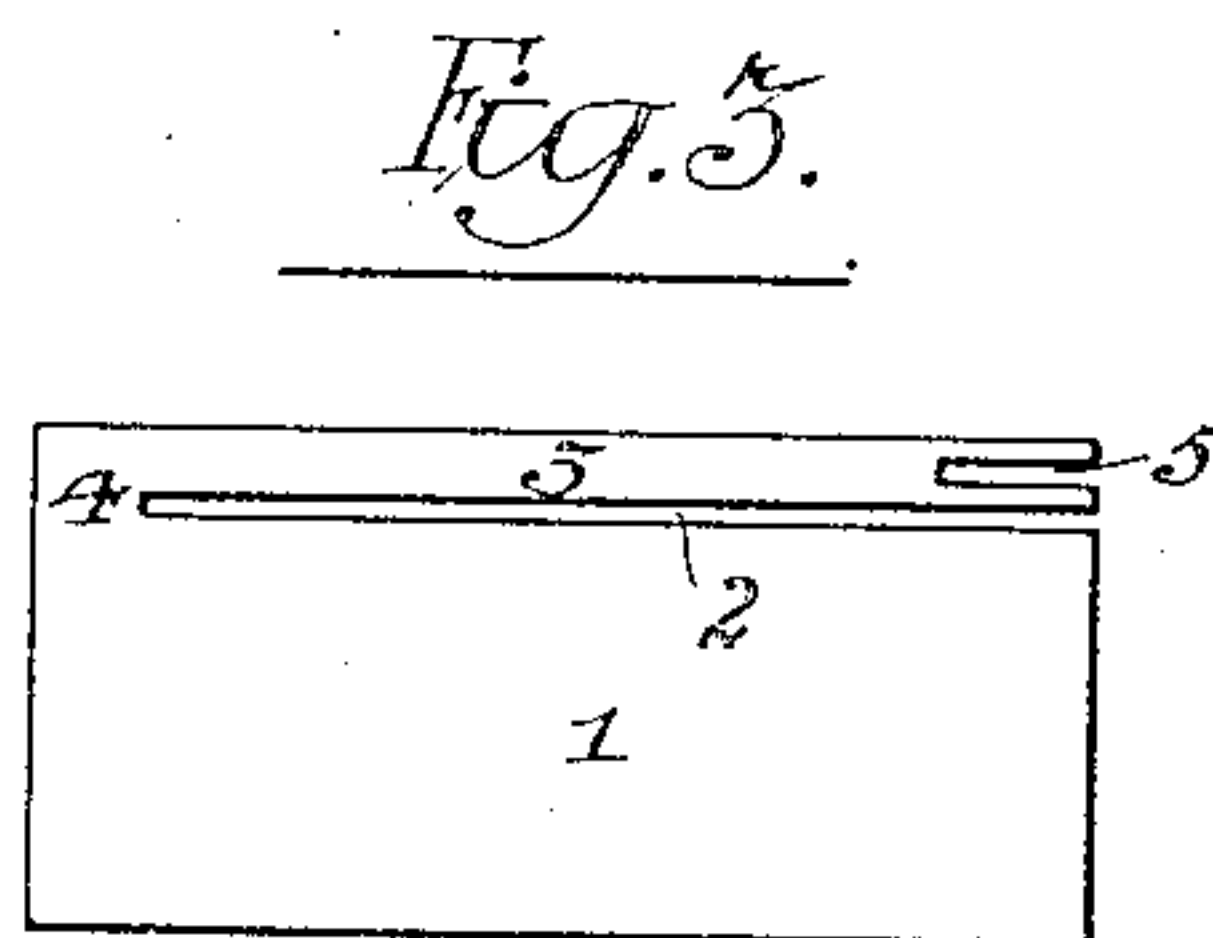
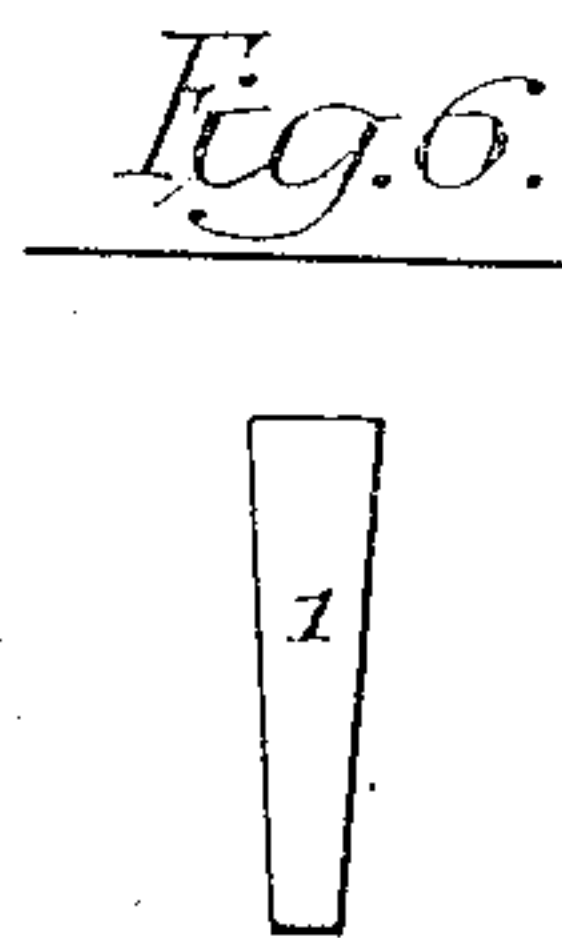
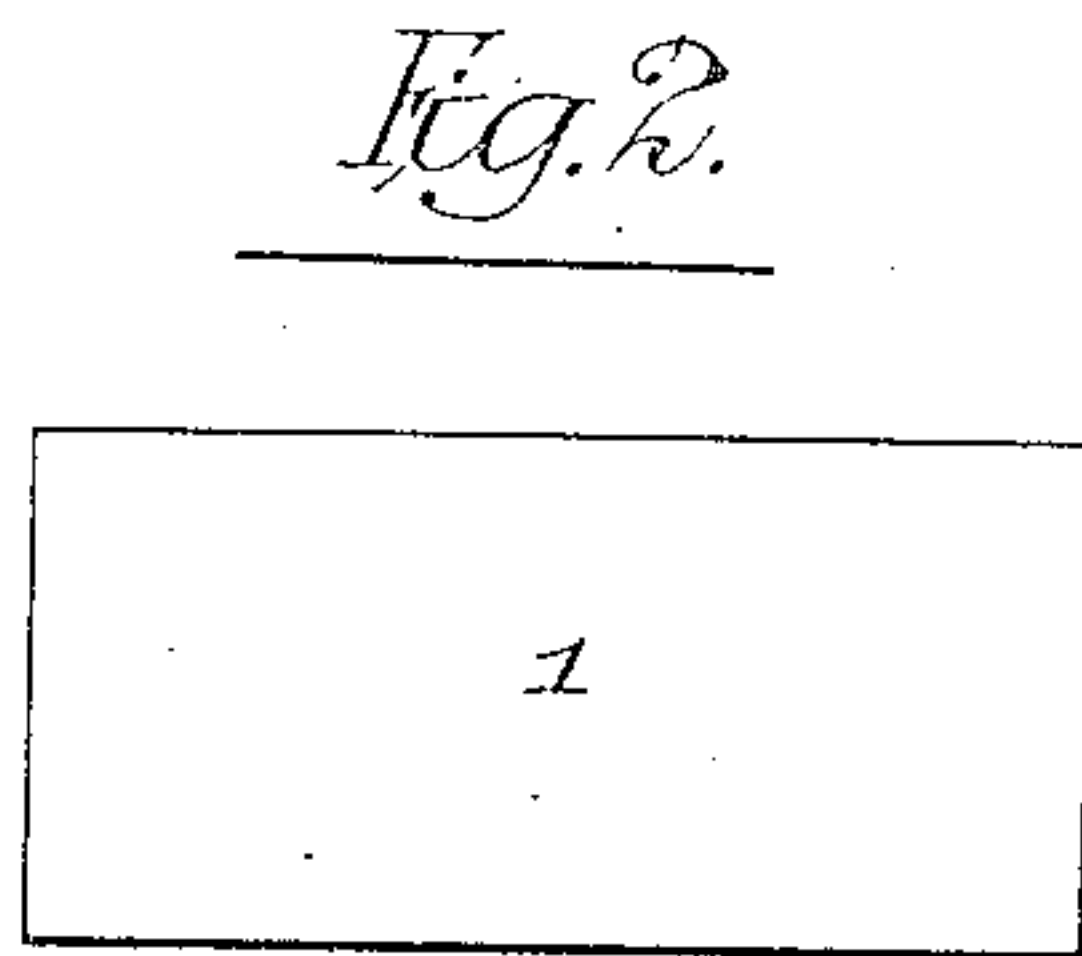
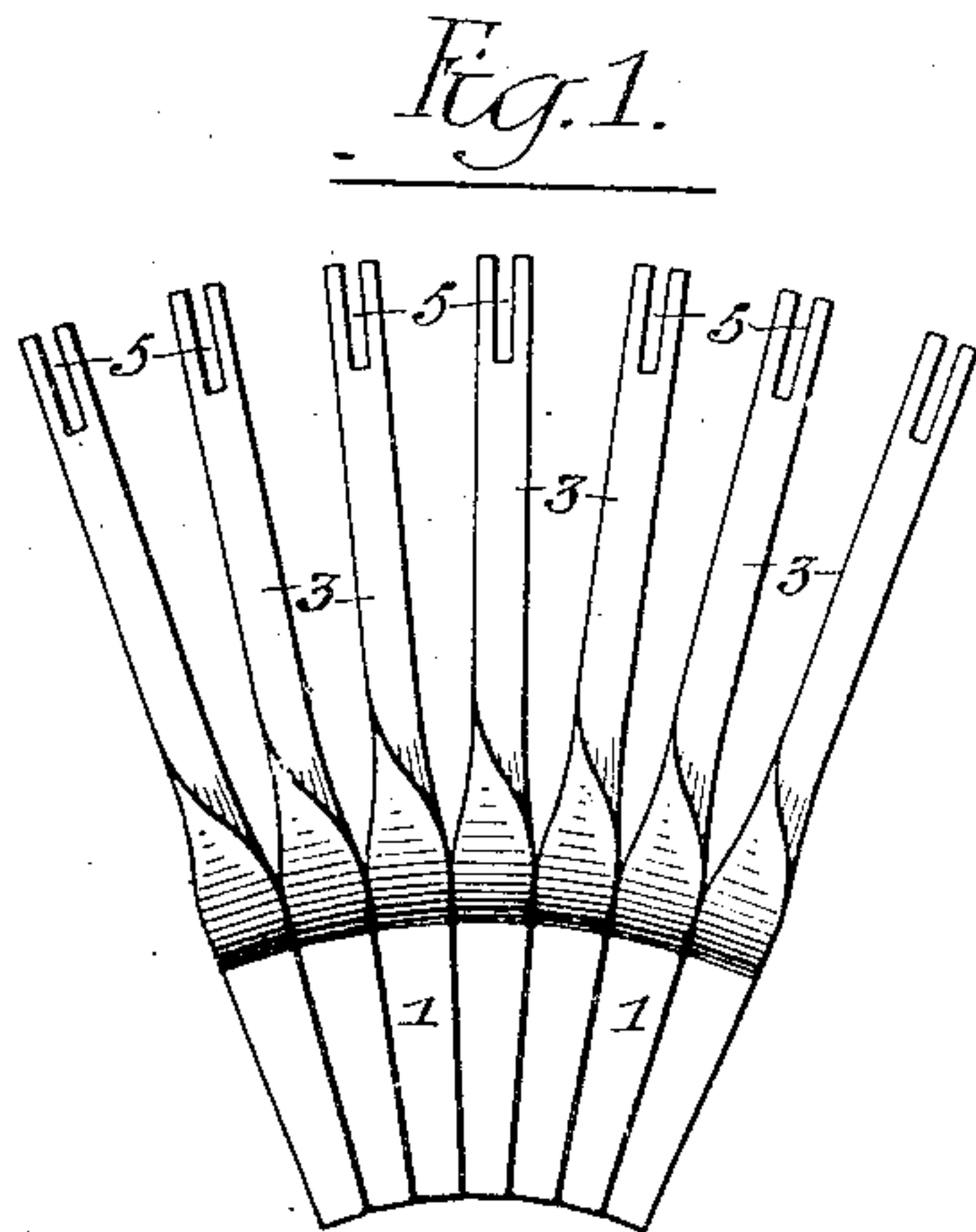
No. 702,272.

Patented June 10, 1902.

W. H. WINDLE.  
COMMUTATOR SEGMENT.

(Application filed Apr. 21, 1902.)

(No Model.)



Witnesses:-

Frank A. Graham  
Herman E. Metcalf

Inventor:-

William H. Windle,  
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# UNITED STATES PATENT OFFICE.

WILLIAM H. WINDLE, OF PHILADELPHIA, PENNSYLVANIA.

## COMMUTATOR-SEGMENT.

SPECIFICATION forming part of Letters Patent No. 702,272, dated June 10, 1902.

Application filed April 21, 1902. Serial No. 104,008. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. WINDLE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain  
5 Improvements in Commutator-Segments, of which the following is a specification.

The object of my invention is to so construct a commutator-segment for dynamo-electric machines or electric motors as to materially lessen the cost of the same, while at  
10 the same time providing more effective means than usual for connecting thereto the terminals of the armature-coils, so as to insure free ventilation of said connections and prevent  
15 overheating of the same. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a view of a series of commutator-segments constructed in accordance with my invention and disposed in the relation to each other which they assume in the completed commutator. Figs. 2, 3, 4, and 5 are  
20 side elevations illustrating the successive steps in the formation of a commutator-segment in accordance with my invention; and Figs. 6, 7, 8, and 9 are respectively end views of Figs. 2, 3, 4, and 5.

In the ordinary method of manufacturing  
30 commutators a series of segments composed of hard-drawn copper bars of the proper wedge-shaped cross-section are built up into drum form with suitable insulation interposed between adjoining segments, and this drum is  
35 then turned down throughout the greater portion of its length and to a depth sufficient to form at one end of the drum an annular flange consisting of a projecting lug at one end of each  
40 of the commutator-segments, these lugs being then notched for the attachment of the terminals of the armature-coils or for the attachment of radially-projecting sheet-metal strips, which are soldered in the slots and have  
45 other strips riveted or secured to them at their outer ends, so as to form slots for the reception of the armature-terminals, this latter construction being for the purpose of separating  
50 said terminals, so as to insure free ventilation of the same and prevent overheating. This is an expensive method of manufacture not only because of the waste of metal involved in turning down the drum, but also

because of the cost of the additional strips used for carrying the armature-coil connections and the labor involved in turning down  
55 the drum and fitting and securing these strips.

My invention has been designed with the view of reducing the cost of material to a minimum, preventing waste, and at the same time  
60 saving labor in the manufacture of the commutator.

My invention comprises a commutator-segment consisting of a bar of the proper wedge-shaped cross-sectional form and having an  
65 armature-terminal connection bent up from said bar and by preference notched or slotted at the outer end for the attachment of the armature-terminal and twisted, so as to present this notch in the best position for the reception  
70 of said terminal.

In carrying out my invention I first take a hard-drawn copper bar 1 of the proper wedge-shaped cross-sectional form, as shown in Figs. 2 and 6, and I form in the same near the top  
75 a longitudinal slot or saw-kerf 2, extending throughout almost the entire length of the bar, as shown in Fig. 3, so as to form a finger 3, connected to the body of the bar at one end by a neck 4, the free end of this finger  
80 being also slotted or kerfed, as shown at 5 in Fig. 3. I then bend the finger 3 until it assumes a position at right angles to the body of the bar, as shown in Figs. 4 and 8, and finally twist the finger, as shown in Figs. 5  
85 and 9, so as to cause the slot 5 at the outer end of the finger to extend parallel with the bar 1, thereby bringing the same into line with the terminal wires running to the armature-coils and providing a length of slot for the  
90 reception of each wire which is equal to the width of the thick end of the bar 1, the latter being greater than the thickness of the finger 3, and hence giving a more extended surface for connection with the terminal than if a slot  
95 parallel with the bar 1 had been formed in the finger 3 after the same had been bent up but not twisted.

The process of manufacture described not only reduces waste of material to a minimum,  
100 but simplifies and cheapens the process of manufacture and correspondingly reduces the labor cost, while at the same time the finger 3, being an integral part of the segment-bar



1, insures the best possible electrical connection between the two.

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

5 1. A commutator-segment consisting of a metallic bar having a projecting finger bent up therefrom at one end, substantially as specified.

10 2. A commutator-segment consisting of a metallic bar having a projecting finger bent up therefrom at one end, said finger being notched at the outer end for the reception of the armature-terminal, substantially as specified.

15

3. A commutator-segment consisting of a metallic bar having a projecting finger bent up therefrom at one end, said finger being twisted to the extent of a partial turn and having at its outer end a slot for the reception of the armature-terminal, substantially as specified. 20

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM H. WINDLE.

Witnesses:

F. E. BECHTOLD,  
JOS. H. KLEIN.