

No. 648,118.

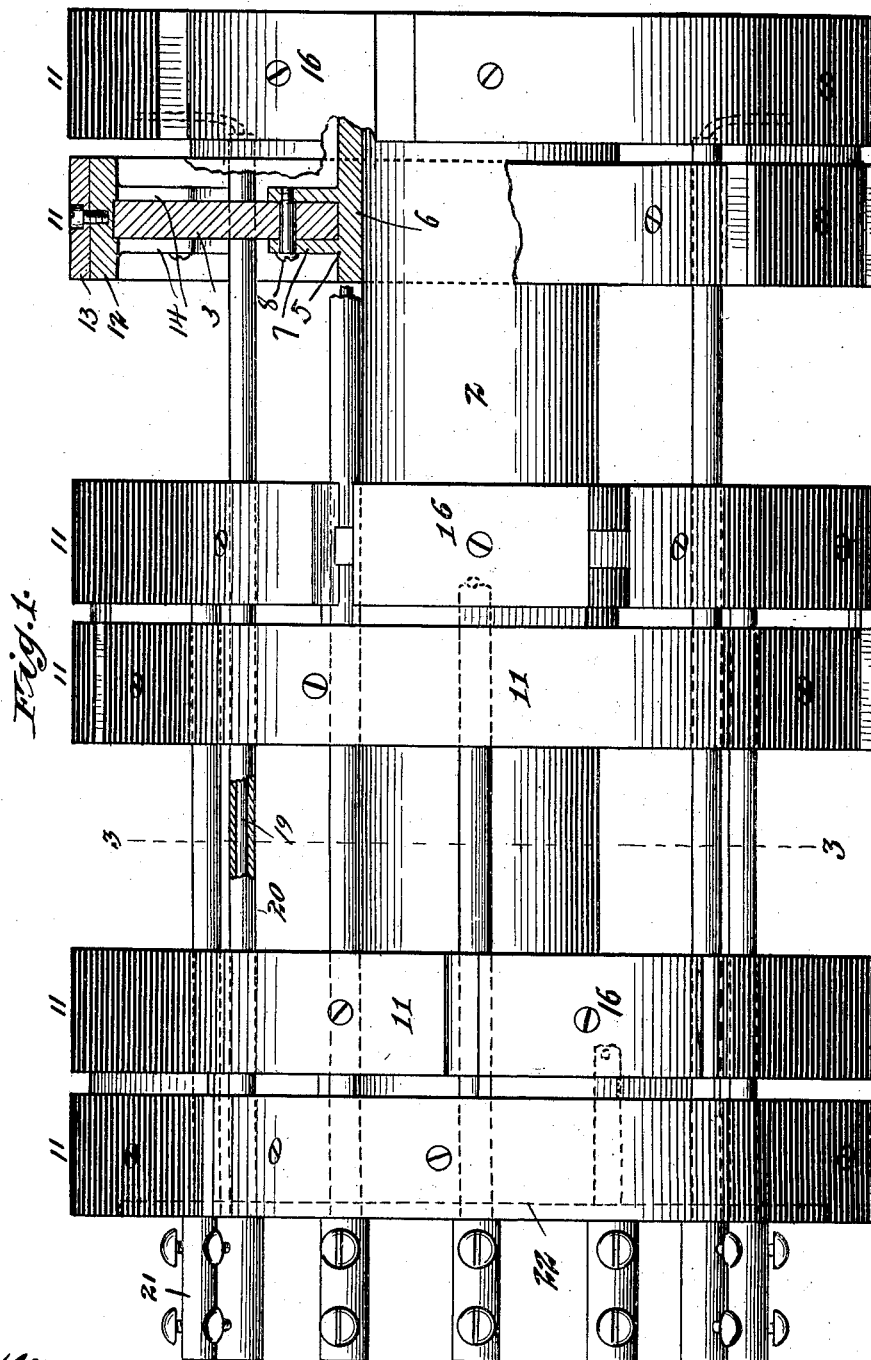
Patented Apr. 24, 1900.

H. F. STUBENRAUCH.
COMMUTATOR.

(Application filed Feb. 6, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses,
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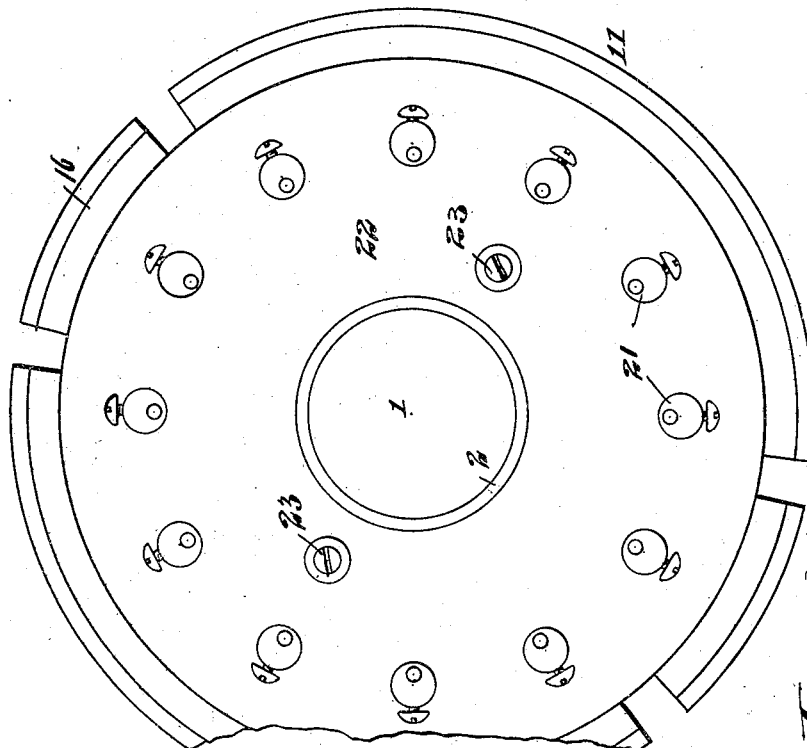
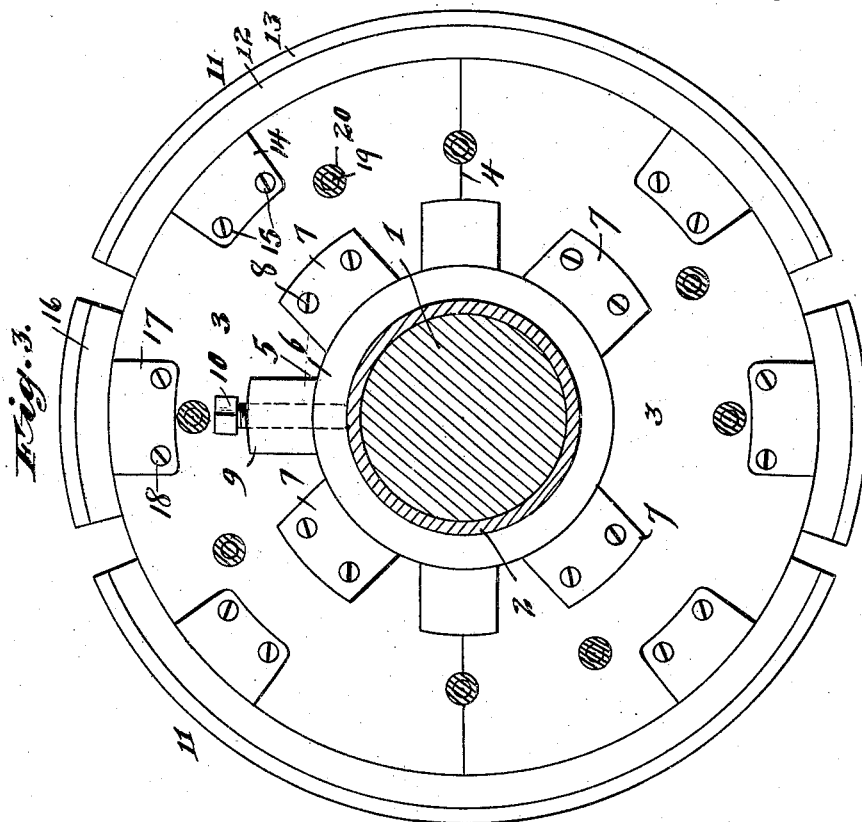
H. F. STUBENRAUCH.

COMMUTATOR.

(Application filed Feb. 6, 1900.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses,
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UNITED STATES PATENT OFFICE.

HERMAN F. STUBENRAUCH, OF CHICAGO, ILLINOIS.

COMMUTATOR.

SPECIFICATION forming part of Letters Patent No. 648,118, dated April 24, 1900.

Application filed February 6, 1900. Serial No. 4,184. (No model.)

To all whom it may concern:

Be it known that I, HERMAN F. STUBEN-
RAUCH, of Chicago, Illinois, have invented
certain new and useful Improvements in Com-
mutators, of which the following is a specifi-
cation.

This invention relates to commutators, and
has for its object to provide a strong and dura-
ble construction and to afford facility for the
ready renewal of the individual parts of the
commutator when such parts become worn or
useless without sacrificing any of the remain-
ing or similar parts of the structure.

To these ends my invention consists in cer-
tain novel features, which I will now proceed
to describe and will then particularly point
out in the claims.

In the accompanying drawings, Figure 1 is
an elevation, partly in section, of a commu-
tator embodying my invention. Fig. 2 is an
end elevation viewed from the inner or left-
hand end of Fig. 1, and Fig. 3 is a transverse
sectional view taken on the line 3 3 of Fig. 1.

In the said drawings I have shown my in-
vention as embodied in a commutator of what
is known as the "Brush" type, such as is set
forth, for instance, in Letters Patent, No.
189,997, of April 24, 1877, and No. 203,412, of
May 7, 1878, both granted to Charles F. Brush.

In said drawings, 1 indicates the armature-
shaft, and 2 a sleeve secured thereon and
adapted to receive the several disk-like sec-
tions of which the commutator is composed.
In the drawings the commutator is shown as
composed of six of these disk-like sections
arranged in pairs, and as said sections are
similar in their general construction I will de-
scribe in detail the construction of one of
them, it being of course understood that the
same description is equally applicable to all
of them. The body portion of each section
consists of a disk of slate 3, divided diamet-
rically into two semicircular halves and cen-
trally pierced by an aperture of somewhat
greater diameter than the external diameter
of the sleeve 2. The division-line is indicated
at 4 in Fig. 3 of the drawings. These half-
disks of slate are united by means of a spider
5, consisting of an annular body portion 6,
from which extend radially outward a plu-
rality of pairs of arms 7, having between

them a space within which the inner margin
of the half-disks fit closely. The half-disks
are held in position between the arms of the
spider by means of screws 8, which screws
pass loosely through one of each pair of arms
and also loosely through the body of the slate,
being threaded into suitable apertures in the
other one of each pair of arms. As shown in
Fig. 3 of the drawings, each pair of arms is
not necessarily provided with the fastening-
screws, and in the particular construction
illustrated those arms which overlie the line
of junction of the two halves of the disk are
without screws and serve merely as alining
devices to hold the two halves of the disk in
proper relative position. The annular body
6 of the spider is also provided with a boss
or projection 9 to receive a set-screw 10, by
means of which the spider and disk may be
secured upon the sleeve 2.

The commutator segments or plates are se-
cured to the margin of the disk 3 and are in-
dicated as a whole by the reference-numeral
11. As shown, they are constructed in the
usual manner of a permanent base 12 and re-
movable segments proper, 13, so as to permit
the renewal of the wearing-surface. Each
segment is provided with pairs of arms 14,
which extend inward radially and receive be-
tween them the outer margin of the slate disk
3, which fits snugly between said arms. Screws 15, passing through the pairs of arms
and through the body of the disk, serve to
connect the segments to the disk in a firm
and rigid manner. It will be observed that
the dividing-line of the two halves of the
slate disk is spanned by a segment in each
instance in such manner that each segment
has connecting devices between it and the
disk, located on each side of said dividing-
line, so that the segments themselves serve
as means for holding the two halves of the
disk together.

Each disk-like section of the commutator
may be provided with a separate spider; but
I prefer to form the spiders of each pair of
sections in a single piece by making their an-
nular body portions 6 continuous, as indi-
cated in Fig. 1 of the drawings, thereby as-
suring proper relative location of the sections
composing each pair. In the construction

shown the insulating-segments of the commutator, which are indicated at 16, are made in one piece with the adjacent segment 11 of the adjacent disk-like section, and in this case said insulating-section will be provided with radial inwardly-extending arms 17, corresponding to the arms 14 of the segments 11, embracing and fitting the margin of the disk 3 and connected with said disk by fasteningscrews 18. This construction not only more firmly and accurately unites the two sections of each pair, but also serves to more firmly hold the two halves of the disk 3 in proper position relatively to each other.

The several slate disks which compose the bodies of the sections of the commutator are apertured for the passage of the wires 19, which connect the several sections with the armature-coils, and these wires are covered with an insulation, which preferably consists of a tubing 20, of hard rubber. Said wires are provided with the usual connecting-sleeves 21 at their exposed ends.

The inner end of the commutator is preferably closed by means of a disk 22, of slate, adapted to fit between the sleeve 2 and the inner edge of the commutator-segments, being secured in position by screws 23 and serving to present at this point a smooth and readily-cleanable surface, which cannot become charred or burned out by the action of the current. The connecting-sleeves 21 preferably rest against the outer face of this disk, so that the end of the commutator presents a flush clean hard surface of a non-combustible material, forming a seat for the sleeves 21.

It will be observed that the entire commutator is composed of non-combustible material, which will not char, burn, or deteriorate under the action of the current and which will not absorb the lubricants employed to reduce the friction between the brushes and the contact-segments. The material employed for the body of the commutator-sections—to wit, slate—serves to effectually insulate the several segments to prevent arcing and is at the same time of great durability and strength. By reason of the division of each disk into separable halves each section of the commutator may be readily disconnected from the whole thereof, and in case of injury any individual section or part of a section can be readily renewed without disturbing or discarding any of the remaining parts and without the necessity of sending the entire commutator to the maker or to a repair-shop. The mode of connecting the slate and metallic portions of each disk-like section is such as to give great strength, while at the same time facilitating detachability of the parts, and the divided slate disks not only support the segments, but these latter in turn also hold together the parts of the disks.

I prefer to employ slate as the material for

the body of each section; but it is obvious that the mechanical structural features hereinbefore set forth may be employed where divided disks of insulating material other than slate are employed. I also prefer to mount the entire commutator as a whole upon a sleeve, such as the sleeve 2, since by this means the several elements of the commutator are united into a unitary whole; but it is obvious that the several disk-like sections might be secured either singly or in pairs directly upon the shaft 1, the sleeve 2 being omitted.

Other modifications than those above indicated may be made without departing from the principle of my invention, and I therefore do not wish to be understood as limiting myself strictly to the precise details hereinbefore described, and shown in the accompanying drawings.

I claim—

1. A commutator composed of disk-like sections, each having a body portion of insulating material, divided to form separable parts, and segments secured to the periphery of said body portions, substantially as described.

2. A commutator composed of disk-like sections, each having a body portion of insulating material, divided to form separable parts, and segments secured to the periphery of said body portion and uniting the parts thereof, substantially as described.

3. A commutator composed of disk-like sections, each comprising a disk-shaped body portion of slate or the like, divided into separable parts, a central spider embracing the inner margin of said body portion and serving to unite the parts thereof, and segments embracing and secured to the outer margin of said body portion, substantially as described.

4. A commutator composed of disk-like sections, each comprising a disk-shaped body portion of slate or the like, divided to form separable parts, a central spider embracing the inner margin of said body portion and serving to unite the parts thereof at said inner margin, and segments embracing and secured to the outer margin of said body portion and uniting the parts thereof at said margin, substantially as described.

5. A commutator composed of disk-like sections, arranged in pairs, each section comprising a disk-shaped body portion of slate or the like, a central spider secured to the inner margin of said body portion and lying between it and the armature-shaft, and segments secured to the outer margin of said body portion, the spiders of each pair being integrally united, substantially as described.

6. A commutator composed of disk-like sections, arranged in pairs, each comprising a disk-shaped body portion of insulating material, a central spider secured to the inner margin of said body portion, and segments secured to the outer margin of said body por-

tion, the spiders of each pair being integrally united and the segments of each pair being provided with insulating-segments secured to the margin of the body of the adjacent section, substantially as described.

7. In a commutator of the character described, the combination, with a central spider having radially-projecting parallel arms, of a disk-shaped body of slate or the like, adapted to fit and be detachably secured between said arms and divided into separable parts, and segments having inwardly-extending radial arms to fit the outer margin of the

slate body and detachably connected therewith, substantially as described.

8. In a commutator of the class described, the combination, with a central sleeve and disk-like sections mounted thereon, and having laterally-overhanging peripheral sections, of an end piece of slate or the like adapted to fit between the sleeve and the segments of the terminal section, substantially as described.

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Witnesses:

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