

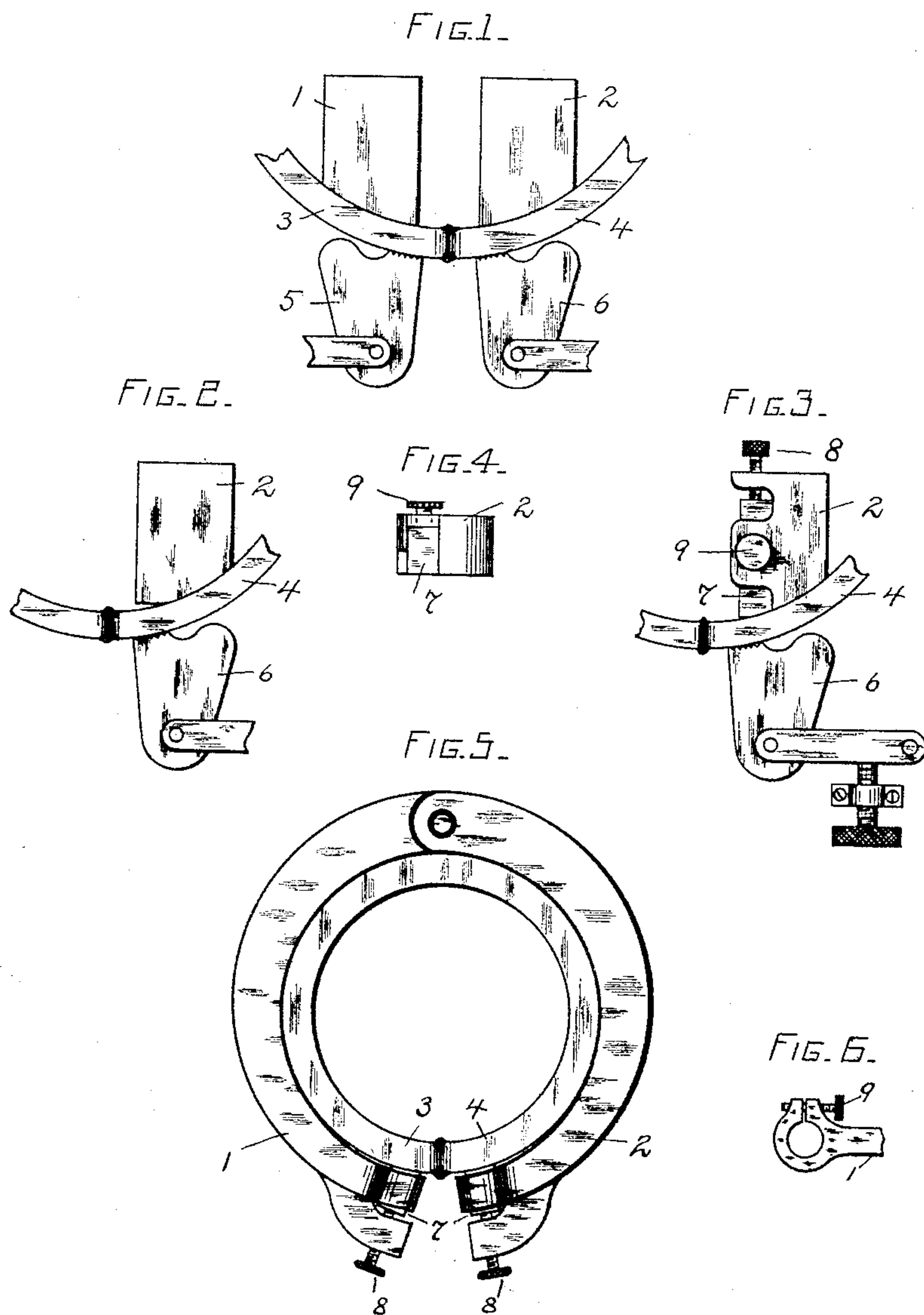
(No Model.)

2 Sheets—Sheet 1.

H. LEMP.
ADJUSTABLE ELECTRIC CLAMP.

No. 458,177.

Patented Aug. 25, 1891.



WITNESSES.
H. J. Hightman
Wm. B. Lewis

INVENTOR.
H. Lemp

(No Model.)

2 Sheets—Sheet 2.

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Fig. 7.

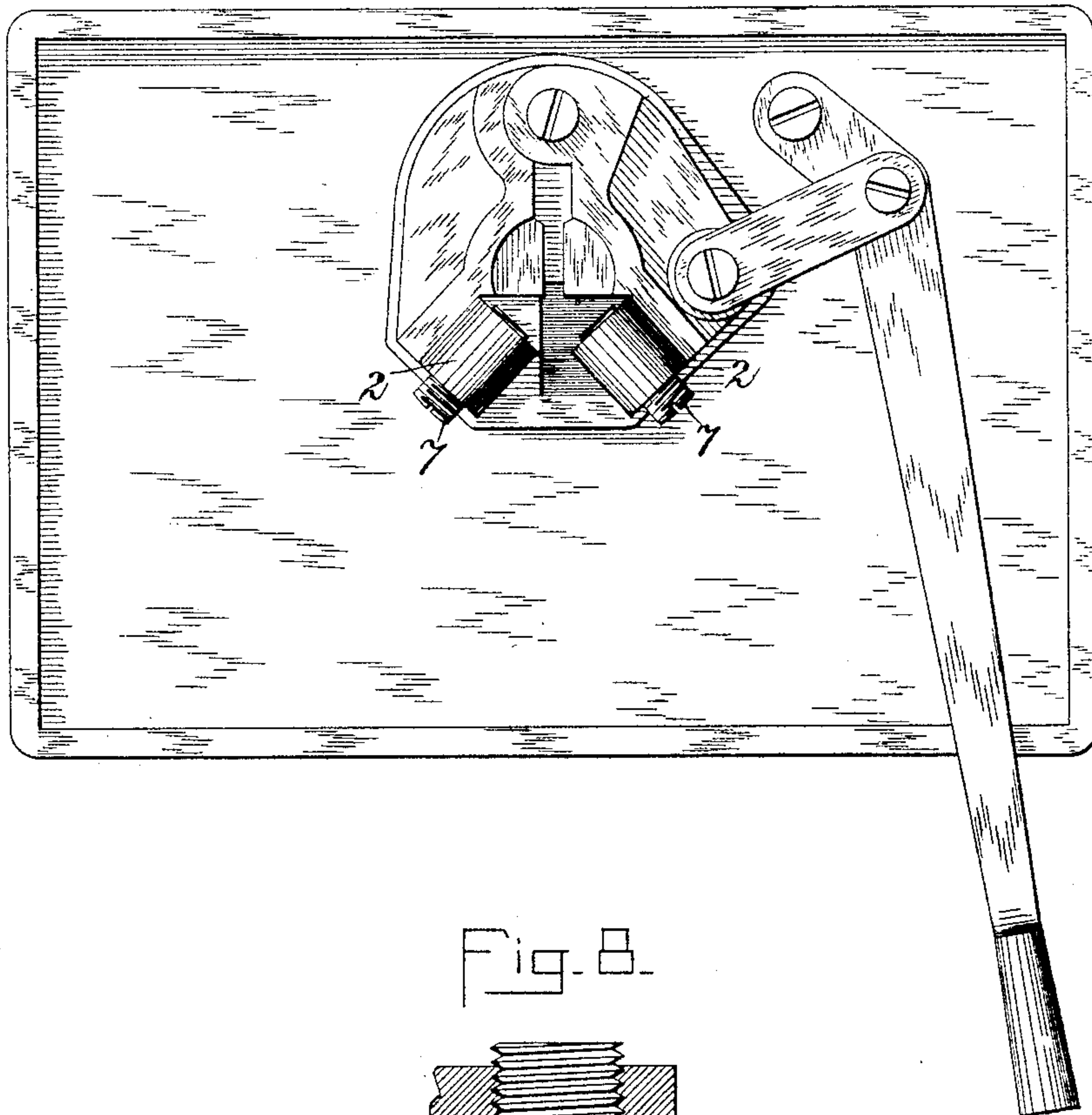
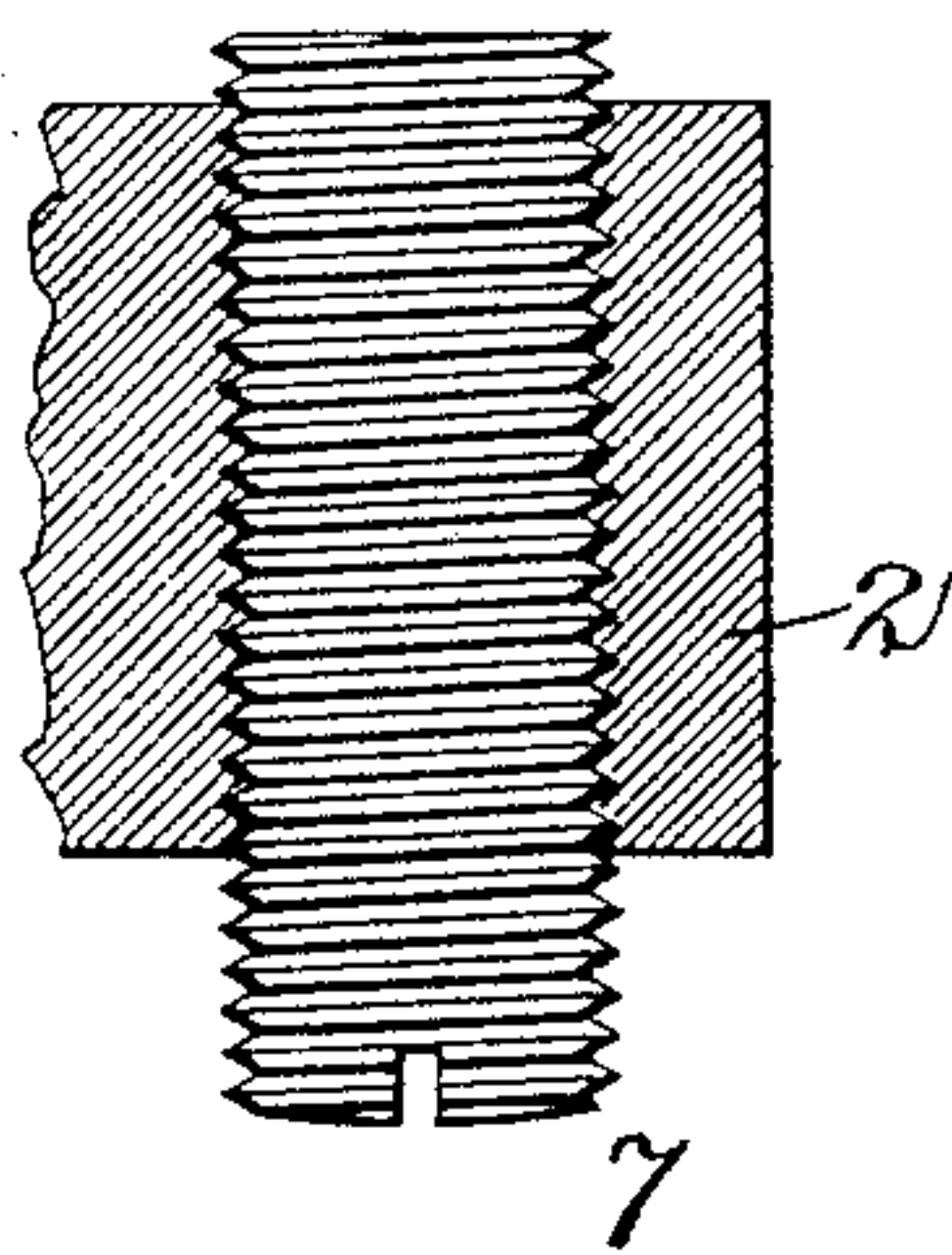


Fig. 8.



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INVENTOR:

Hermann Lemp
By H. N. Sweet
Atty.

UNITED STATES PATENT OFFICE.

HERMANN LEMP, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE THOMSON
ELECTRIC WELDING COMPANY, OF MAINE.

ADJUSTABLE ELECTRIC CLAMP.

SPECIFICATION forming part of Letters Patent No. 458,177, dated August 25, 1891.

Application filed October 9, 1890. Serial No. 367,489. (No model.)

To all whom it may concern:

Be it known that I, HERMANN LEMP, of
Lynn, in the county of Essex and State of Mas-
sachusetts, have invented a new and useful
5 Improvement in Adjustable Electric Clamps,
of which the following, taken in connection
with the accompanying drawings, is a specifi-
cation.

My present invention relates to improve-
10 ments in electric-welding and metal-working
apparatus, and particularly to those parts of
the apparatus which supply the work-pieces
with the heavy heating electric currents.

My invention consists in a novel construc-
15 tion of the conducting-jaws or holding de-
vices, in which the parts that are subjected to
excessive wear and oxidizing or burning ef-
fects are susceptible of adjustment and may
be easily and cheaply replaced by any person.
20 I use for the adjustable portion of these de-
vices material that is readily procurable in the
market, and which needs little or no further
working to adapt it to the requirements of my
invention. As is well known by those skilled
25 in the art, it is essential for the economi-
cal operation of electric-welding machines
that the very best electrical contact possible
be secured between the conducting-jaws and
the pieces of metal to be operated upon. The
30 scale, dirt, oil, &c., which are generally on the
surface of iron or steel, offer considerable
resistance to the flow of the heavy currents.
If this is not removed before placing the work
into the holding-clamps, then the heavy cur-
35 rents will generate heat at the points of con-
tact and burning of the clamp-surfaces results.
To prevent this oxidizing or burning effect it
is necessary to thoroughly clean the work-
pieces before they are placed in circuit. Now
40 in practice I find it more economical to omit
the cleaning of the pieces and to supply
clamping devices that are adjustable and that
may be easily replaced when very much worn
or burned away. I have found also that the
45 surface of actual contact between the metal
to be welded and the clamping devices may
be quite small, provided there is an abun-
dance of metal immediately back of the con-
tact-surfaces to convey away the heat gener-
50 ated at these points.

My invention will be more fully set forth

and explained in connection with the accom-
panying drawings.

Figure 1 illustrates the clamping devices
of an electric-welding machine with the work- 55
pieces in place and the weld completed. Fig.
2 represents a part of the above-described
welding-clamps after having been in use for
welding tires, &c., for a comparatively short
time. Figs. 3, 4, 5, 6, 7, and 8 illustrate elec- 60
tric clamps embodying my invention.

In Fig. 1, 1 and 2 represent cast copper
blocks, the terminals of a source of current.
The iron pieces 3 and 4 are held firmly in
electrical connection with 1 and 2 by means 65
of the clamp-dogs 5 and 6. If a current be
passed from 1 to 2 through the work-pieces,
the larger part of the current will enter the
bars at that part of the conducting-block
nearest the weld, owing to the resistance of 70
the iron bars being greater than that of the
copper blocks, and to the well-known fact that
an electric current takes the path of least re-
sistance. This causes a greater heating of the
scale at this point than elsewhere, and a con- 75
sequent burning and roughening of the
clamps at this place.

Fig. 2 is a good illustration of the appear-
ance of an electric-welding clamp of the form
under consideration after it has been sub- 80
jected to the continued action of an electric
current, in the manner above described. It
is evident that the continuance of this action
would in a short time so reduce the contact
area as to render the clamps useless, necessi- 85
tating the substitution of a new contact-piece
specially constructed for the purpose. Now
to obviate this difficulty I construct my con-
ducting clamps or jaws in such a manner that
the parts subjected to injurious heating effects 90
are adjustable, and I use for the adjustable
pieces bars or rods of commercial sizes so that
it is only necessary to cut from such bars or
rods the required lengths and to place the
pieces in position, adjusting them from time 95
to time, as required.

Fig. 3 shows an electric-welding clamp con-
structed according to my invention. 2 is the
conducting-block, and 7 the adjustable piece
of conducting material. 8 and 9 are screws 100
for adjusting and holding the contact-pieces
in the desired position.

Fig. 4 is a view of the contact end of the same clamp. It will be seen that the copper block 2 is recessed on one side to receive the bar of conducting material which fits snugly into the recess and makes good electrical connection therewith. The rod 7 projects very slightly beyond the face of the block 2 and is the sole means of delivering current to the bar 4; but the block 2 is sufficiently near the end of 7 to conduct away the excess of heat. This construction enables the conductor 7 to carry many times more current without injuriously heating the contact-surfaces than would otherwise be the case. As the face of 7 becomes worn away, the screw 9 is loosened, and by a turn of 8 the conductor is again brought into position and firmly held there by tightening 9. As before mentioned, the rod 7 is of a standard size of good conducting metal. I prefer for this purpose hard rolled copper, silicon bronze, or aluminium bronze. The application of my invention to a ring-welder is shown in Fig. 5. Frames 1 and 2, to which are connected the terminals of a source of current, are pivoted and insulated at the back, and their free ends are constructed as shown in Fig. 6. 8 represents the adjusting-screw for forcing the conductor into position. In some cases I prefer to tap out the hole in the conducting-frame and insert therein a screw of hard copper or other suitable metal for a contact-piece. Figs. 7 and 8 illustrate this construction, 7 being the adjustable-piece, 2 the conducting-block, and 4 the work. This is a very convenient arrange-

ment, as a turn of this screw 7 is all that is required to adjust it as desired. Although this construction does not allow of so easy and simple renewal of contact-pieces as the former, it has the advantage of fewer parts. 4c

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

1. In electric clamps, the combination of holding devices for gripping the work-pieces, and adjustable contact-pieces of good conducting material for conveying current to the work-pieces, substantially as described. 45

2. In electric clamps, the combination of holding devices for gripping the work-pieces, and replaceable contact-pieces of good conducting material for conveying current to the work-pieces, substantially as described. 50

3. An electric metal-working clamp having adjustable and replaceable contact-pieces of good conducting material, such as copper, substantially as set forth. 55

4. An electric metal-working clamp having adjustable and replaceable contact-pieces, consisting of screw-shaped pieces of conducting material. 60

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 4th day of October, A. D. 1890.

HERMANN LEMP.

Witnesses:

JOHN W. GIBBONEY,
H. PERCY MAXIM.