

J. RIDDELL.
CONCENTRIC CLAMP.

No. 523,009.

Patented July 17, 1894.

FIG. 1.

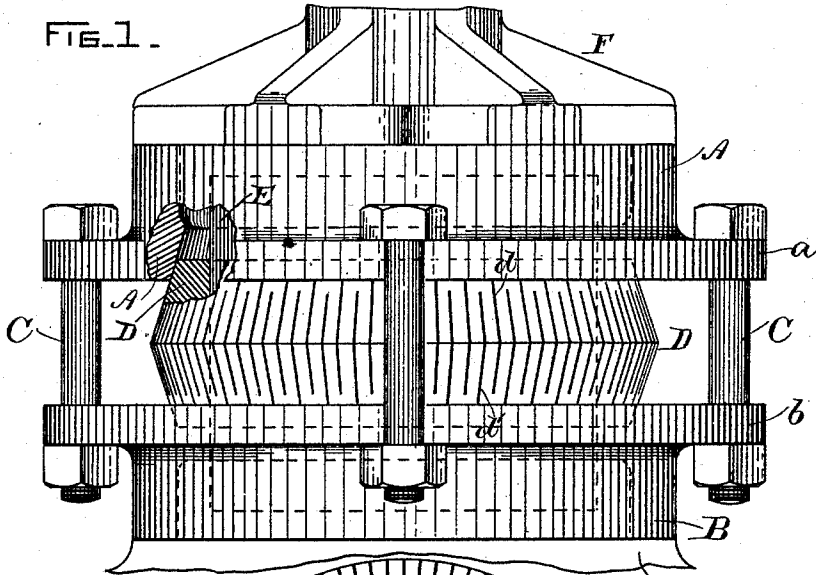


FIG. 2.

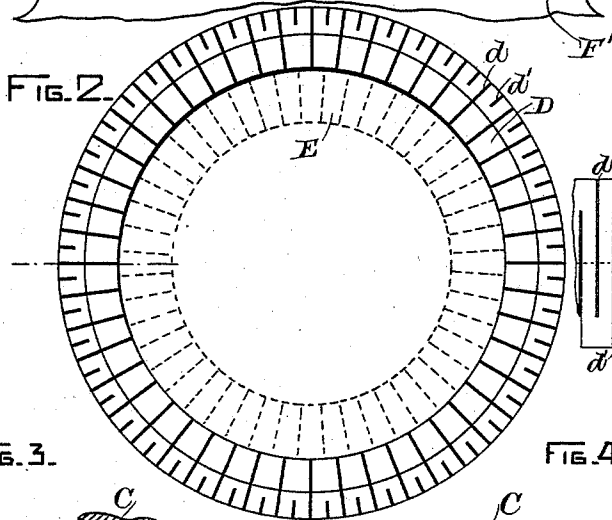


FIG. 5.

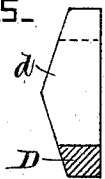


FIG. 6.

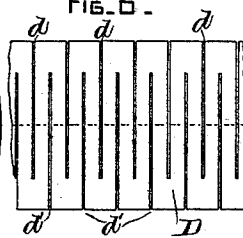


FIG. 3.

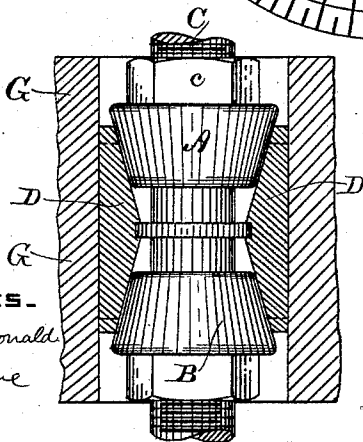
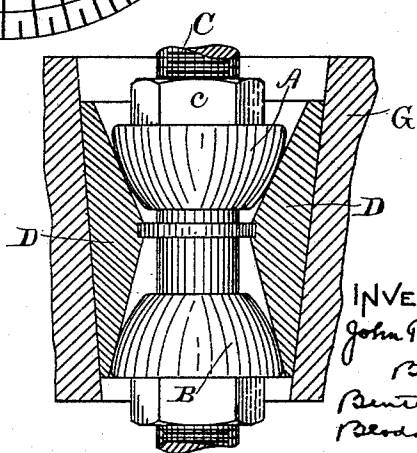


FIG. 4.



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FIG. 7.

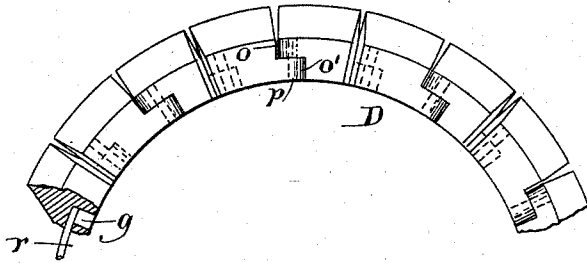


FIG. 8.

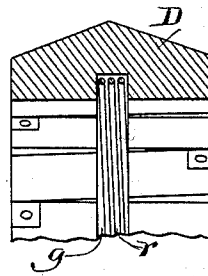


FIG. 10.

FIG. 9.

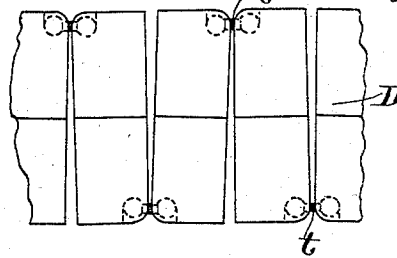
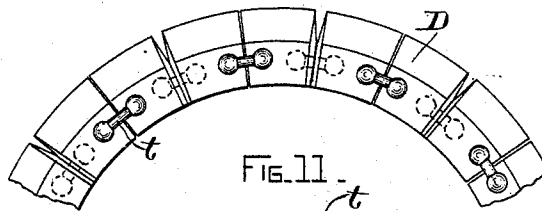
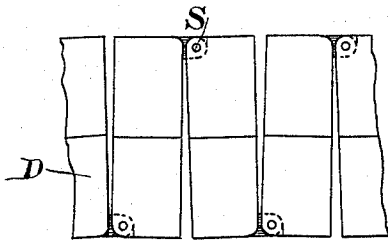


FIG. 12.

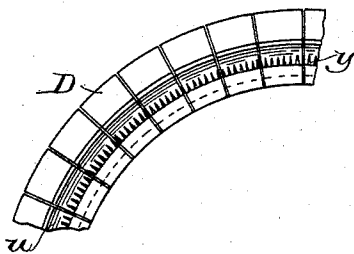
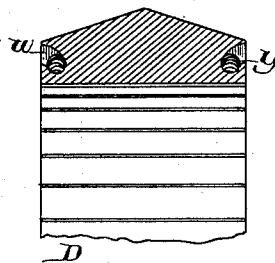


FIG. 13.



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UNITED STATES PATENT OFFICE.

JOHN RIDDELL, OF SAUGUS, MASSACHUSETTS, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

CONCENTRIC CLAMP.

SPECIFICATION forming part of Letters Patent No. 523,009, dated July 17, 1894.

Application filed January 28, 1893. Serial No. 460,044. (No model.)

To all whom it may concern:

Be it known that I, JOHN RIDDELL, a citizen of the United States, residing at Saugus, county of Essex, State of Massachusetts, have invented a certain new and useful Improvement in Concentric Clamps, of which the following is a specification.

The invention is an improvement in clamps or concentric clutches and it consists in a specially organized arrangement having a few simple parts, and possessing considerable latitude of movement so that it is adapted to grasp articles of varying size, or to compress a number of pieces which are in yielding relation to each other. It also has very many bearing points engaging the article, or assemblage of articles, to be held, and the moving parts of the clamp or clutch travel in true radial lines from the center, the free spaces within the clutch being very nearly a true circle throughout the full range of movement.

The invention was designed and is particularly useful for assembling commutators for electric machines. Such commutators are usually assembled by placing side by side a number of copper segments with insulating strips between them the segments having tapering sides so that when the proper number are in position a circle is formed. A uniform pressure is now brought to bear on all parts of the periphery of the aggregated segments and insulating pieces, forcing them solidly together and to a position of smaller diameter where they are permanently secured and afterward placed upon the armature shaft. Hitherto the clamp for forcing the segments to position has usually been a ring of metal of suitable size through which projected very many screws the ends of which engaged with the segments and each screw was required to be independently advanced. This of course took much time, and besides this demanded skillful manipulation. It was to overcome these difficulties that the present apparatus was devised.

In the accompanying drawings, Figure 1 shows the complete structure. Fig. 2 is a plan view of the clamping ring. Figs. 3 and 4 are modifications of the clamp adapting it for an internal clutch. Figs. 5 and 6 illustrate the construction of the clamping ring and Figs.

7 to 13 illustrate modified forms in which the clamping ring may be made.

In Fig. 1, A, B, are heavy rigid cast rings provided with flanges *a, b*, entirely around them, through which pass bolts C for drawing the rings together. These rings have inner conical bearing surfaces which engage, respectively, with the ends of the contractible clamping ring D, which is constructed as follows: A ring of steel or other highly elastic metal is turned so as to have a section like that shown in Fig. 5, that is, the inner surface is plain and the outer is V-shaped, the point of the V being outermost. Slots *d, d* as shown in Fig. 6, are milled or sawed from one edge toward the opposite side of the ring. Similar slots *d' d'* are likewise milled or sawed from the opposite side of the ring between each of the slots *d, d*. The slots are preferably cut as shown from the top and bottom edge alternately, but if desired, they may be cut from the inside and outside edges. The number of slots thus cut in the ring will depend upon the range of movement and the character of work to which the clutch will be applied. In the case of the manufacture of commutators they would be rather numerous. The commutator segments E and intervening insulation having been loosely assembled, the ring D resting upon the lower ring B is slipped over them. The upper part A is then brought to rest on the upper edge of the clamp ring and the bolts C engage with the rings A, B. The nuts of the bolts are then screwed up to approximate the rings A, B and their conical surfaces engaging with the outer V-shaped surface of the clamp ring D contract it forcing the segments E into proper position. After the commutator segments have been placed within the ring D and the rings A B are in position the whole may be inserted between the plates F F' of a powerful press and forced together, and the bolts C screwed up to retain them in that position. When thus firmly clamped the ends of the commutator segments E may be machine worked and fitted with the ordinary retaining device of any suitable design to hold them in place, and then the structure of the invention A, B, C, D, may be removed, the ring D being elastic, returning to its normal position.

In Figs. 3 and 4 the action of the arrangement is reversed. In this modification of the invention the ring D has its inner surface V-shaped, the point of the V extending inward and the cone shaped surface of the parts A, B are now made to engage the inner surface of the ring D so that their movement toward each other forces the ring outward, the ring having slots as before mentioned. In virtue of its great elasticity the expanding clamp or clutch so made may even be used in hollow objects which have a taper bore, as shown in Fig. 4. In this case one end of the expanding ring would remain almost in its normal position while the farther end impelled by the advancing nut *c*, would expand to a greater extent until the object G was firmly held.

It will be understood that the invention can be readily applied to the construction of chucks or expanding mandrels for use with lathes and other purposes.

Figs. 7 to 13 show modified constructions, the modifications consisting principally in the means for joining the parts of the ring together. Instead of a ring slotted as in Fig. 1, the sections in Fig. 7 have underlying and overlapping tongues *o o'* which are jointed together at *p* with sufficient looseness in the joint to permit contraction of the ring when under pressure. A groove *g* cut in the ring sections contains a spring *r* which separates the sections and distends the ring when the pressure is removed. In Fig. 9 the sections are hinged together at diagonally opposite corners by pins *S*. In Figs. 10 and 11 pins *t*, having rounded ends, fit corresponding sock-

ets in adjacent sections and couple them together by sort of a ball and socket joint. In Figs. 12 and 13 seats or channels *u* are cut in the ends of the sections and spiral springs *y* are placed therein which hold the sections together and form a contractible ring like that already described.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a clamping machine, a contractible portion composed of a metal ring having slots cut part way through it from each edge alternately, substantially as set forth.

2. A clamp composed of a contractible elastic metal ring having slots *d, d'* and a conical surface, and a rigid ring having a conical surface to act upon the surface of the contractible ring, substantially as described.

3. A clamp composed of a contractible elastic metal ring, slots, *d, d'* cut part way through from each edge alternately, and a conical surface, and a rigid ring having a conical surface to act upon the surface of the contractible ring, substantially as described.

4. The combination with the elastic metal ring D having the series of slots *d, d'*, and the double conical surface, of the rings A, B, having conical surfaces, and the bolts C for drawing the rings together, substantially as described.

In witness whereof I have hereto set my hand this 25th day of January, 1893.

JOHN RIDDELL.

Witnesses:

JOHN W. GIBBONEY,
BENJAMIN B. HULL.