

No. 672,950.

Patented Apr. 30, 1901.

F. A. MERRICK & J. D. FORRER.

ELECTRIC MOTOR.

(Application filed Aug. 16, 1900.)

(No Model.)

Fig. 2.

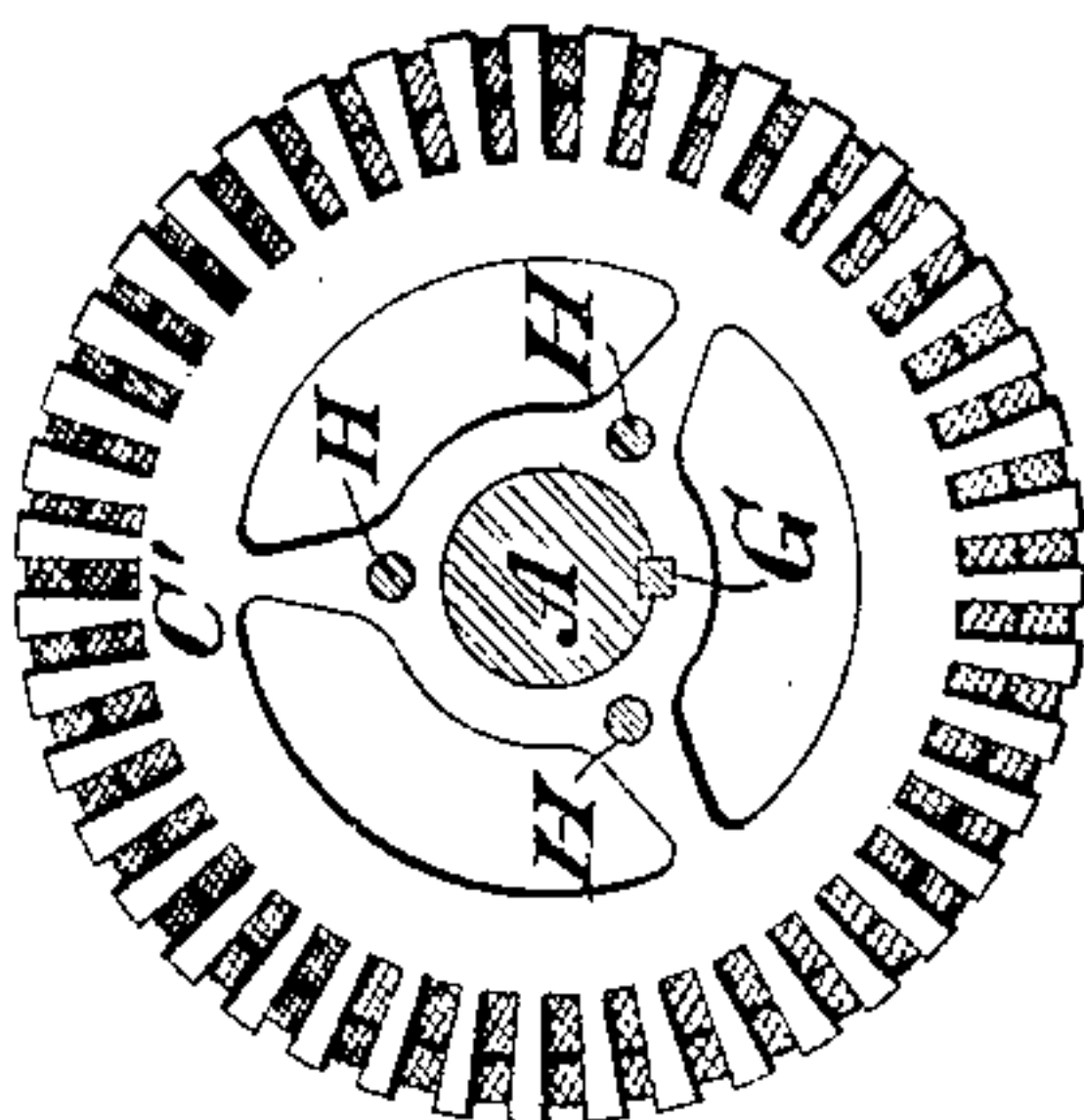
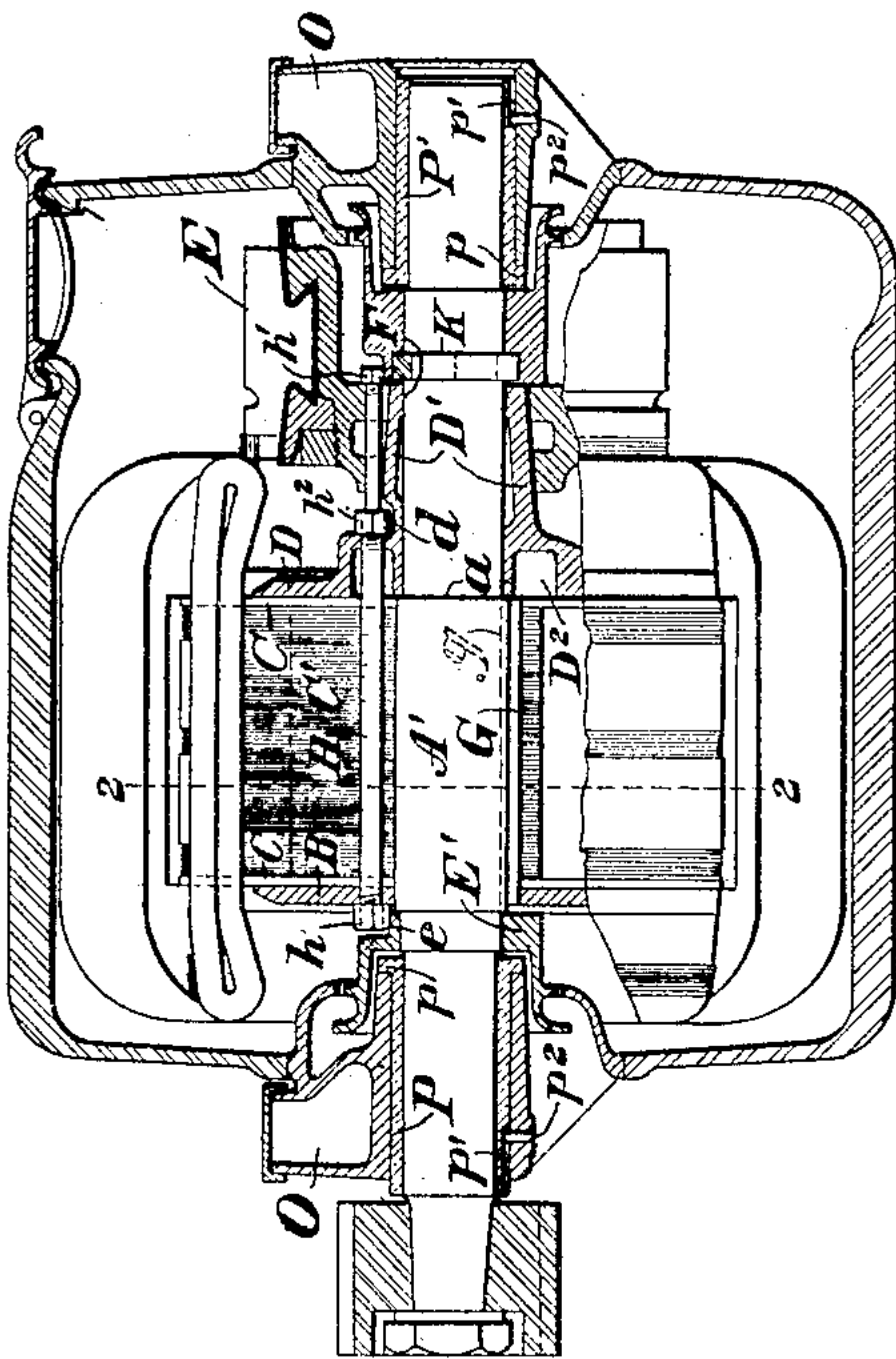


Fig. 3.



Fig. 1.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

FRANK A. MERRICK AND JOSEPH D. FORRER, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNORS TO THE LORAIN STEEL COMPANY, OF PENNSYLVANIA.

## ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 672,950, dated April 30, 1901.

Application filed August 16, 1900. Serial No. 27,051. (No model.)

*To all whom it may concern:*

Be it known that we, FRANK A. MERRICK and JOSEPH D. FORRER, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented new and useful Improvements in Electric Motors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

Our invention has relation to certain new and useful improvements in electric motors, and is designed mainly to provide means whereby the armature-shaft of the motor may be readily removed from the armature-body without dismembering the latter and without disturbing the commutator and commutator connections. Our invention is also designed to accomplish the above-stated object by a simple and efficient construction involving a minimum amount of machine-work and fitting. We attain these and other minor objects by the novel construction, arrangement, and combination of parts, all as hereinafter described, and pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a central longitudinal section of a motor embodying our invention, with a small portion of the armature shown in side elevation. Fig. 2 is a cross-section on the line 2 2 of Fig. 1, and Fig. 3 a detail view of the locking-ring.

Describing the figures more particularly, the letter A designates the armature-shaft, having an enlarged portion A', on which are seated the back armature-head B and also the laminated body C C', the end laminæ C being preferably of somewhat thicker or heavier stock than the intermediate laminæ C'.

D is the front head, which is seated on the shaft A against the shoulder a, formed by one end of the enlarged portion A', and which is formed with an elongated tapered hub D', on which is seated the commutator E.

F designates the oil-guard at the commutator end of the armature, and E' the corresponding guard at the pulley end.

g is a keyway formed in the portion A' of the shaft A, and G is a key seated therein

and securing the head B and laminæ C C' against rotary movement.

H designates elongated bolts (in the present instance three in number) which extend longitudinally through the two heads and the intermediate laminæ and which are also extended through the commutator-body. On one end of each bolt is a nut h, which is screwed up tightly against the head B, and on the opposite end is a second nut h', which is screwed up against the commutator-body. On the intermediate portion of each bolt is a third nut h<sup>2</sup>, which sets up tightly against the head D. In lieu of this third nut we may employ simply a collar or shoulder on the bolt. The nuts when used may be prevented from turning by a bearing d on the hub D'.

The oil-guard E' is drawn to its seat on the shaft A and is formed with sockets or recesses e, which engage the nuts h, preventing them from turning by reason of such engagement. In a similar manner the nuts h' lock and are locked by the oil-guard F.

Endwise displacement of the armature-body is prevented by means of a locking-ring K, which is partially seated in the shaft A against the end of the hub D'. This ring is in turn held against displacement by the oil-guard F, which is shouldered over it.

To remove the armature-shaft, the oil-guard F and the ring K are first removed. The shaft can then be drawn out from the pulley end without disturbing the armature-body of the commutator.

The head D is preferably formed with a chamber D<sup>2</sup>, in which molten metal or other suitable weights may be placed for the purpose of balancing the armature.

P P' designate the bearing-sleeves in which the armature-shaft is journaled and which are supported in the end portions O of the frame. These sleeves are each formed with a flange p at its inner end, which seats against the end of the inwardly-projecting sleeve-support. Each sleeve is also formed with a groove p', which is engaged by a pin or stud p<sup>2</sup>, carried by the sleeve-support. The flanges p hold the sleeves against endwise outward displacement, and the pins or studs p<sup>2</sup> secure them against any tendency to rotate. The



sleeves must of course be seated from the inside of the frame. These features are not, however, part of the present invention, but are claimed in the application of F. A. Mer-  
 5 rick, Serial No. 27,566.

We do not wish to limit ourselves to the exact construction, combination, and arrangement of parts herein shown and described, it being obvious that various mechanical  
 10 changes may be made in the details thereof without departing from the spirit and scope of our invention as pointed out in the appended claims.

Having thus described our invention, what  
 15 we claim, and desire to secure by Letters Patent, is—

1. In an armature, the combination with a non-threaded shaft having an enlarged portion, a head seated on said enlarged portion,  
 20 an opposite head seated against the shoulder formed by one end of said enlarged portion, the laminated body between said heads, and clamping-bolts passing through said body and heads, together with a locking device remov-  
 25 ably secured to the shaft to prevent endwise movement thereof through the said body and heads.

2. In an armature, the combination with a shaft having an enlarged portion, a head  
 30 seated on said enlarged portion, an opposite head seated against the opposite end of said enlarged portion, and having an extended hub, a commutator seated on said hub, a laminated body between the said heads, and clamp-  
 35 ing-bolts extending through said body and heads and also through the commutator-body.

3. In an armature, the combination of a shaft, a pair of heads seated thereon, one of  
 40 said heads having an extended hub, a laminated body between said heads, a commutator seated on said hub, and clamping-bolts extending through said heads and body, and also through the commutator-body.

4. In an armature, the combination of a  
 45 shaft, a pair of heads seated thereon, one of said heads having an extended hub, a commutator seated on said hub, a laminated body between said heads, and clamping-bolts extending through said heads and body, and  
 50 also through the commutator-body, said bolts having a nut at both ends, and also an intermediate abutment for one of said heads.

5. In an armature, the combination with the shaft, the heads thereon, the laminated body  
 55 between said heads, and a commutator seated on an extension of one of said heads, of clamping-bolts extending through the said body and heads and also through the body of the commutator, nuts on the said bolts, and an oil-  
 60 guard secured on the shaft and locked by and locking the said nuts.

6. In an armature, the combination of a shaft, armature-heads thereon, an armature-  
 65 body clamped between said heads, a commutator, bolts passing through said heads, body and commutator, and having clamping-nuts at their ends, and oil-guards on said shaft,

each of said guards having sockets or recesses which receive the nuts on the adja-  
 cent ends of said bolts, whereby the nuts and  
 70 also the guards are prevented rotary movement on their respective seats.

7. In an armature, the combination of a shaft, armature-heads seated thereon, a lami-  
 75 nated body clamped between the said heads, a commutator seated on the hub portion of one of said heads, a locking-ring seated in the shaft, and engaging the end of said hub, and an oil-guard fitting over and securing the  
 80 said ring.

8. In an armature, the combination of a shaft, armature-heads seated thereon, a lami-  
 nated body between the said heads, a com-  
 85 mutator seated on the hub portions of one of said heads, bolts extending longitudinally through the said heads, body and commuta-  
 90 tor, nuts on said bolts which seat against the commutator, a locking-ring seated in said shaft and engaging the end of the said hub portion, and an oil-guard fitted over the said  
 ring and also having sockets or recesses which engage the said bolts.

9. The combination of an unthreaded ar-  
 95 mature-shaft, an armature-body thereon having its plates or laminæ directly engaging said shaft, and means for normally preventing the shaft from moving endwise in said body but capable of being released to permit  
 100 said shaft to be withdrawn without dismembering any portion of the body.

10. The combination of an armature-shaft,  
 105 an armature-body having its plates or laminæ directly keyed to the shaft, an abutment on the shaft for preventing separate endwise movement of the shaft and body in one di-  
 110 rection, and a removable locking device which normally prevents such movement in the opposite direction, but which can be released to permit the shaft to be withdrawn through  
 said body.

11. The combination of an armature-shaft,  
 115 an armature-body having its plates or laminæ keyed directly to the shaft, armature-heads fitting the shaft but not secured thereto with respect to endwise movement, an  
 120 abutment on said shaft engaged by one of said heads to prevent endwise movement in one direction, and a removable locking device for normally preventing such movement  
 in the opposite direction.

12. In an armature, the combination of a shaft having a shoulder or abutment thereon,  
 125 an armature-body keyed directly to said shaft and engaging said shoulder or abutment to prevent separate endwise movement of the shaft and body in one direction, and a remov-  
 able locking device secured on said shaft and engaging the head to prevent endwise move-  
 ment in the opposite direction.

13. The combination of an armature-shaft  
 130 having a shoulder or abutment thereon, armature-heads seated on said shaft, one of said heads seating against said shoulder or abutment, a locking device removably se-



cured to the shaft and engaging the opposite side of said head, and an armature-body clamped between said heads and directly supported on said shaft.

5 14. The combination with an armature-body keyed directly to the armature-shaft and having an extended hub at the commutator end, a commutator-support seated on said hub and independent of the shaft, and bolts  
10 extending through the armature-shaft and also through the said commutator-support.

15. The combination of an unthreaded armature-shaft, an armature-body keyed to said shaft, means for normally preventing

separate endwise movement of the body and shaft, but which can be released to permit said shaft to be withdrawn through said body without disturbing any part of the body, and a commutator-support connected to and carried wholly by said body. 20

In testimony whereof we have affixed our signatures in presence of two witnesses.

FRANK A. MERRICK.  
J. D. FORRER.

Witnesses:

B. M. SMITH,  
H. W. SMITH.