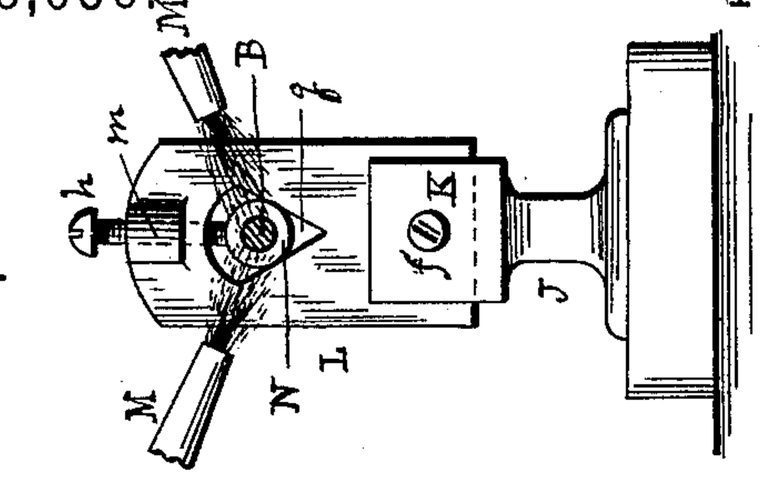
(No Model.) 3 Sheets—Sheet 1.

C. R. SMITH.

MAKING SEAMLESS GOLD PLATED WIRE.

No. 428,056. Patented May 13, 1890.

FIG. 2.



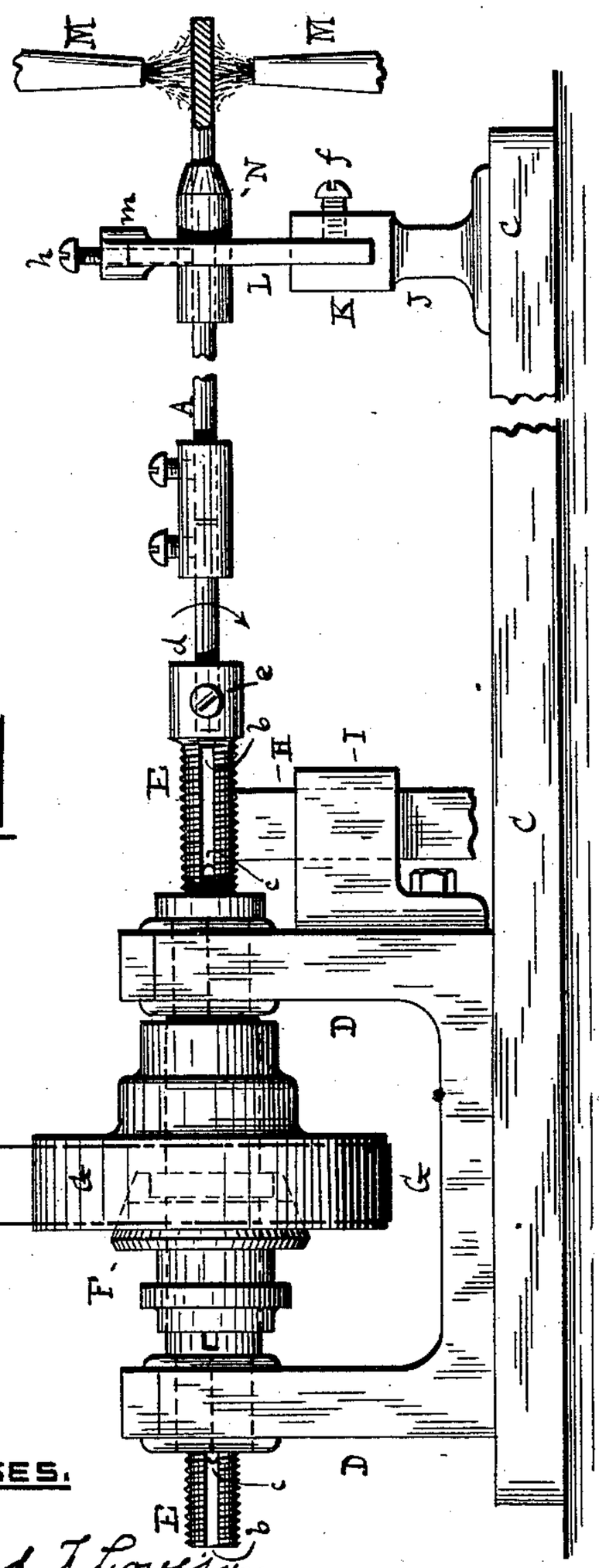


FIG. 1.

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

WITNESSES.

Edward T. Lovejoy.

Warren R. Pierce

INVENTOR.

Charles R. Smith

(No Model.) 3 Sheets—Sheet 2.

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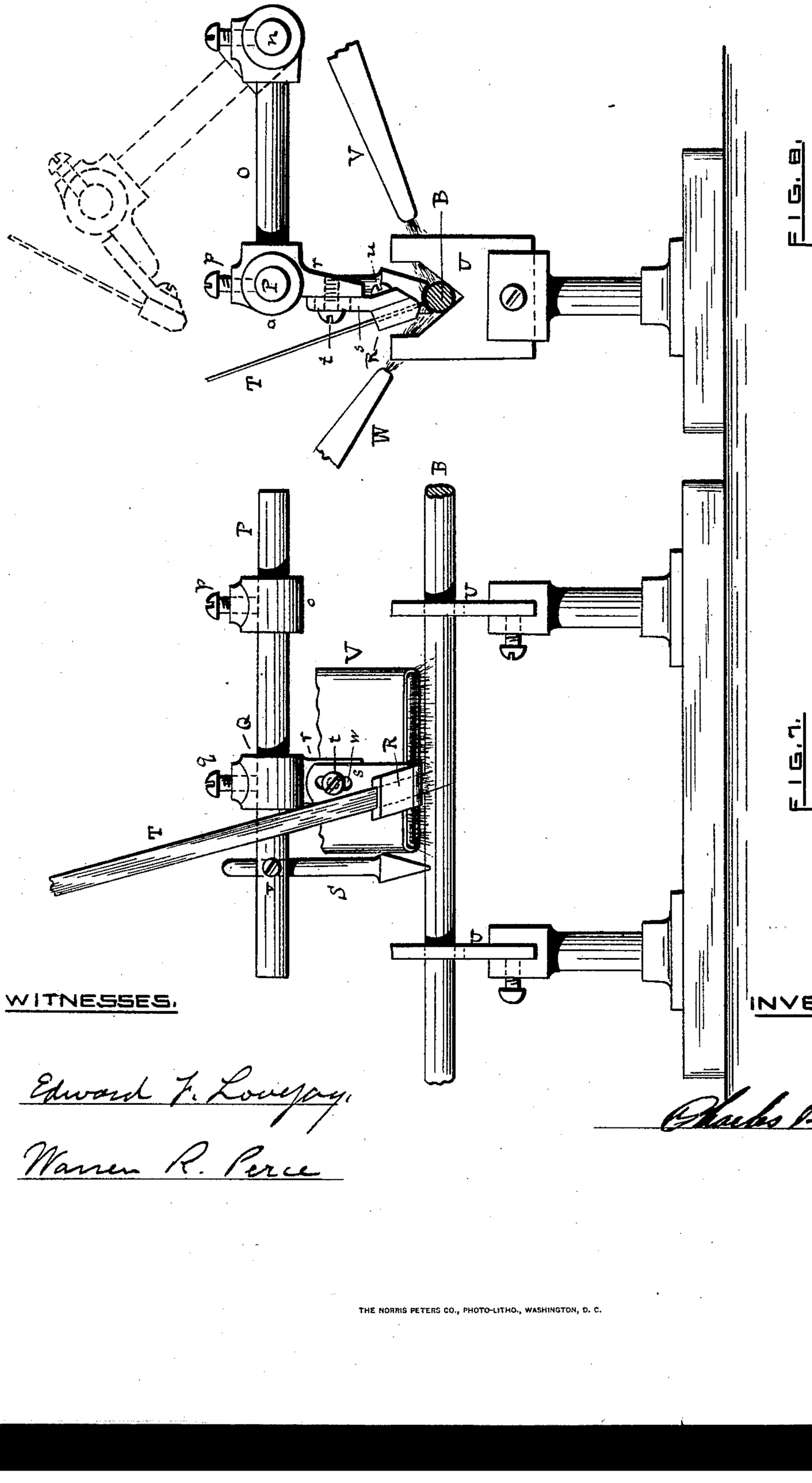

FIG. 8.

FIG. 7.

WITNESSES.

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(No Model.) 3 Sheets—Sheet 3.

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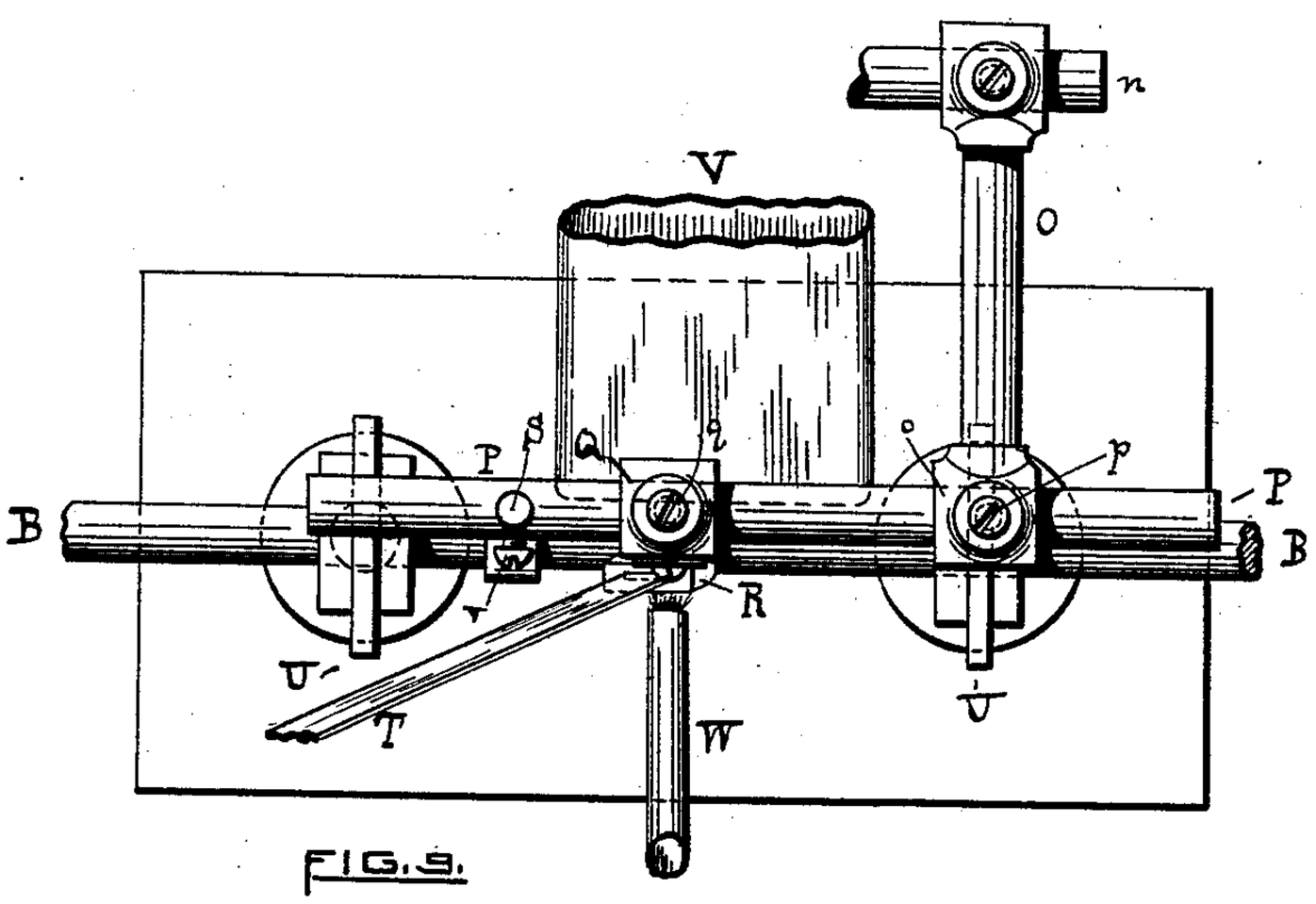

FIG. 9.

WITNESSES.

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Warren R. Pease

INVENTOR.

Charles R. Smith

UNITED STATES PATENT OFFICE.

CHARLES R. SMITH, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF TWO-THIRDS TO EDWARD D. WILLIAMS AND FRANK M. MATHEWSON, OF SAME PLACE.

MAKING SEAMLESS GOLD-PLATED WIRE.

SPECIFICATION forming part of Letters Patent No. 428,056, dated May 13, 1890.

Application filed March 8, 1890. Serial No. 343,152. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. SMITH, of the city and county of Providence, in the State of Rhode Island, have invented a new and useful Improvement in Processes of Manufacturing Gold-Plated Wire; and I declare the following to be a specification thereof, reference being had to the accompanying drawings.

Like letters indicate like parts.

Figure 1 is a side elevation of the mechanism used in my improved process. Fig. 2 is an end elevation of the standard or guide plate used to support the wire during the process. Fig. 3 shows in side elevation and cross-section the shell or split tube of gold which is to be plated on the wire. Fig. 4 shows, partly in side elevation and partly in longitudinal and cross-sections, the composition or base-metal wire which is to be plated. Fig. 5 shows, partly in side elevation and partly in longitudinal and cross-sections, the gold shell in position upon the wire of base metal. Fig. 6 shows, partly in side elevation and partly in longitudinal and cross-sections, the seamless gold-plated wire which is the product of my improved process. Figs. 7, 8, and 9 are respectively side and end elevations and a top plan of a modified form of said mechanism adapted to receive the gold in the form of a ribbon or wire to be plated on the composition wire.

This invention relates to the manufacture of that class of wire used by jewelers, which consists of an interior solid wire of base metal and an exterior solid tube of gold, which is soldered upon said inner wire. It has been common hitherto to make such wire by drawing through a draw-plate a compound cylindrical ingot of gold having a core of inferior metal, until it is reduced in diameter to the requisite size, the result being a wire of base metal having a thin covering of gold plate, or by soldering a gold plate upon a flat piece of composition stock and then cupping this compound plate until a tube is formed, which can be drawn down into a solid wire through a draw-plate. These processes, however, are tedious and expensive, and the stock requires frequent annealing from time to time during the operation. The repeated drawing of the stock toughens and hardens the fiber of the gold, making the wire less capable of being worked to advantage.

By my improved process I dispense with the preliminary formation of a compound soldered plate or ingot, and also the entire process of reducing the stock to the desired diameter by drawing, (except the final drawing to get a proper finish.) I thus obtain a better result and at a less cost.

In the drawings, A represents a shell or split tube of gold made from flat stock in the usual manner. This tube has the usual longitudinal opening *a*.

B is the solid wire of composition or any suitable metal. The shell A should be covered with borax or any of the well-known fluxes, and the wire B is also covered with the same preparation. The shell A is then slipped or drawn on the wire B, as shown in Fig. 5, the opening *a* being apart, as before.

Fig. 6 shows the result of my process, which is a solid wire having an inner core of inferior metal and an outer seamless tube of gold plate soldered firmly thereon by the process hereinafter described.

Any suitable mechanism which will rotate and feed the wire at a proper rate of speed may be adapted to this process. In the drawings I represent a form of mechanism suitable for this purpose. It consists of a machine having a bed-piece C and upright bearings D. A shaft E is mounted in said bearings. The shaft E has a longitudinal slot *b*, and is movable along pins *c*, which enter said slot. F is a friction-clutch, engageable in the usual manner with the pulley G, by means of which clutch the pulley is made fast or loose upon the shaft, as may be desired. The shaft E is screw-threaded, and is movable longitudinally when revolved by its engagement with a feeder H, which is screw-threaded on its upper surface, and which is vertically movable through the bracket I. The feeder H can be thrown up into engagement with the shaft E, or may be disengaged therefrom by means of a suitable lever or treadle. The shaft E is thus capable of rotation and longitudinal motion at the same time by the engagement of the friction-clutch F with the

pulley G and of the feeder H with the shaft E, respectively. At the end of the shaft E is a socket *d* and a set-screw *e*. A standard J has a slotted head K and a set-screw *f*. In the slotted head rests a guide-plate L, which is horizontally adjusted in the slot of the head K, and when it is in the desired position it is secured by the set-screw *f*. The guide-plate L has an opening or aperture *g*, which is V-shaped in its lower part, as seen in Fig. 2. A set-screw *h*, passing through a boss *m* on the top edge of the guide-plate L, has its lower end projecting into said aperture, as seen in Fig. 2. Blow-pipes M, of any desired number, preferably two or more, are placed as illustrated in Figs. 1 and 2.

After the gold shell A has been put upon the wire B, as shown in Fig. 5, a sleeve or tube N, made of platinum, is slipped on the wire loosely and is passed through the aperture *g* of the guide-plate L. One end of the wire is inserted in the socket *d* of the shaft E, and is fastened there by the set-screw *e*. The platinum sleeve N rests in the aperture *g* of the guide-plate L, and is held in its adjustment there by the set-screw *h*, as best seen in Fig. 2.

When the pulley G has been made fast to the shaft E by the clutch F and the feeder H has been engaged with the shaft E, as already described, a rotary and progressive movement is imparted to the wire B and its inclosing-shell A. Said mechanism advances or feeds the wire through the platinum sleeve (which is snugly held within the guide-plate L by the set-screw *h*) on between the blow-pipes M. The heat of the blow-pipes should be regulated at 2,000° Fahrenheit. When the wire and shell are exposed to this heat, the gold is immediately melted and flows over the wire in a solid mass, closing up the opening *a*. As is well known, the heated metal is drawn toward the flame, and as the wire is both rotated and fed the gold is flowed uniformly over the wire and united to it, forming a solid mass having a surface of gold-plate, which is seamless throughout.

Instead of placing a split tube or shell of gold-plate on the wire, as above described, leaving a longitudinal opening *a*, I may apply the gold plate in strips or ribbons, or in the form of a wire, and arrange to feed it upon the base-metal wire in an angular direction. To accomplish this purpose the modifications of mechanism shown in Figs. 7, 8, and 9 are useful. An arm O, pivoted at *n*, carries a rod P, fastened to it by the collar *o* and screw *p*. A sliding collar Q, adjustable on the rod P by the screw *q*, has a downwardly-projecting piece *r*, bent, as seen in Fig. 8, to which a steel plate *s* is fastened by a screw *t*. A platinum guide R is secured to the steel plate *s* by the screw *u*. Near the end of the rod P is a supporting-rod S, which passes through the rod P and is vertically adjustable therein by the set-screw *v*. The lower portion of the rod S is broadened transversely, as seen in Fig. 8, and there concaved, so as to rest on the wire as the latter is advancing. The arm O and all these connected parts can be swung upward into the position indicated in dotted lines in Fig. 8. As the steel plate *s* is slotted, as shown at *w* in Fig. 7, it is vertically adjustable and can be held in the desired position by the set-screw *t*. By such adjustment the delivery of the platinum guide R can be brought to any required distance above the wire which is to be plated, while the supporting-rod S, adjustable in the rod P by the set-screw *v*, holds the arm P and the guide R connected therewith at a uniform height above said wire.

The strip of gold plate T is fed from a suitable reel through feed-rolls, (not shown,) which are of such size and so timed in rate of speed in relation to the rotation of the wire to be plated that the length of the strip T, fed as stated, is equal to the circumference of said wire. The wire B having been properly covered with the fluxing material is supported in the holding-plates U and is fed to the blow-pipes V W, and at the same time rotated by the mechanism hereinbefore described, or in any suitable manner. As soon as the gold strip T, which has also been previously coated with the fluxing material, is exposed to the heat of the blow-pipes it melts and flows on the wire B in the same manner as already explained. The blow-pipe V is oblong and should give a flame heated to about 360° Fahrenheit, which "sweats" the wire B or partially softens it to adapt it the better to receive the gold plating. It is made oblong, so as to give an extended flame for this purpose. The blow-pipe W (shown in Figs. 8 and 9, but not shown in Fig. 7) is the common blow-pipe having a small round discharge. The heat of its flame should be 2,000° Fahrenheit. When the wire is exposed to the heat of both blasts, the gold is melted and flows over the wire B in a solid and uniform mass.

By using a second guide R and two strips T of gold—one of red gold and the other of green gold—a pleasing contrast of color may be obtained, which, by regulating the comparative speed of the rotation and advance of the wire B and by other readily apparent modifications, will produce various novel and artistic results. By this process gold of a high grade may be plated on gold of a lower grade, or silver can be plated on a baser metal, or any desired metal upon another, and this process is also applicable to plating flat stock as well as to plating wire.

By feeding the wire and plate to the flames by means of power automatically, by suitable mechanism, a uniform rotation is given to the wire and a steady advance at the same time. Each of said motions is capable of any desired degree of variation, so that the portion of the wire to be plated, as well as the plating-metal, can be kept in the flame as

long a time as is necessary to completely melt and flow the gold uniformly on the composition wire.

When the plating has been accomplished, the wire so plated is pickled in acid to remove the fluxing material which may remain on the outer surfaces, and the wire is then drawn through a draw-plate to give it a smooth and polished appearance, or said wire may be finished by hammering, rolling, or in any other proper manner.

I claim as a novel and useful invention, and desire to secure by Letters Patent—

1. The improved process of plating herein described, consisting of the following steps: covering with a fluxing material the metal which is to be plated, covering with a fluxing material the plating-metal, placing the latter metal upon the former and passing them so in contact through the flame of one or more blow-pipes, and there fusing and flowing the plating-metal upon the metal to be plated in position in a solid mass, substantially as specified.

2. The improved process of manufacturing seamless gold-plated wire herein described, consisting of the following steps: covering a wire of base metal with a fluxing material, covering a split tube of gold plate with a fluxing material, placing the split tube upon the wire, feeding said wire and tube with a rotary and longitudinal movement through the flame of blow-pipes, and fusing there the gold tube upon the wire in a solid mass, and then smoothing and finishing the plated wire by any of the usual methods for that purpose, substantially as specified.

3. The improved process of manufacturing seamless gold-plated wire herein described, consisting of the following steps: covering a wire of base metal with a fluxing material, covering a strip of gold plate with a fluxing material, feeding said strip to said wire in an angular direction, feeding said wire with a rotary and longitudinal movement through the flame of blow-pipes, and fusing there the gold strip upon the wire in a solid mass, and then smoothing and finishing the plated wire in any suitable known manner, substantially as specified.

CHARLES R. SMITH.

Witnesses:
EDWARD F. LOVEJOY,
WARREN R. PERCE.