

(No Model.)

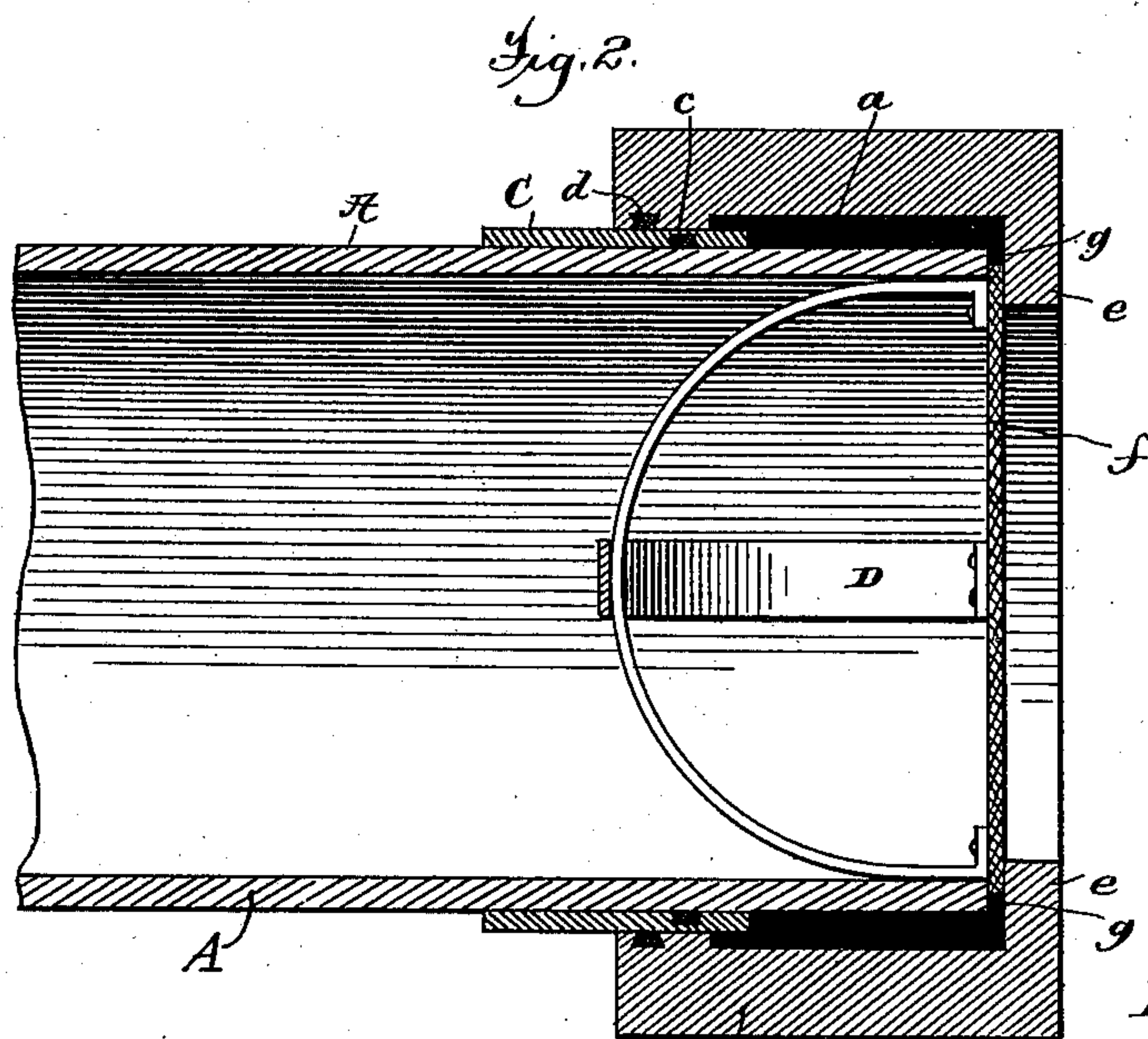
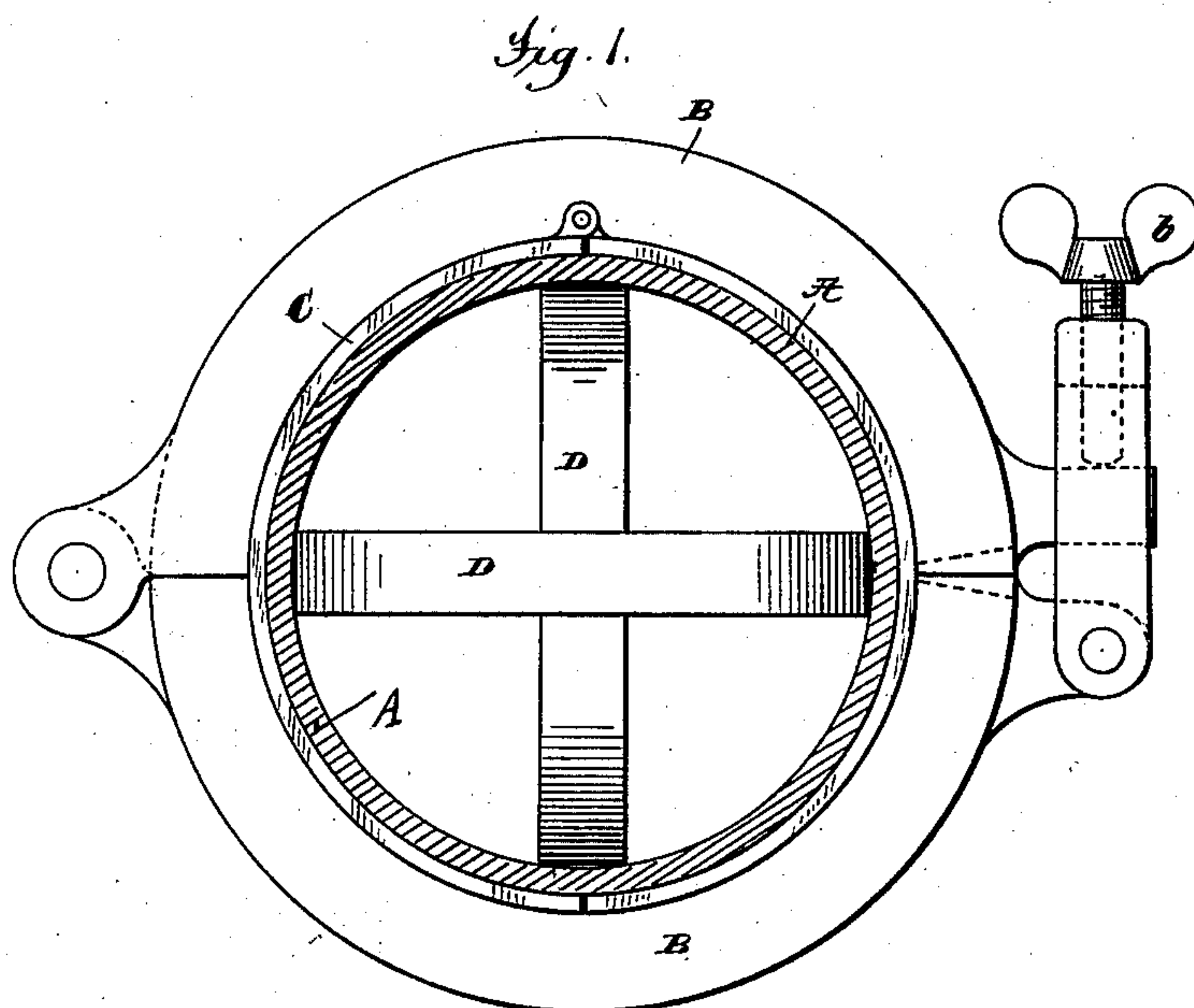
2 Sheets—Sheet 1.

A. N. RANKIN.

TOOL FOR FORMING COLD PACKED PIPE JOINTS.

No. 376,609.

Patented Jan. 17, 1888.



Attest:

Geo. H. Bott

W. C. Bowen

Inventor:

Andrew Nerva Rankin,  
By J. M. Bowen  
Atty.

(No Model.)

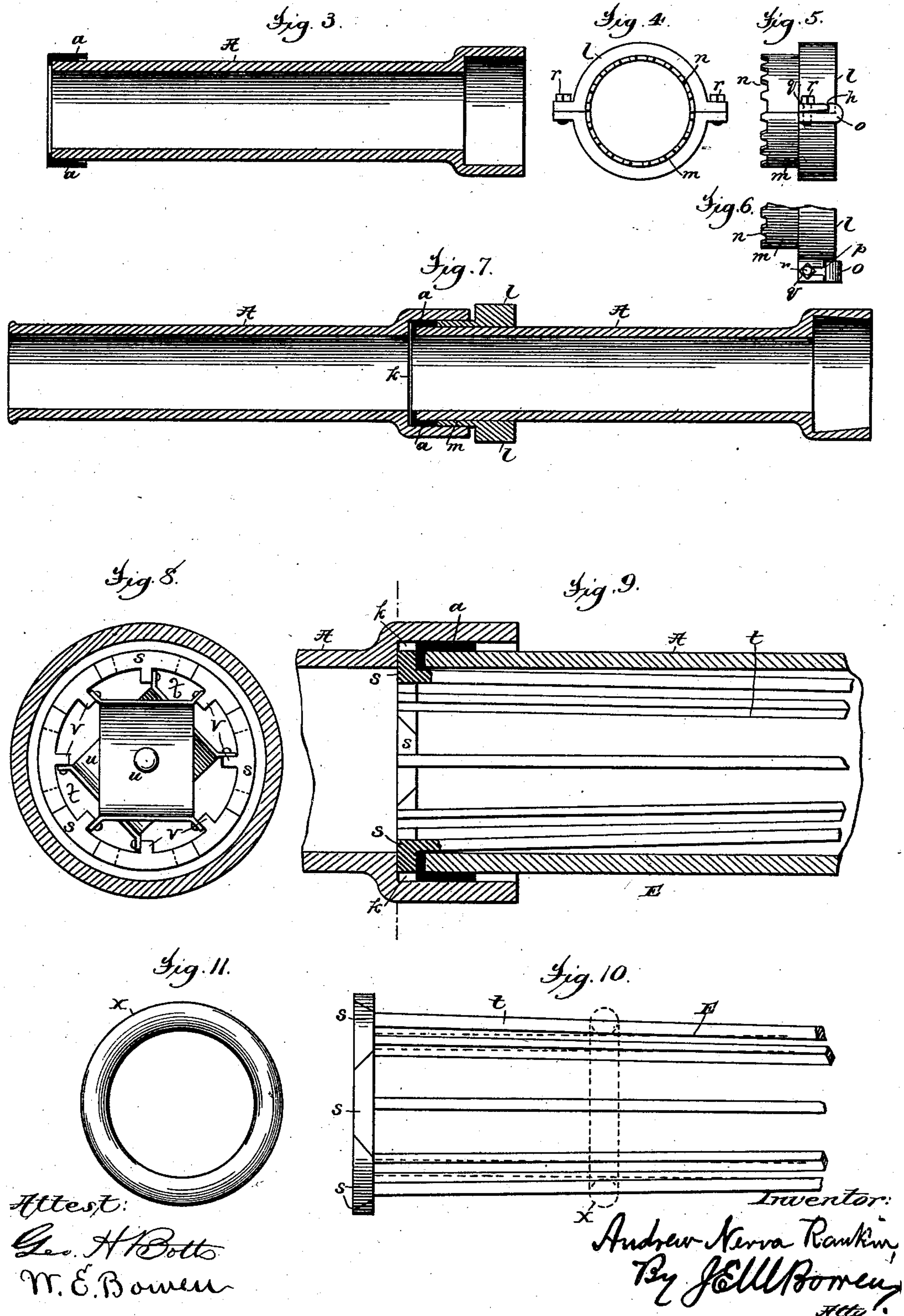
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# UNITED STATES PATENT OFFICE.

ANDREW NERVA RANKIN, OF JAMAICA, NEW YORK.

## TOOL FOR FORMING COLD-PACKED PIPE-JOINTS.

SPECIFICATION forming part of Letters Patent No. 376,609, dated January 17, 1888.

Application filed March 9, 1887. Serial No. 230,246. (No model.)

*To all whom it may concern:*

Be it known that I, ANDREW NERVA RANKIN, a citizen of the United States, and a resident of Jamaica, in the county of Queens and State of New York, have invented certain new and useful Tools for Forming Cold-Packed Pipe-Joints, of which the following is a specification.

This invention relates to tools or devices for forming the cold-packed pipe-joint patented to me on August 10, 1886, No. 347,060. In the patent in question I have described and claimed a pipe-joint wherein a band of lead is cast around the spigot end of an iron pipe, whereby a perfect connection between said pipe and band is provided. In connecting the spigot end of the pipe to its companion section I employ a tool by which the said lead band is upset against the interior walls of the socket or bell of the companion section, whereby a close fit between said lead band and socket is provided. In the present instance I desire protection for certain tools or devices by which I am enabled to expeditiously and satisfactorily, first, cast the lead band upon the spigot end of the pipe; second, effectually upset said band, so as to form a close contact between it and the walls of the socket or bell of the companion section; and, third, to cast said lead band upon the spigot end in such manner as to provide a space between the end of the lead band at the extremity of the pipe end and the base of the socket or bell, so that a slip-joint is provided which will permit the pipe-sections to contract or expand with the variations of temperature.

The objects of my invention are sufficiently set forth in the above statement; and the invention consists of the features specifically defined in the claims at the end of this specification.

In the accompanying drawings, which form a part of this specification, and in which like features are indicated by like letters of reference in the several views, Figure 1 is a cross-section of the mold whereby the lead band is cast upon the spigot end of the pipe, the pipe in said view being shown at A. Fig. 2 is a longitudinal section of a section of pipe with the mold in position. The latter is also in

longitudinal section, showing the lead band cast on the pipe end. Fig. 3 is a longitudinal section of pipe provided with a soft-metal band. Fig. 4 is an end view of the device for upsetting the soft-metal band *a* against the inner walls of the socket or bell of the pipe. Fig. 5 is a side elevation of the upsetting device shown in Fig. 4. Fig. 6 is a fragmentary section of Fig. 4, showing the means of connecting the several parts of said upsetting device together. Fig. 7 is a longitudinal sectional view of two sections of pipe provided with a joint made as herein described and having the upsetting device in position. Fig. 8 is an end view of my device for producing the space between the end of the band *a* and the base of the socket or bell, the pipe A in said view being in cross-section. Fig. 9 is a longitudinal sectional view of parts of two sections of pipe, showing the device in position, whereby the space between the end of the soft-metal band *a* and the base of the socket or bell is provided. Fig. 10 is a side elevation of the device last mentioned, and Fig. 11 is a side view of the ring or sleeve which is used for compressing the limbs of said device when it is to be withdrawn from the pipes.

Referring to the drawings, the letter A indicates the iron pipe-sections, and B the mold for casting the soft-metal band *a* upon the spigot end of the pipe-section. The mold B may be made of any suitable material, and, as shown, it is formed in two sections hinged together, and is secured in position around the end of the spigot end of the pipe by means of a suitable thumb-screw, *b*.

C represents a hinged ring, made of brass or of any suitable material, which is adapted to be placed around the pipe end and to be partly inclosed by the rear portion of the mold B. Upon the interior surface of this hinged ring C there is provided a dovetailed groove, *c*, which is fitted with a packing, preferably of asbestos, the object of which is to prevent the molten soft metal from escaping from the interior of the mold between said hinged ring C and the outer surface of the pipe. The ring C is also made in sections and hinged, in order to be easily placed upon the pipe end and removed therefrom. Upon the outer front sur-



face of said hinged ring C, or upon the interior surface of the mold B, at its rear side, there is provided a dovetail groove, *d*, which is fitted with packing, preferably of asbestos, the purpose of which is to prevent the molten soft metal from escaping between the mold and ring C, all as shown in Fig. 2. The front of mold B projects within the line formed by the inner circumference of pipe A at its end, when the said mold is placed in position upon the pipe end. This portion of the mold is marked *e* in the drawings.

It will be observed by referring to Fig. 2 that the part *e* of mold B is not in contact with the end of the pipe-section. A portion of the space thus left is occupied when the mold is in position for casting the lead band by a disk forming a part of a spring-plug, D. This disk is marked *f* in the drawings, and its function is to overlap the end of the pipe B, as stated, in order that when the soft metal is being cast around the pipe end it cannot escape. As said disk *f* only partly overlaps the end of the pipe-section, the molten metal flows round the pipe end and occupies a space not taken up by said disk. By this means the soft-metal band *a* is caused to partly overlap the end of the pipe, as shown at *g*, Fig. 2. At the back of the mold the hinged ring C extends sufficiently beyond the offset upon the interior surface at the rear of the mold to prevent the soft-metal band *a* coming in contact with the surface of the pipe at that point. This is the principal function of the hinged ring C, and by this means I am enabled to so cast the soft-metal band *a* upon the pipe end that for a small distance at its rear it will have no contact whatever with the surface of the pipe. The purpose of this peculiarity of the band *a* will be presently explained.

The spring-plug D is placed in the end of the pipe preliminary to affixing the mold in position, and in addition to the disk *f* it comprises a series of springs, *h*. After the soft-metal band *a* has been cast and the mold B removed from the pipe end, the spring-plug D is also easily removed, as will be obvious from an inspection of Fig. 2 of the drawings.

In Fig. 3 the pipe A is shown provided with the soft-metal band *a*, cast thereupon by means of the molding devices just described. It will be noticed that said soft-metal band partly overlaps the end of the said pipe-section, and for a short distance at its rear it is not in contact with the pipe-surface.

In Fig. 7 I show two companion sections of pipe, which illustrate the appearance of my joint when it has been perfected by means of the tools which will now be described. In this view the soft-metal band *a* is in position upon the pipe end and the device by which the upsetting operation has been performed has not yet been removed. This view also shows the space between the base of the socket or bell and the end of the pipe clothed with the soft-metal band *a*, which enables the pipe-sections to contract and expand under variations

of temperature. This space I have marked *k*, and the manner in which it is produced will be presently explained. By referring to this view, Fig. 7, it will be noticed that the soft-metal band *a* has been compressed or compacted by the action of the upsetting device, so that its rear end is snugly in contact with the surface of the spigot end, where, previous to its being operated upon by the upsetting device, it was not in contact therewith, as shown in Fig. 3—that is to say, in Fig. 7 the entire end of the spigot of the pipe is covered by the soft-metal band *a*, this result having been attained in the act of using the aforesaid mold and the upsetting device.

The tool or device by which I perform the upsetting operation is shown in Figs. 4, 5, and 6. This device is formed in sections, so that it may be readily placed in position upon the pipe and removed therefrom. It comprises the main portion *l* and the front extension *m*, which latter portion is provided upon its edge with serrations *n*, in order that it may more effectually perform this function. The sections of this upsetting device are connected together by the following means: Upon a section of the rear part, *l*, there are formed integral therewith lugs or ears *o*, of the form shown in Fig. 5, having the hammering surfaces curved and terminating in flat surfaces, as shown at *p*. Upon another section there are formed lugs *q*, which are slotted, as shown in Fig. 6. The rear ends of the lugs are rounding, as shown in Fig. 5, and the lower surfaces are slightly inclined from the front to the rear, as also shown in Fig. 5. These part sections are held together by screw-bolts *r*, smaller in cross-section than the slots in the lugs *q*, so as to pass loosely therethrough, and by reason of the peculiar construction of the lugs *q* the parts are tightened by means of the screw-bolts *r*, the effect being to slightly throw apart the sections of the serrated side extension *m*, and thereby enlarge the circumference of the serrated calking-tool. This will be found necessary in the calking process, in order that the entire rear end of the soft-metal band *a* may be uniformly acted upon, especially that part which does not adhere to the spigot.

The tool or device whereby the space between the base of the socket or bell and the rear end of the band *a* is provided for the purpose of permitting contraction and expansion is shown in Figs. 8, 9, 10, and 11. In these views, A is the pipe, *a* the soft-metal band, and *k* the space at the base of the socket or bell. In forming this space in the act of connecting two companion sections of pipe I place within the spigot end of the pipe the device E, which comprises a sectional ring, *s*, and a series of bars or rods, *t*, which are connected together at their rear ends by means of spring-plates *u*. When this device is placed in the pipe, the spring-joined rods *t* are expanded, so as to bring the several parts of the sectional ring *s*



in position, as shown in Fig. 8. The ring *s* is composed of a number of segmental parts, which are caused to overlap one another, as shown in dotted lines in Fig. 8. Each segmental section is provided with a lug, *v*, to which one of the bars *t* is secured.

Instead of the bar being formed independent of the segmental section and secured thereto, said section may be made integral with the bar. The rear ends of the bars *t* are connected to the spring-plates *u*, so that the tendency of the bars is to separate or spring outward at their front ends, which carry the segmental ring while the joint is being formed, and enable compression for their removal. The ring *s*, when in position within the pipe end, bears upon the extreme surface or end of the soft-metal band *a*, and also against the base of the socket or bell, as shown in Fig. 9. The ring or sleeve shown in Fig. 11 (marked *x*) is employed to facilitate the removal of the device now being described from the pipes after the formation of the joint between the sections.

In the use of the device just described, as before stated, it is placed in the spigot end of the pipe, which is clothed with the soft-metal band *a*, and it will then occupy the position with reference to the spigot or bell of the companion section of the pipe, when the spigot is entered therein, shown in Fig. 9. In this position of the tool the upsetting or calking operation is performed, preferably, by the tools shown in Figs. 4, 5, and 6, and after that manipulation has been accomplished the space-forming device is removed by moving the ring or sleeve *x* toward the front of said device, being toward the segmental ring *s*, the effect of which is to compress the spring-joined bars *t* and contract the segmental ring *s*, so that it may be readily caused to assume a diameter less than the bore of the pipe, and thereby permit its ready withdrawal from the perfected joint. The joint, when thus formed, as will be obvious from an inspection of Fig. 9, is provided with a space between the base of the socket or bell and the end of the soft-metal band *a*. I thus afford a very effective guard against bursting of the joints when the pipes are subjected to contraction and expansion with the variations of temperature, since it is obvious that there is room for the pipe-sections to move upon one another, there being no obstruction either at the back or in front of the soft-metal joint *a*.

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

1. A mold for casting a soft-metal band upon the spigot end of a pipe-section, comprising the sectional portions B, the hinged ring C, and suitable packing placed between said ring and mold and said ring and pipe-section, substantially as set forth.

2. The mold B and ring C, the said mold having an inwardly-projecting front, which,

when the mold is placed in position upon the pipe end, extends below the line of the bore of the pipe, combined with the disk *f*, secured within the bore of the pipe between the front of the mold and the end of the pipe, all the parts being adjusted so that the soft-metal band *a* may be formed to overlap the front end of the pipe-section, and also be separated a short distance at the rear from the pipe-surface, enabling the calking to act thereon against the inside of the socket or bell without disturbing the adhesion by shrinking of the balance of the soft-metal band to the spigot, substantially as set forth.

3. The mold B, provided with packing at its rear, combined with the hinged ring C, likewise provided with packing, the said hinged ring arranged to extend sufficiently within said mold, whereby the soft-metal band *a* at its rear end will not come in contact with the pipe-surface, substantially as and for the purpose set forth.

4. The mold B, having an inwardly-projecting front portion, combined with the hinged ring C and spring-plug D, the latter comprising a disk, *f*, of less diameter than the external diameter of the pipe end, and springs D, whereby a line of soft-metal packing is provided from the point of calking to the base of the socket or bell, substantially as set forth.

5. The sectional serrated upsetting device herein described, comprising a rear portion, *l*, and a front portion, *m*, the former provided with lugs *o* and its companion section with lugs *q*, the said lugs *q* being slotted and having an inclined under surface, as shown, and adapted to receive screw-bolts, substantially as set forth.

6. The sectional upsetting device comprising the rear portion, *l*, and side extension *m*, the latter provided upon its edge *n* with serrations, substantially as set forth.

7. The serrated sectional upsetting device provided with lugs *o*, whose rear ends are curved and terminate in a vertical plane, and with slotted lugs *q*, whose terminations are rounding and whose lower surfaces are inclined from the front to the rear, combined with screw-bolts having a smaller cross-section than the slots of the lugs *q*, substantially as set forth.

8. A tool or device for forming a space between the base of the socket or bell of one section of pipe and the soft-metal clothed spigot end of its companion section, comprising a segmental expanding and collapsible ring, a series of bars, *t*, and spring-plates connecting the rear ends of said bars, substantially as set forth.

9. The segmental expanding and collapsible ring, the sections whereof are provided with lugs, and a series of bars secured to said segmental sections at their front ends and having their rear ends attached to spring-plates, substantially as set forth.

10. The tool or device whereby a space may

be formed between the base of the socket or  
bell of one section of pipe and the soft-metal  
clothed end of the spigot of its companion  
section, comprising a collapsible and expand-  
5 ing segmental ring, bars connected to said seg-  
ments or integral therewith, spring-plates at  
the rear end of said bars, and the ring or sleeve  
æ, substantially as set forth.

Signed at New York, in the county of New  
York and State of New York, this 7th day of 10  
March, A. D. 1887.

ANDREW NERVA RANKIN.

Witnesses:

HUGO KOELKER,  
J. E. M. BOWEN.