

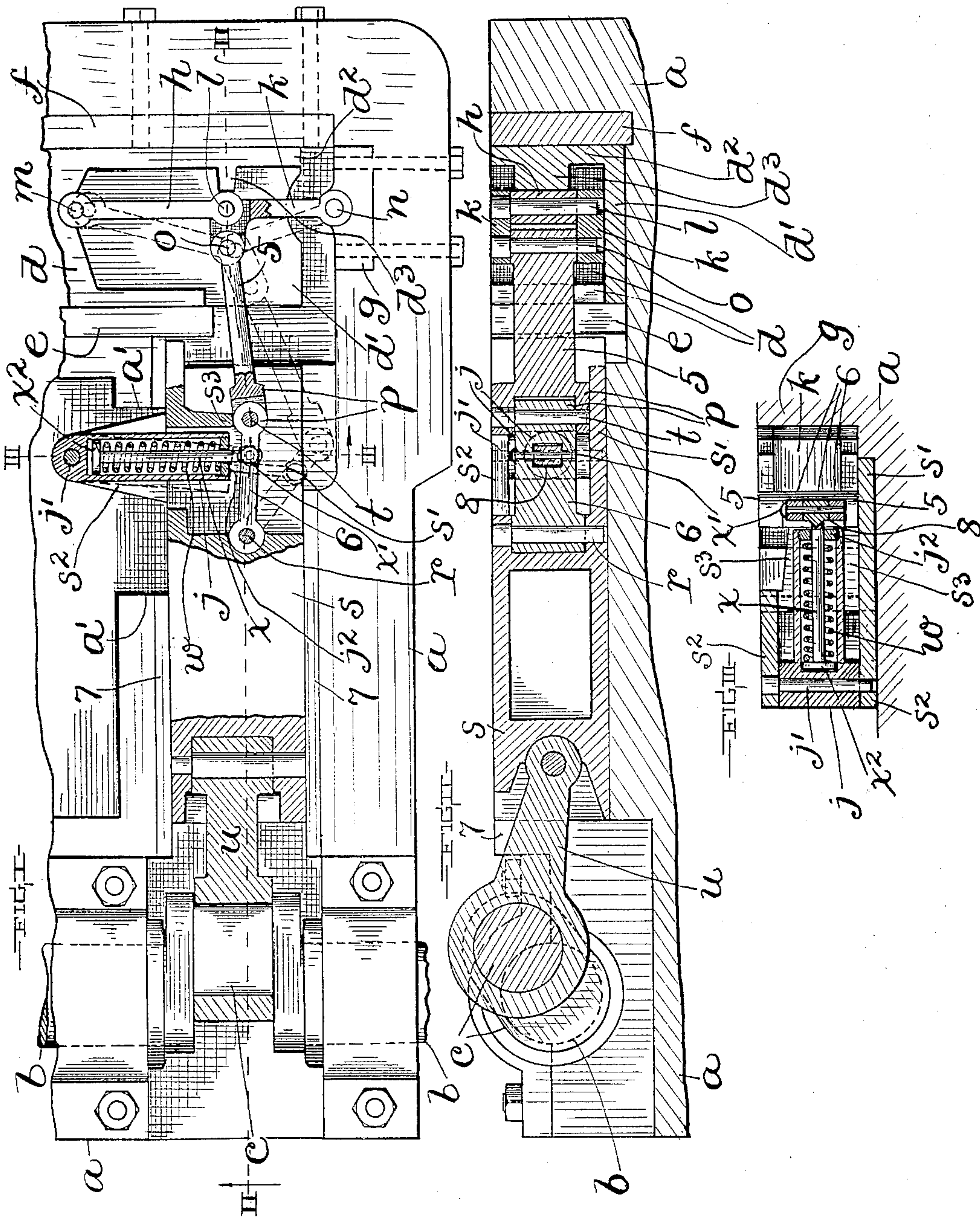
No. 707,553.

Patented Aug. 26, 1902.

J. A. COSTELLO & W. S. BIDLE.
PRESSURE EXERTING MACHINE.

(Application filed June 2, 1902.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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PRESSURE-EXERTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 707,553, dated August 26, 1902.

Application filed June 2, 1902. Serial No. 109,931. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH A. COSTELLO and WILLIAM S. BIDLE, citizens of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Pressure-Exerting Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

Our invention relates to improvements in pressure-exerting machines suitable for use in gripping, pressing, and forging operations—as, for instance, in gripping or exerting pressure against a blank or stock which is to be converted or formed into a predetermined article of manufacture; and our invention pertains more especially to a machine of the character indicated, which comprises a suitably-guided pressure-exerting block capable of reciprocation and actuated by a suitably-operated toggle-joint.

The general object of this invention is to permit the pressure-exerting block to dwell a suitable length of time in engagement with the object to be operated upon and to avoid breakage of or injury to any portion of the mechanism of the machine by an excess of material in or displacement of the said object or by any obstructing matter obtaining ingress to the space entered by the blank, stock, or material which is to be pressed against or otherwise operated upon by the said block.

With this object in view our invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure I is a top plan, largely in section, of a portion of a pressure-exerting machine embodying our invention. Fig. II is a side elevation in section on line II II, Fig. I, looking in the direction indicated by the arrow. Fig. III is a vertical section on line III III, Fig. I, looking in the direction indicated by the arrow.

Referring to the drawings, *a* designates the stationary horizontally-arranged bed of the machine, and *b* a crank-shaft arranged horizontally at one end of and supported from

the bed *a* and driven in any approved manner. A pressure-exerting block *d* is arranged at and supported from the opposite end of the bed *a*. The block *d* is capable of reciprocation and has its line of travel arranged parallel with the shaft *b*. The shaft *b* and the block *d* are arranged, therefore, a suitable distance apart longitudinally of the bed *a*. The block *d* is arranged to operate between two guide-forming walls *e* and *f*, with which the bed *a* is provided. The walls *e* and *f* are arranged at the inner side and outer side, respectively, of the path of the block *d*.

The block *d* is operated by a toggle-joint arranged at one end of the said block longitudinally between the said block and a thrust-block *g*. The two links *h* and *k* of the said toggle-joint are pivoted together vertically at their adjacent ends, as at *l*, centrally between the blocks *d* and *g*. The link *h* is pivoted vertically at its opposite end, as at *m*, to the block *d*, and the link *k* is pivoted vertically at its opposite end, as at *n*, to the thrust-block *g*.

The block *d* is provided at the bottom and at its toggle-joint-connecting end with a flat horizontally-arranged extension *d'*, which normally extends in under the aforesaid toggle-joint. The block extension *d'* is provided at its outer side edge with an upwardly-projecting flange *d''*, which extends from the block proper to the outer or free end of the said extension and has bearing at its outer side against the inner surface of the bar *f*, which extends along the said flange toward the thrust-block *g*. The flange *d''* is provided upon its inner side and next adjacent to the knuckle of the aforesaid toggle-joint with an inwardly-projecting stop-forming lug *d'''*, arranged to engage the said knuckle when the links of the said toggle-joint are arranged approximately in line when the block *d* is performing its function of engaging the object (not shown) to be operated upon. The link *k* of the aforesaid toggle-joint, adjacent to the knuckle of the said joint, is pivoted vertically, as at *o*, to the adjacent end of the link *5* of another toggle-joint *p*, which is arranged longitudinally between the knuckle of the first-mentioned toggle-joint and a slide *s*, which is capable of reciprocation and arranged to operate between the shaft *b* and the travel of

the block d , and the other link 6 of the toggle-joint p is pivoted vertically, as at r , to the said slide. The two links 5 and 6 are pivoted vertically to each other at the knuckle of the joint, as at t . It will be observed, therefore, that the first-mentioned toggle-joint is operatively connected at its knuckle, through the medium of the toggle-joint p , with the slide s , which is operatively connected by a pitman u with the crank c of the shaft b , and the bed a is provided with walls 7, arranged to form guides for the said slide, which rests upon the bottom of the recess or slideway formed between the said walls. The slide s is provided at its toggle-joint-connecting end and at the bottom with an extension s' , which is integral or rigid with the slide and projects in the direction of the travel of the block d . The member s' is arranged in under the toggle-joint p .

At one side of the toggle-joint p is a spring-containing case j , which is carried by the slide extension s' and is normally arranged at right angles to the travel of the slide s . As shown, the case j is arranged in a horizontal plane between two horizontally-arranged arms s^2 , with which the slide extension s' is provided above and below the said case, respectively, and the case is vertically pivoted, as at j' , to and between the free ends of the said arms. A rod x extends into and longitudinally of the case j and is pivoted vertically, as at x' , to the link 6 of the toggle-joint p in suitable proximity to the knuckle of the said joint. The rod x extends normally into close proximity to the inner end wall of the chamber of the case j and is there provided with a head or shoulder x^2 , and, as shown, the said rod at its opposite or pivoted end engages a slot 8, formed in the link 6. A spiral spring w is coiled around and confined upon the rod x , between the shoulder or head x^2 and an externally-screw-threaded ring j^2 , which is screwed into the correspondingly internally screw-threaded free end of the case j and embraces or surrounds the rod x . The ring j^2 is therefore removable to accommodate a renewal of the parts contained within the case j . The spring w is normally under enough tension to hold the toggle-joint p against a stop-forming lug s^3 , with which the upper side of the slide extension s' is provided, adjacent to the knuckle of the said joint and between the case j and the travel of the block d , but in close proximity to the said case. Preferably the toggle-joint abuts against the stop s^3 at its said knuckle, and the links 5 and 6 of the said joint are somewhat out of line in the normal position of the parts in the direction opposite to the direction in which the spring w acts upon the said joint.

By the construction hereinbefore described it is obvious that the stop s^3 , the case j , and its spring w and the toggle-joint p travel all with the slide s during the operation of the said slide.

The pressure-exerting block d should ade-

quately engage and operate upon the stock or object (not shown) to be engaged or pressed against, and the arrangement of the parts is such, therefore, that the said block d shall have been actuated into its pressure-exerting position, as shown, before the slide s has completed its travel in the direction of the path of the said block, so that the said block shall be held in engagement with the object operated upon thereby the desired length of time, and obviously the further movement of the said slide in the said direction during the said travel of the slide while the block d dwells in the performance of its function results in the actuation of the links 5 and 6 farther out of line against the action of the spring w and away from the stop s^3 . It is obvious also that should the pressure-exerting block d during its forward stroke and before the toggle-links h and k shall have been actuated into line during the actuation of the toggle-joint formed by the said links toward the stop d^3 be arrested by any obstructing matter or otherwise the toggle-joint p would yield against the action of the spring w , and thereby prevent breakage of or injury to the toggle-joints and connected parts. For instance, if the block d during its forward stroke were arrested when the links h and k are in the position shown in dotted lines, Fig. I, the toggle-joint p would yield, as shown in dotted lines in the said drawings, against the action of the spring w , and to accommodate the yielding of the toggle-joint p the case j is pivotally supported from the slide s , so as to render the said case capable of oscillating in a horizontal plane during the yielding movement of the links of the said joint, and the bed a is cut away or recessed, as at a' , not only to accommodate the oscillation of the case j , but to accommodate the location of the arms s^2 during the travel of the slide s .

What we claim is—

1. The combination, with the stationary portion of the machine; a pressure-exerting member capable of reciprocation; means for guiding the said pressure-exerting member; a toggle-joint operatively connected, at one end, with the said pressure-exerting member and attached, at its opposite end, to the stationary portion of the machine; a slide arranged to travel at one side of and toward and from the travel of the aforesaid pressure-exerting member and provided, at the bottom, with an extension which is rigid with the slide and projects toward the travel of the said pressure-exerting member; means for guiding the slide, and means for actuating the slide, of another and laterally-yieldable toggle-joint arranged over the said slide extension and operatively connected with the slide at one end and operatively attached, at its opposite end, to the first-mentioned toggle-joint and normally having its links somewhat out of line; a stop-forming member provided upon the slide extension and arranged

to prevent the movement of the said links into line, and yieldable means acting to retain the said links in their normal position.

2. The combination, with the stationary portion of the machine; a pressure-exerting block capable of reciprocation; means for guiding the said block; a toggle-joint operatively connected, at one end, with the said block and attached, at its opposite end, to the stationary portion of the machine; a slide arranged to travel at one side of and toward and from the travel of the aforesaid block and provided, at the bottom, with an extension which is rigid with the slide and projects toward the travel of the said block and has a stop-forming lug upon its upper side; means for guiding the slide, and means for actuating the slide, of another and laterally-yieldable toggle-joint arranged over the slide extension and operatively connected with the slide at one end and operatively attached, at its opposite end, to the first-mentioned toggle-joint; yieldable means acting to retain the second-mentioned toggle-joint in its normal position, and the arrangement of the parts being such that the links of the said second-mentioned toggle-joint, in the normal position of the parts, abut against the aforesaid lug and are somewhat out of line in the direction opposite to the direction of action upon the said toggle-joint by the means which, as aforesaid, acts to retain the said toggle-joint in its normal position.

3. The combination, with the stationary portion of the machine; a pressure-exerting block capable of reciprocation; means for guiding the said block; a toggle-joint operatively connected, at one end, with the said block and attached, to the stationary portion of the machine; a slide capable of reciprocation and arranged to travel at one side of and toward and from the travel of the aforesaid block; means for guiding the slide, of another and laterally-yieldable toggle-joint operatively connected with the slide at one end and operatively and directly attached, at its opposite end, to the first-mentioned toggle-joint and having its links normally out of line laterally in one direction; a stop arranged to prevent the movement of the said links into line in the opposite direction, and yieldable means acting to retain the said second-mentioned toggle-joint in engagement with the said stop.

4. The combination, with the stationary portion of the machine; a pressure-exerting block capable of reciprocation; means for guiding the said block; a toggle-joint operatively connected, at one end, with the said block and attached, at its opposite end, to the stationary portion of the machine; a slide capable of reciprocation and arranged to travel at one side of and toward and from the travel of the aforesaid block; means for guiding the said slide, and means for actuating the slide, of another and yieldable toggle-joint operatively connected with the slide at one end and opera-

tively attached, at its opposite end, to the first-mentioned toggle-joint and having its links normally out of line; a stop arranged to prevent the movement of the said links into line and carried by the slide; a rod pivotally attached, at one end, to one of the said links; a case surrounding the said rod; a spiral spring confined and coiled upon the said rod within the said case and acting to retain the second-mentioned toggle-joint against the aforesaid stop, and the said case being pivotally supported from the slide and the arrangement of the parts being such that the said case shall be capable of oscillating during the yielding of the second-mentioned toggle-joint against the action of the aforesaid spring.

5. The combination, with the stationary portion of the machine; a pressure-exerting block capable of reciprocation; means for guiding the said block; a toggle-joint operatively connected, at one end, with the said block and attached, at its opposite end, to the stationary portion of the machine; a slide capable of reciprocation and arranged to travel at one side of and toward and from the travel of the aforesaid block, which slide is provided, at the bottom, with an extension which projects toward the travel of the pressure-exerting block, of another and laterally-yieldable toggle-joint arranged over the slide extension and vertically pivoted to the slide at one end and directly attached, at its opposite end, to the first-mentioned toggle-joint and having its links normally somewhat out of line; a stop provided upon the slide extension and arranged to prevent the movement of the said links into line and a suitably-applied spring acting to retain the second-mentioned toggle-joint in engagement with the said stop.

6. The combination, with the stationary portion of the machine; a pressure-exerting block capable of reciprocation; means for guiding the said block; a toggle-joint operatively connected, at one end, with the said block and attached, at its opposite end, to the stationary portion of the machine; a slide capable of reciprocation and arranged to travel at one side of and toward and from the travel of the aforesaid block and provided, at the bottom, with an extension which projects toward the travel of the pressure-exerting block and is provided, at one side, with two arms arranged one above the other and a suitable distance apart, and has a stop-forming lug; means for guiding the slide, and means for actuating the slide, of another and laterally-yieldable toggle-joint arranged over the slide extension and operatively connected with the slide at one end and operatively attached, at its opposite end, to the first-mentioned toggle-joint and normally having its links somewhat out of line and engaging the aforesaid lug; a case arranged longitudinally between and pivoted vertically to the aforesaid arms; a rod pivoted vertically at one end to one of the said links and extending into

and longitudinally of the said case, which rod is provided at its free end with a head or shoulder; a ring surrounding the rod at the free end of and attached to the case, and a
5 spiral spring coiled around the rod between the said ring and the aforesaid shoulder or head.

Signed by us at Cleveland, Ohio, this 24th day of May, 1902.

JOSEPH A. COSTELLO.
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Witnesses:

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