

(No Model.)

2 Sheets—Sheet 1.

J. HOOVEN.

MACHINE FOR BENDING TUBE SKELPS.

No. 320,936.

Patented June 30, 1885.

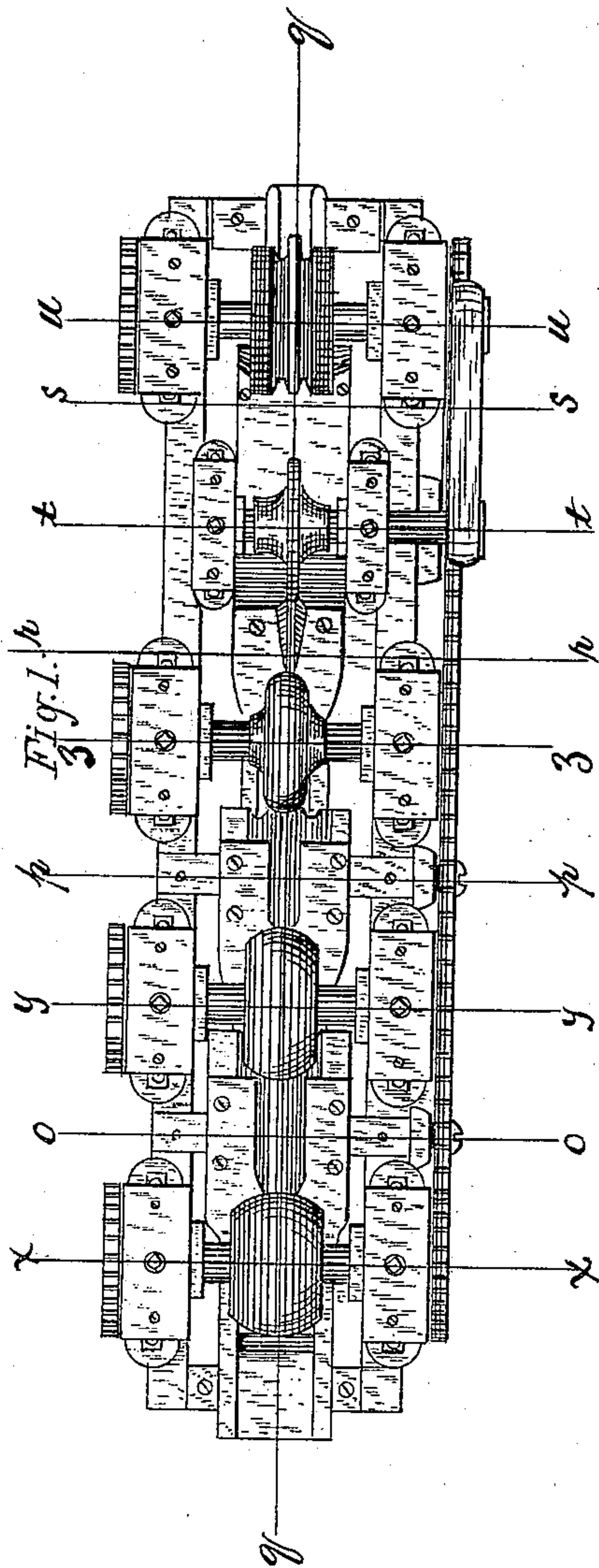


Fig. 2.

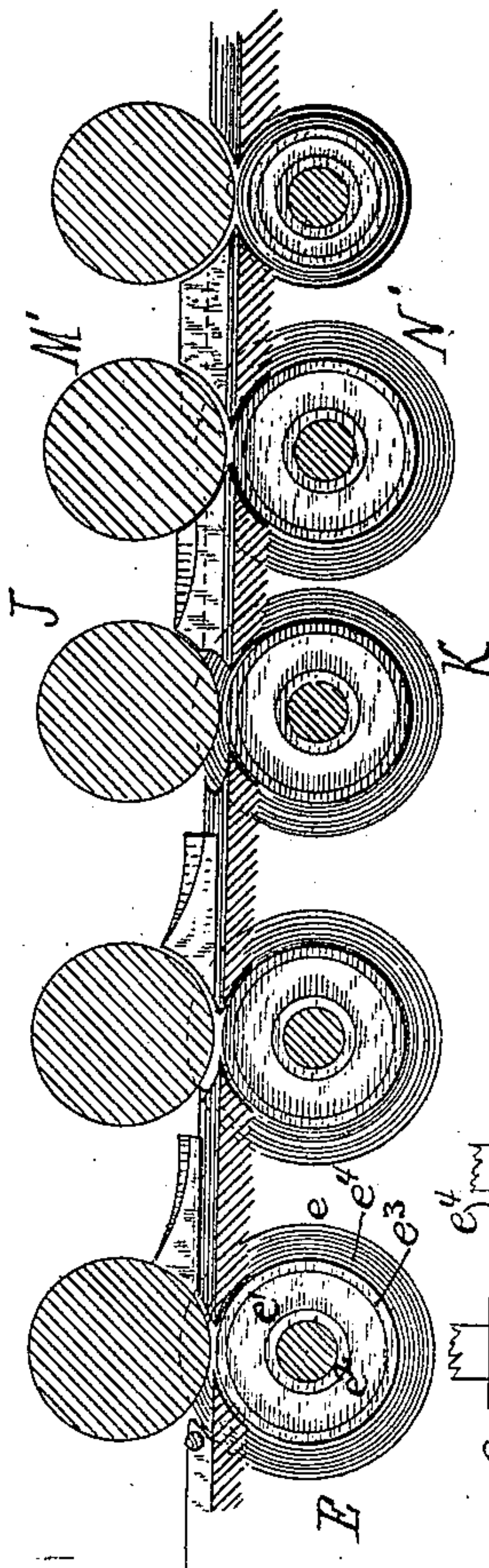
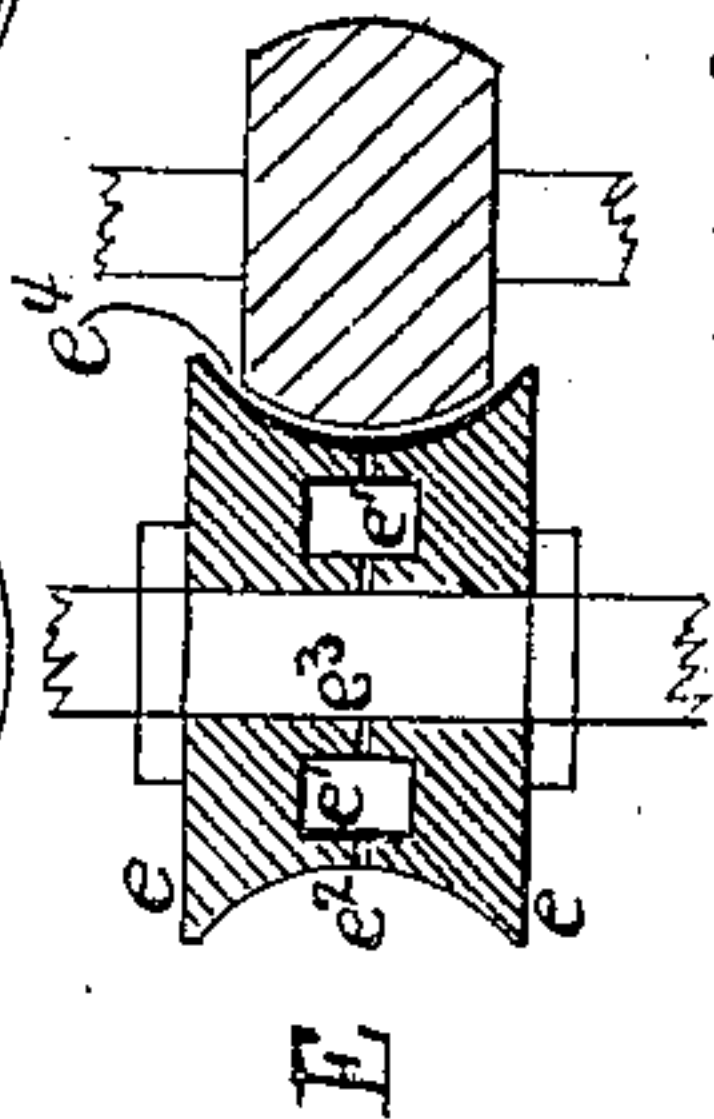


Fig. 3.



Witnesses

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2 Sheets—Sheet 2.

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Fig. 8.

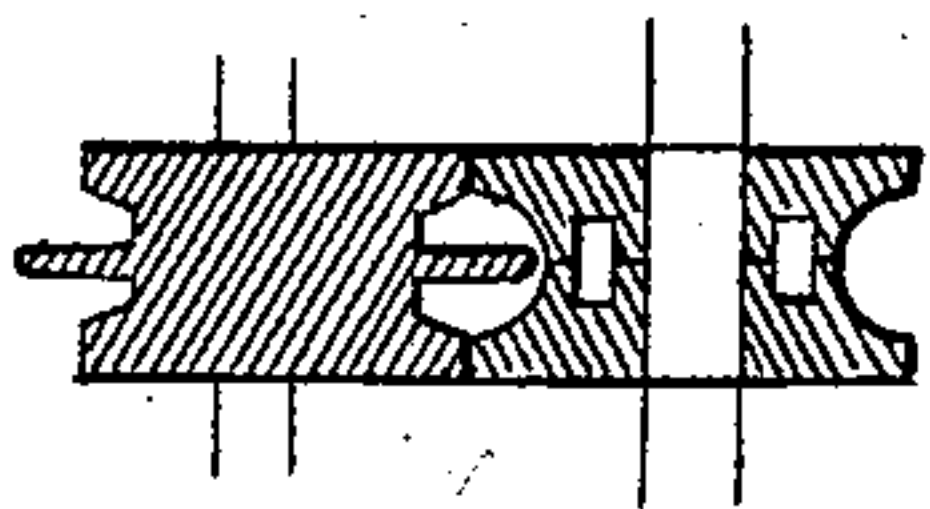


Fig. 7.

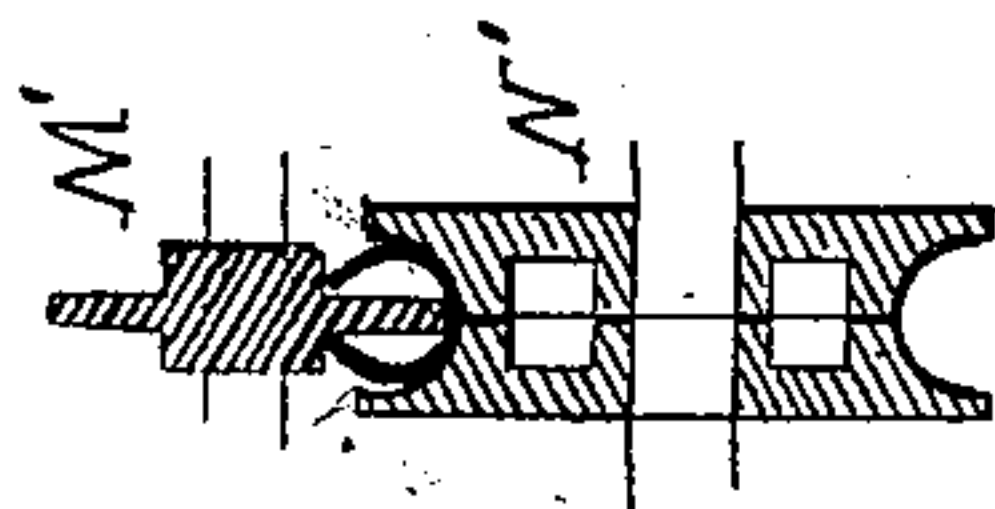


Fig. 12.



Fig. 6.

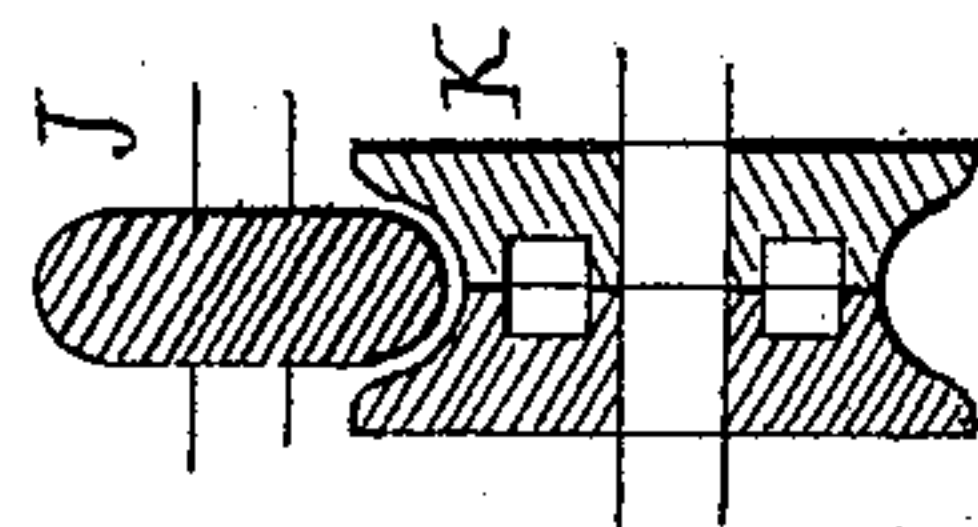


Fig. 11.

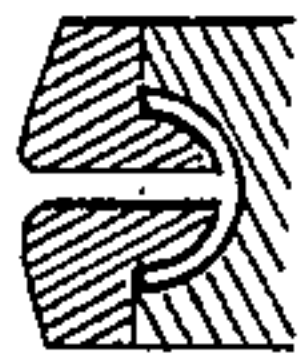


Fig. 5.

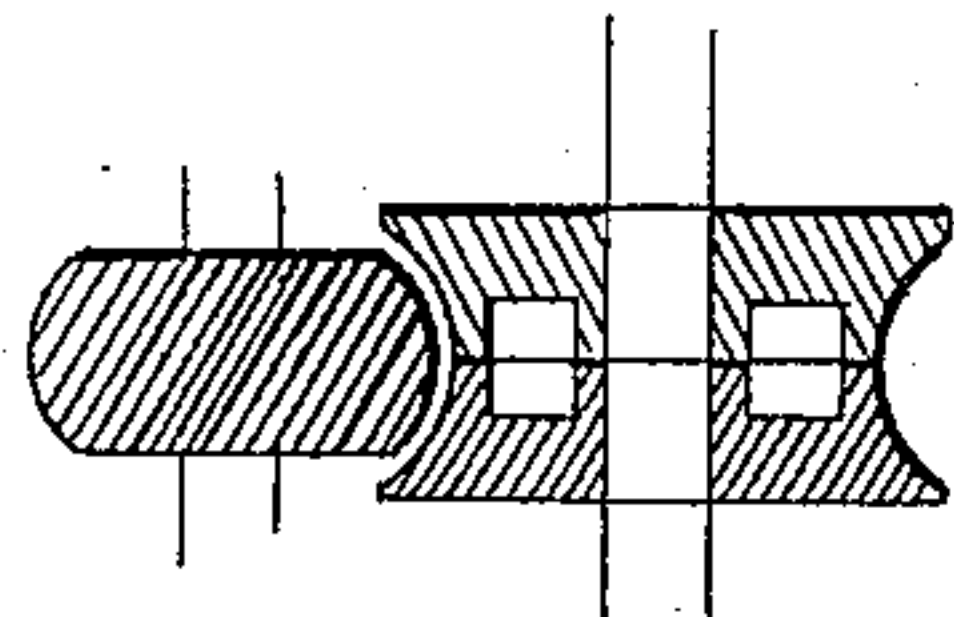


Fig. 10.



Fig. 4.

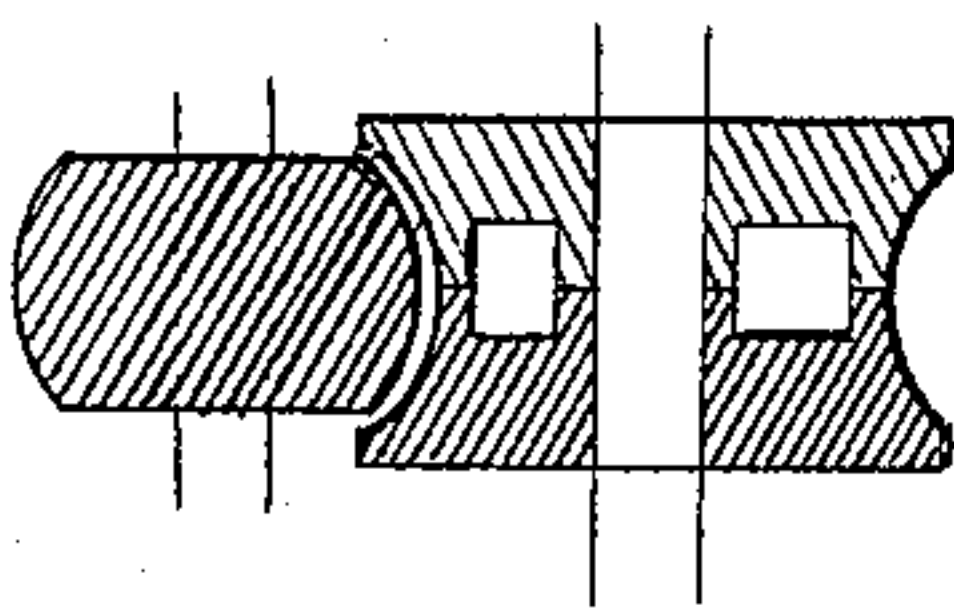


Fig. 9.

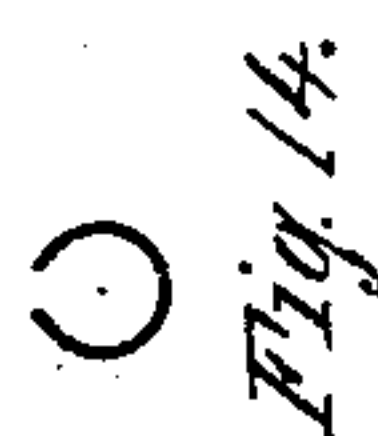


Fig. 13.

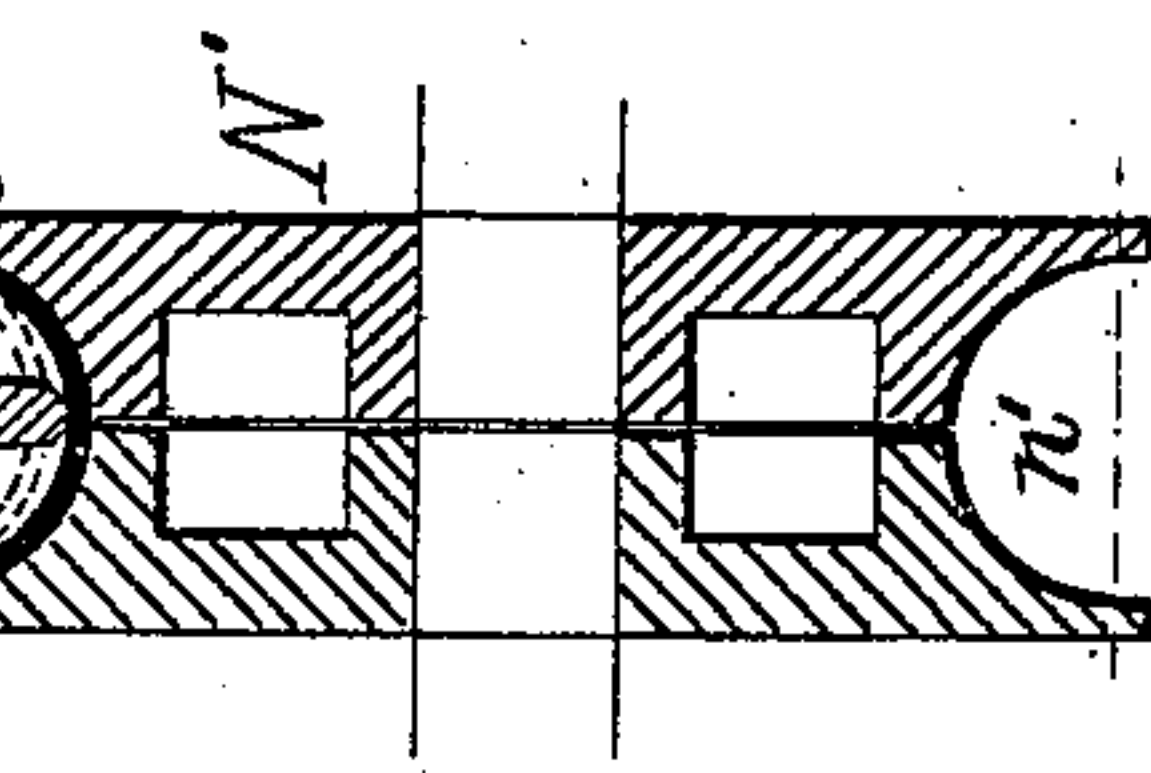


Fig. 15.

Witnesses

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Inventor

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*per Voorhees & Singleton*  
*Attys.*



# UNITED STATES PATENT OFFICE.

JAMES HOOVEN, OF NORRISTOWN, PENNSYLVANIA.

## MACHINE FOR BENDING TUBE-SKELPS.

SPECIFICATION forming part of Letters Patent No. 320,936, dated June 30, 1885.

Application filed November 22, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES HOOVEN, a citizen of the United States, residing at Norristown, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Bending or Skelping Machines, of which the following is a specification, reference being had to the accompanying drawings.

Figure 1 is a top or plan view of the device. Fig. 2 is a longitudinal section on the line  $q q$ , Fig. 1. Fig. 3 is a transverse section on the line  $x x$ , Fig. 1. Fig. 4 is a similar view. Fig. 5 is a transverse section on the line  $y y$ , Fig. 1. Fig. 6 is a transverse section on the line  $z z$ , Fig. 1. Fig. 7 is a transverse section on the line  $t t$ , Fig. 1. Fig. 8 is a transverse section on the line  $u u$ , Fig. 1. Fig. 9 is a transverse section on the line  $o o$ , Fig. 1. Fig. 10 is a transverse section on the line  $p p$ , Fig. 1. Fig. 11 is a transverse section on the line  $r r$ , Fig. 1. Fig. 12 is a transverse section on the line  $s s$ , Fig. 1. Fig. 13 is an end view of the skelp before entering the machine. Fig. 14 is an end view of the skelp as it leaves the machine. Fig. 15 is a section on line  $t t$ , Fig. 1, enlarged, showing the operation of the fourth set of rollers.

This invention relates to bending or skelping machines; and it consists in certain details which are improvements upon the device shown in my United States Patent No. 225,835, and which improvements are herein set forth and explained.

The machine is in all essential particulars like the one described in such patent, except so far as relates to the improvements. Reference is therefore made to such patent for a detailed description of the old portions of the device, only the improvements and so much of the machine as is requisite for a clear apprehension of them being herein set forth in detail.

In the annexed drawings, the letter E indicates the lower or female roller of the first pair of forming-rolls. In the patent referred to this and all the other lower rollers are solid. I now propose to make them in two parts or halves. This is clearly shown in Fig. 3,  $e e$  being the halves. These have each a circular recess,  $e'$ , made in them, about which are the facing-sur-

faces  $e^2 e^3$ . These two halves are fastened together on their shafts, forming one roller. As the peripheral groove  $e^4$  becomes worn the halves are removed, their facing-surfaces  $e^2 e^3$  reduced, the groove  $e^4$  trued, and the halves put together again. In this way as the rollers wear they can be trued up at small cost instead of being cast aside.

As shown in the other transverse sections, all the lower rollers are to be made in halves fastened together. In the patent referred to I use a pair of forming-rollers, M N, having a peculiar periphery, so as to start the skelp for the finishing-rollers. Instead of such rollers M N, I now propose to use the rollers M' N'. (Shown in Figs. 7 and 15.) These rollers are constructed in the main like the rollers J K just in front of them, but the roller M' is decidedly narrower than the groove in the roller N', as is clearly shown, and the groove  $n'$  in such roller N' is not a simple segment of a circle.

The edges  $n^2 n^2$  do not continue out with the same curvature as the bottom of the groove  $n'$ , but beyond the horizontal diameter  $y y$  of the groove they are tangential, such groove being in configuration like half of an ellipse flattened at the sides.

In the first three sets of rollers, as shown in the patent, and also in the present case, the grooves in the lower rollers and the peripheries in the upper rollers are circular in cross-section; hence the skelp passing through comes out circular in cross-section, as clearly appears. In the pair now referred to the upper roller is narrower in proportion to its groove than the upper roller of the other set.

By using the rollers M N, as described in the patent, the edges of the skelp are thrown in and given somewhat of a tangential line, as is clearly indicated by Fig. 6 of the patent. Now, by having the roller M' decidedly narrower than the groove  $n'$  in the roller N', as the skelp, circular in cross-section, comes to these rollers the skelp bears on the edges  $n^2 n^2$  of the roller N', as shown in dotted lines in Fig. 15, their curves not being the same. Now, as the roller M' bears upon the skelp it forces the latter down into the groove  $n'$ , the lower part of the skelp taking the form of the groove. The edges of the skelp taking fulcrum on the



edge of the groove are bent around, the narrow web of roller  $M'$  allowing, and come in toward such roller  $M'$ , the result being as shown in heavy lines in Fig. 15. The result is that  
 5 the skelp is circular all around, and when it is bitten by the last rollers it is in the right shape to be taken by them and enters freely with slight resistance.

Instead of employing rollers  $M' N'$  as a fourth  
 10 set, they might be substituted for rollers  $J K$ , only having four sets to the entire machine; but of course the more sets the less work for each.

Instead of gearing the upper roller of each  
 15 set positively in the machine, I may run them by friction, except the first one which, of course, is geared to run positively.

I am aware that split female rollers are old, and that they have been used in a number of  
 20 machines—such as swaging-machines. I lay no broad claim to such construction. My rollers are used in a skelping-machine wherein great strain comes upon the moving parts and there is a tendency to separate the two halves  
 25 of the split roller; hence these halves have to be forced together and held by great pressure. To resist this binding pressure and keep the halves from springing, they are provided at their centers with the facing-surfaces  $e^2$ . These  
 30 surfaces form a nave about the shaft, and, bearing against each other, prevent any spring-

ing of the halves when the latter are pressed together.

I am further aware that a skelp-bending machine has been devised in which the upper  
 35 roller is of less thickness than the width of the groove in the lower roller. In my device, however, the upper roller is so narrow that in forcing the skelp down into the groove the edges of the skelp are not bent, but are forced  
 40 against the edge of the groove and thrown inward, as already set forth.

What I claim is—

1. In a skelping-machine, the female roller  
 E, consisting of the two halves  $e e$ , each hav-  
 45 ing the recess  $e'$  and the facing-surfaces  $e^2 e^3$ , the latter forming the nave of the roller, whereby the halves are kept from springing when forced together, as set forth.

2. In a skelping-machine, the female roller  
 50  $N'$ , having the groove  $n'$ , its bottom curved, and the edges  $n^2 n^2$  tangential, as described, in combination with the roller  $M'$ , much narrower than the groove  $n'$ , whereby the edges of the skelp bearing on the parts  $n^2 n^2$  are forced in-  
 55 ward, as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES HOOVEN.

Witnesses:

WM. C. STOKES,

WM. H. ADLE.