

May 13, 1924.

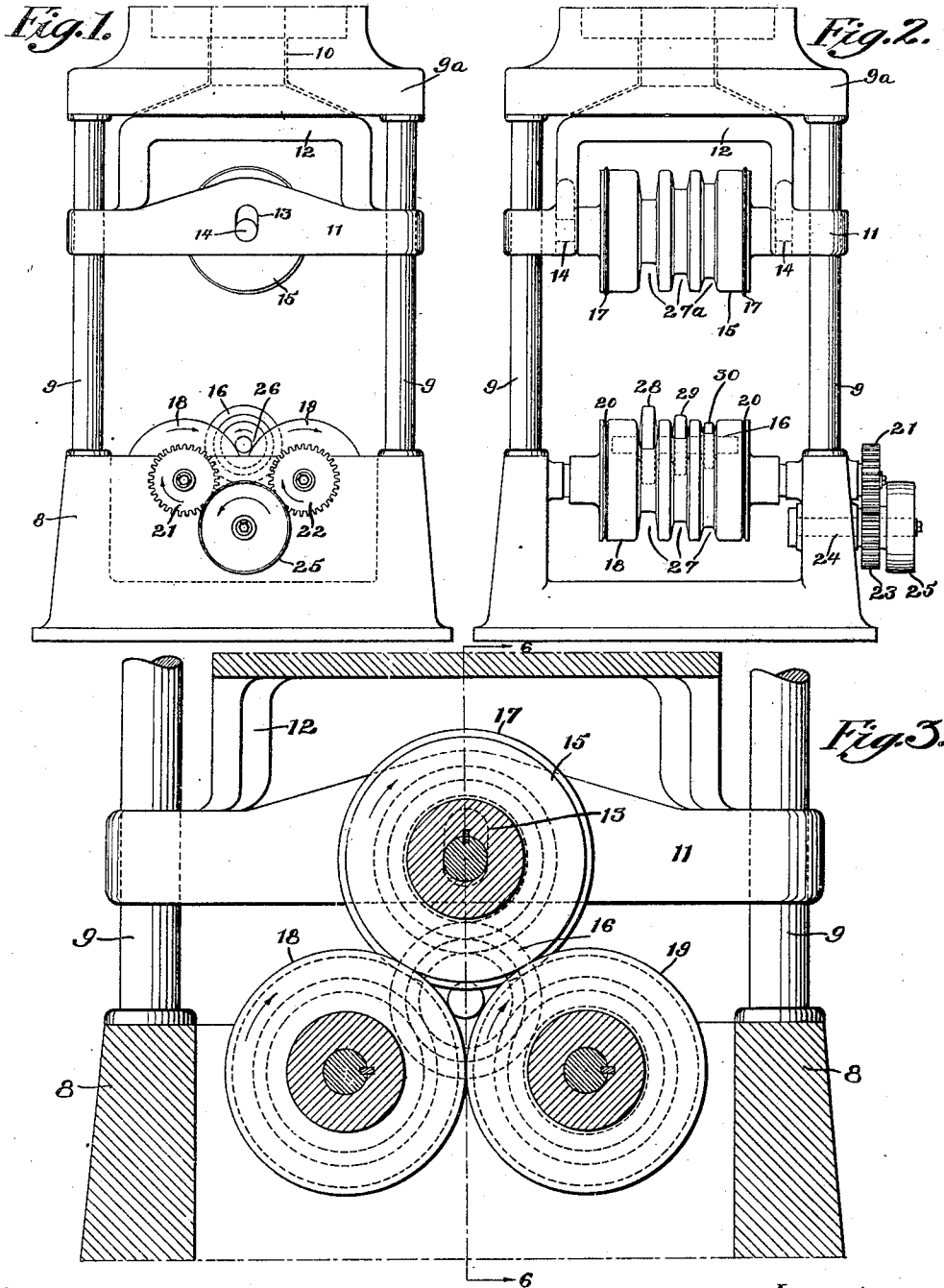
1,493,836

A. L. WURSTER

ROLL PRESS

Filed Dec. 2, 1920

3 Sheets-Sheet 1



Witnesses,
Spencer W. Megonegal,
Augustus B. Coppes

Inventor,
Amey L. Wurster,
by Joshua R. H. Tott
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3 Sheets-Sheet 2

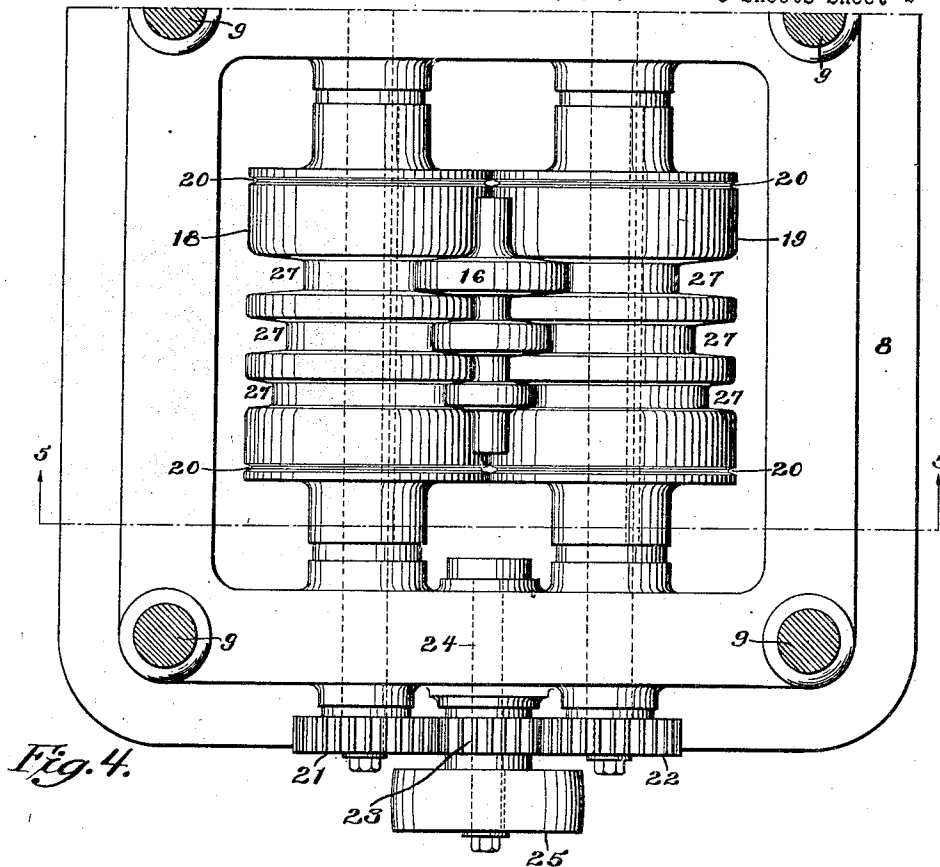


Fig. 4.

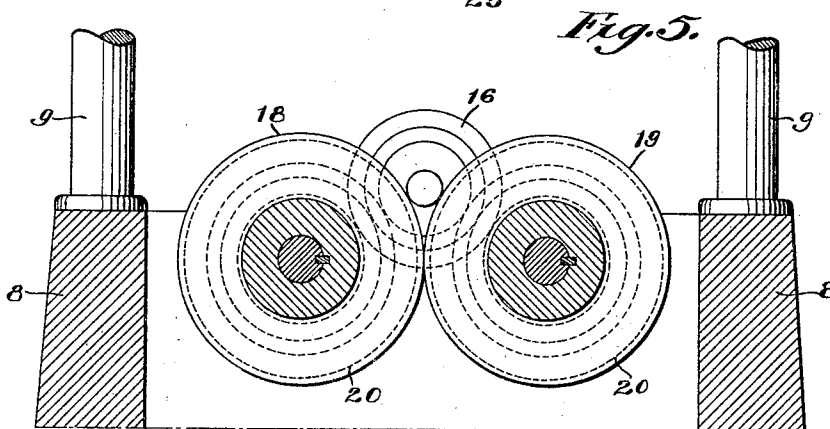


Fig. 5.

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3 Sheets-Sheet 3

Fig. 6.

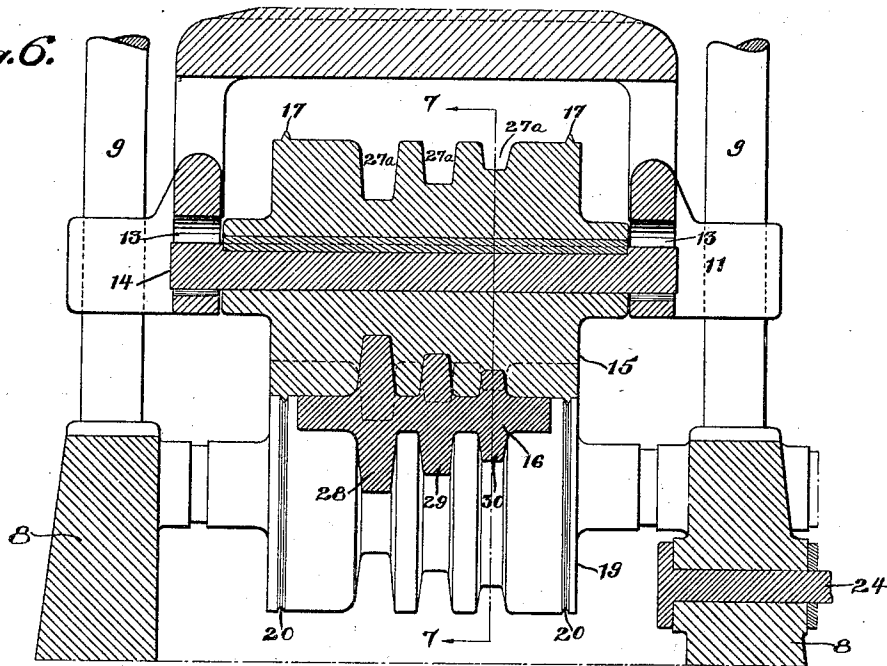
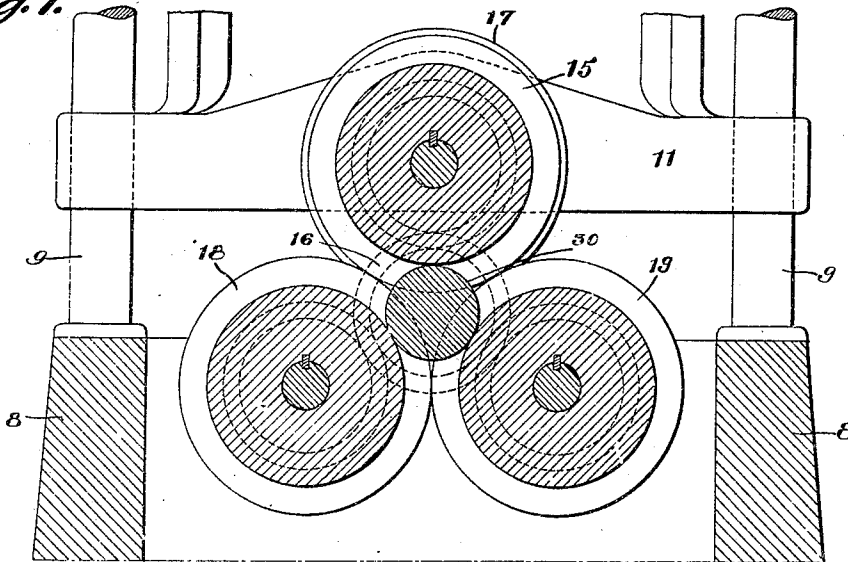


Fig. 7.



UNITED STATES PATENT OFFICE.

AMSY L. WURSTER, OF PHILADELPHIA, PENNSYLVANIA.

ROLL PRESS.

Application filed December 2, 1920. Serial No. 427,721.

To all whom it may concern:

Be it known that I, AMSY L. WURSTER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Roll Presses, of which the following is a specification.

One object of my invention is to facilitate the making of forged articles which are circular in cross section and in which the cross sectional diameter may vary either abruptly or gradually throughout the length of the articles.

Another object is to provide an improved roll press capable of carrying into effect the above mentioned object in such manner that the articles can be more accurately finished than heretofore possible and that said articles when finished will be especially suitable for certain classes of work both with respect to their strength and adaptability to the purpose intended.

A further object is to make my improved roll press of a simple and durable construction.

These objects, and other advantageous ends which will be described hereinafter, I attain in the following manner, reference being had to the accompanying drawings in which—

Figure 1 is an end elevation of a roll press embodying my invention,

Figure 2 is a front view of the roll press shown in Figure 1,

Figure 3 is an enlarged fragmentary cross section of certain of the parts of the roll press shown in Figures 1 and 2 and illustrating the same in a position assumed when finishing a forging,

Figure 4 is a plan view of Figure 3 with the top roll and its carrying means removed,

Figure 5 is a sectional elevation taken on the line 5—5 of Figure 4,

Figure 6 is a sectional elevation taken on the line 6—6 of Figure 3, and

Figure 7 is a transverse sectional elevation taken on the line 7—7 of Figure 6.

Referring to the drawings, my improved roll press in the design illustrated includes a heavy base 8 having four posts 9 which support at their upper ends a top structure 9^a which provides a guideway for a plunger 10 which may be moved upwardly into the position shown in Figures 1 and 2 by any suitable power device (not illustrated); said

plunger being connected to a head 11 through the medium of a yoke 12; said head having holes in which the posts 9 fit so that the head can be guided upwardly and downwardly on the posts 9. The head 11 at opposite ends has slots 13 which provide bearings for the trunnions 14 of a top presser roll 15, said roll being thereby allowed limited movement bodily in said head, so that the weight of the third roll is first brought into play and then positive pressure is applied. The outer surface of the roll 15 may be varied according to the character of work to be done and, for effecting the finishing of a forging such for example as shown at 16 in Figures 3 to 7 inclusive, the roll 15 is of the shape clearly illustrated in Figure 2; said roll adjacent its opposite ends being provided with annularly extending ribs 17 for a purpose hereinafter described. The base 8 provides bearings for two other rolls 18 and 19 which are constructed, in so far as their operating surface is concerned, similar to the roll 15 above mentioned. However, instead of having their opposite end portions provided with annular ribs such as the ribs 17 they are provided with annular grooves 20 of a cross section similar to the cross section of the ribs 17 and spaced apart at distances equal to the distance between the ribs 17 of the roll 15 so as to mate and engage therewith. The rolls 18 and 19 are mounted in the base 8 as a bearing in such manner that their axes will be parallel and spaced apart so that a vertical plane passing through the axis of the roll 15 will pass equidistantly between and parallel to the axes of the rolls 18 and 19.

During the operation of my improved press, the rolls 18 and 19 are rotated in the same direction and for this purpose I have illustrated these rolls as being connected with two spur gear wheels 21 and 22; said gear wheels being in mesh with a common drive gear wheel 23 which is mounted on a stud shaft 24 and rotated by any suitable source of power such for example as through the medium of the pulley 25. In operation the piece of metal which is to be forged into shape is placed so as to rest upon the surfaces of the rolls 18 and 19; it being noted that in the arrangement of said rolls as illustrated there will be a space formed between the extreme outermost portions thereof, which space forms a cradle or pocket as indicated at 26. The rolls 18 and 19 are

then caused to rotate both in the same direction and the head 11 is permitted to descend until the roll 15 rests on the metal to be forged. The head 11 is then caused to descend to a slightly lower level which it can attain due to the provision of the vertically elongated slots 13 which provide the bearings for the trunnions 14 of the roll 15. The metal of the article to be forged will be rotated due to its weight and frictional contact upon the rolls 18 and 19 and this rotation of the metal will cause the roll 15 to be rotated. Thus the roll 15 will be rotated in the same direction as the rolls 18 and 19 but in opposite directions at points of contact. Owing to the pressure exerted upon the metal to be forged by the roll 15 said metal will be forced into the spaces 27 provided by the rolls 18 and 19 and will also be forced into the spaces 27^a in the roll 15. This action will continue until the metal is worked into the spaces of the several rolls and an article will thus be forged such for example as the article 16 above referred to and illustrated.

The particular article 16 as illustrated can be used for example in transmission gear work in which annular projections of various diameters such as shown at 28, 29 and 30 can be milled or cut to form spur gear teeth and the device is especially suitable for lathe construction or as transmission gearing in automobiles.

One of the most valuable features of my present invention is that during the rolling and pressing of the material, the metal will be gradually forced into the recesses 27 and 27^a in a substantially circular direction so that the "grain" of the metal will take a substantially circular formation; thereby rendering an article produced on my improved roll press particularly serviceable for spur gear construction in which it is desirable to provide strength after the cutting of the teeth in the direction in which the gear wheel will rotate. Therefore instead of being pounded or pressed into shape by direct reciprocating movements, the metal of a forging produced on my improved roll press will be actually pressed in a substantially circular path and spun into shape. All of the rolls form a combination of rotatable dies in which there is a pressure between all of the rotatable dies; said pressure preferably being produced by gravitation on the roll 15.

I preferably design and make the arrangement of the rolls such that just prior to the complete finishing of the forging that the ribs 17 of the roll 15 will engage within the grooves 20 of the rolls 18 and 19 so that there will be an accurate registering of all the recesses and intervening annular projections of the several rolls and in this manner there is no possible chance of longitudinal

gripping or accidental movement between the respective rolls and the article produced will be an accurate reproduction effected by the operating portions of the outer surface of the rolls. When it is desired to remove the finished forging, the head 11 and roll 15 can be raised for example into the position shown in Figures 1 and 2 and the finished article can then be removed by lifting the same out of the cradle or pocket 26.

It will of course be understood that the metal to be worked is preferably of a curved cross section prior to being placed within the roll press and that it may be heated to any suitable working temperature.

While I have described my invention as taking a particular form, it will be understood that the various parts of my invention may be changed without departing from the spirit thereof, and hence I do not limit myself to the precise construction set forth, but consider that I am at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

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

1. A roll press including two die rolls placed side by side, said die rolls having annular recesses therein and providing adjacent their tops a cradle in which an article to be forged can be placed; means for rotating said rolls in the same direction; and a third roll having an operating surface of the same contour as said first rolls and being movable into engagement with said article whereby the material of said article will be rotatably pressed into the annular spaces of said rolls, said third roll being mounted in slotted bearings and normally resting in the bottom thereof, whereby the weight of the third roll is initially brought into play when said third roll is brought towards the other rolls; substantially as described.

2. A roll press including two die rolls placed side by side, said die rolls having annular recesses therein and providing adjacent their tops a cradle in which an article to be forged can be placed; means for rotating said rolls in the same direction; a third roll having an operating surface of the same contour as said first rolls and movable into engagement with said article so that it presses initially thereon by its own weight only whereby the material of said article will be rotatably pressed into the annular spaces of said rolls; and means for positively forcing the third roll toward the other rolls to increase the pressure over that exerted by gravity; substantially as described.

3. A roll press including two die rolls placed side by side, said die rolls having an-

nular recesses therein and providing adjacent their tops a cradle in which an article to be forged can be placed; means for rotating said rolls in the same direction; an
5 operating head having elongated slots therein; and a third roll having trunnions bearing within said slots, said third roll having an operating surface of the same contour as said first rolls, said head being movable to
10 permit said third roll to engage said article whereby the material of said article will be rotatably pressed into the annular spaces of

said rolls, the slots within said head permitting said head to move into such position as to allow the third roll to rest by gravity on
15 said material; substantially as described;

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AMSY L. WURSTER.

Witnesses:

ELIZABETH GARBE,
CHAS. E. POTTS.