No. 883,695 PATENTED APR. 7, 1908.

F. E. CANDA.

DIE.

APPLICATION FILED MAR. 19, 1906.

Fig. 1

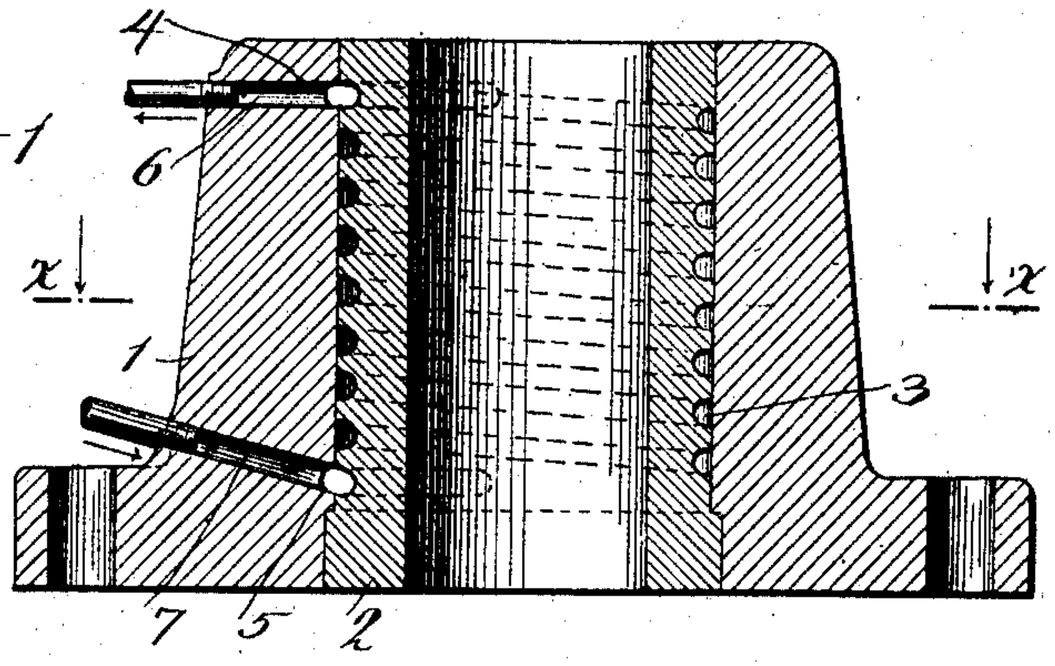


Fig. 2,

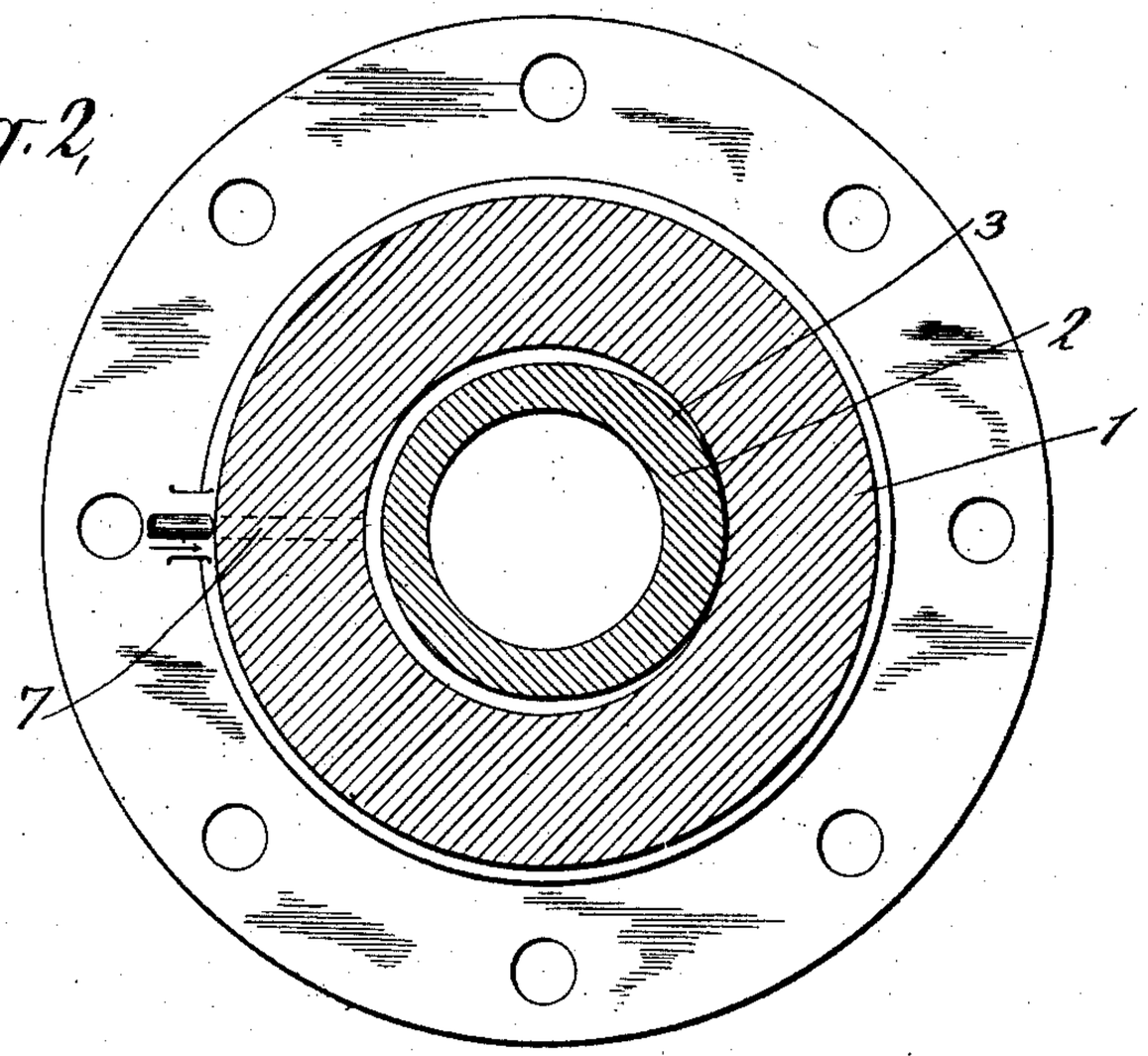
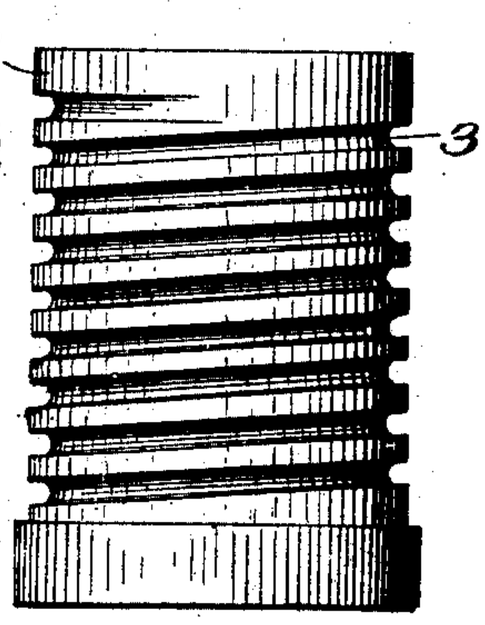


Fig. 3,



WITNESSES:

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DIE.

No. 883,695. Specification of Letters Patent. Patented April 7, 1908.

Application filed March 19, 1906. Serial No. 306,805.

To all whom it may concern:

Be it known that I, FERDINAND E. CANDA, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Dies; and I do hereby declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to means for cooling dies of presses and the like and consists in means for circulating cooling fluid through or around such dies, all as more fully hereinafter described and particularly pointed out in the claims.

The objects of my invention are to avoid over-heating of press dies and the like and to provide simple, inexpensive and reliable means for cooling the same.

I shall particularly describe my invention with reference to dies for forging presses such as are used for extremely heavy work, the particular die illustrated, being one intended for a hydraulic forging press of the type illustrated in my Patent No. 751,430, dated February 2nd, 1904; but it will be understood that the invention is applicable to various other and smaller types of dies, as well as to dies for many different kinds of machines and presses.

In the accompanying drawings; Figure 1 shows a central vertical section of the die of the forging press such as referred to, with the liner of said die in place; Fig. 2 shows a horizontal transverse section of said parts on the line $x\ x$ of Fig. 1; and Fig. 3 shows an elevation of the liner removed from the die, and particularly shows the exterior spiral groove of such liner, through which cooling fluid circulates.

In the said drawings: 1 designates an anvil die for a forging press, such as above referred to, and 2 a liner bushing therefor. This bushing fits closely within the bore of the die, being in fact usually forced in place under great pressure. It may, however, be removed by the application of pressure, and such bushings are from time to time removed and replaced by others as they become worn or as the size or style of the work to be done in the press is changed, a number of bushings of different sizes being frequently provided for the same die. When in place in the press, there is a hydraulic plunger immediately beneath the bore of the die and another hydraulic plunger above the same. The heated ingot to be pressed is placed within the bore of the bushing, resting upon the lower of said plungers and then by the action of the upper plunger, the ingot is compressed within the die and finally is forced outward, usually by the action of the lower plunger. I do not illustrate these plungers, as their location with respect to the anvil die and the method of operation of the press is well known to those acquainted with hydraulic forging presses. It will be readily apparent that much heat will be communicated from the highly heated ingot to the die, and that in order to avoid delay in the operation of the press it is highly desirable to provide means for carrying off the heat thus communicated to the die. This I do, in the construction shown, by providing in the side of the removable bushing 2 a spiral groove 3 and by providing in the inner wall of the die 1 grooves 4 and 5 adapted to register respectively with the upper and lower convolutions of the groove 3 when the bushing is in place. Ducts 6 and 7 lead from these grooves 4 and 5 to the outside, and there may be connected to pipes for supplying and carrying off cooling water or other cooling fluid.

Owing to the close fit of the bushing to the die proper, it is not usually necessary to pack or lute the joints between the die and bushings at the top and bottom.

In the operation of the press, water or other cooling fluid is circulated from duct 7 and through the spiral groove 3 in the bushing to duct 6 and thence outward, the water so circulated absorbing the heat communicated to the bushing from the heated ingot and keeping the bushing and die relatively cool and at practically a uniform temperature.

What I claim is:—

1. A die for forging presses and the like, comprising a die proper and a liner bushing fitting therein, said bushing having in the face adjacent to the die proper a channel for the circulation of cooling fluid, said die provided with means for supplying cooling fluid to said channel.

2. A die for forging presses and the like, comprising a die proper and a liner bushing therefor, said bushing provided in the face

adjacent to the die proper with a spiral groove for the circulation of cooling fluid, said die provided with supply and discharge ducts communicating with said groove.

3. A die for forging presses and the like, comprising a die proper and a liner bushing therefor, said liner bushing having in its outer surface a spiral groove for the circulation of cooling fluid, the die proper having supply and discharge ducts and grooves connected therewith and extending around the inner surface of said die proper, said grooves adapted to register with the spiral groove of the bushing when said bushing is in place.

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

FERDINAND E. CANDA.

Witnesses:

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H. M. MARBLE.