

(No Model.)

C. B. BEACH.
ROLLING MILL PLANT.

No. 370,521.

Patented Sept. 27, 1887.

Fig. 1.

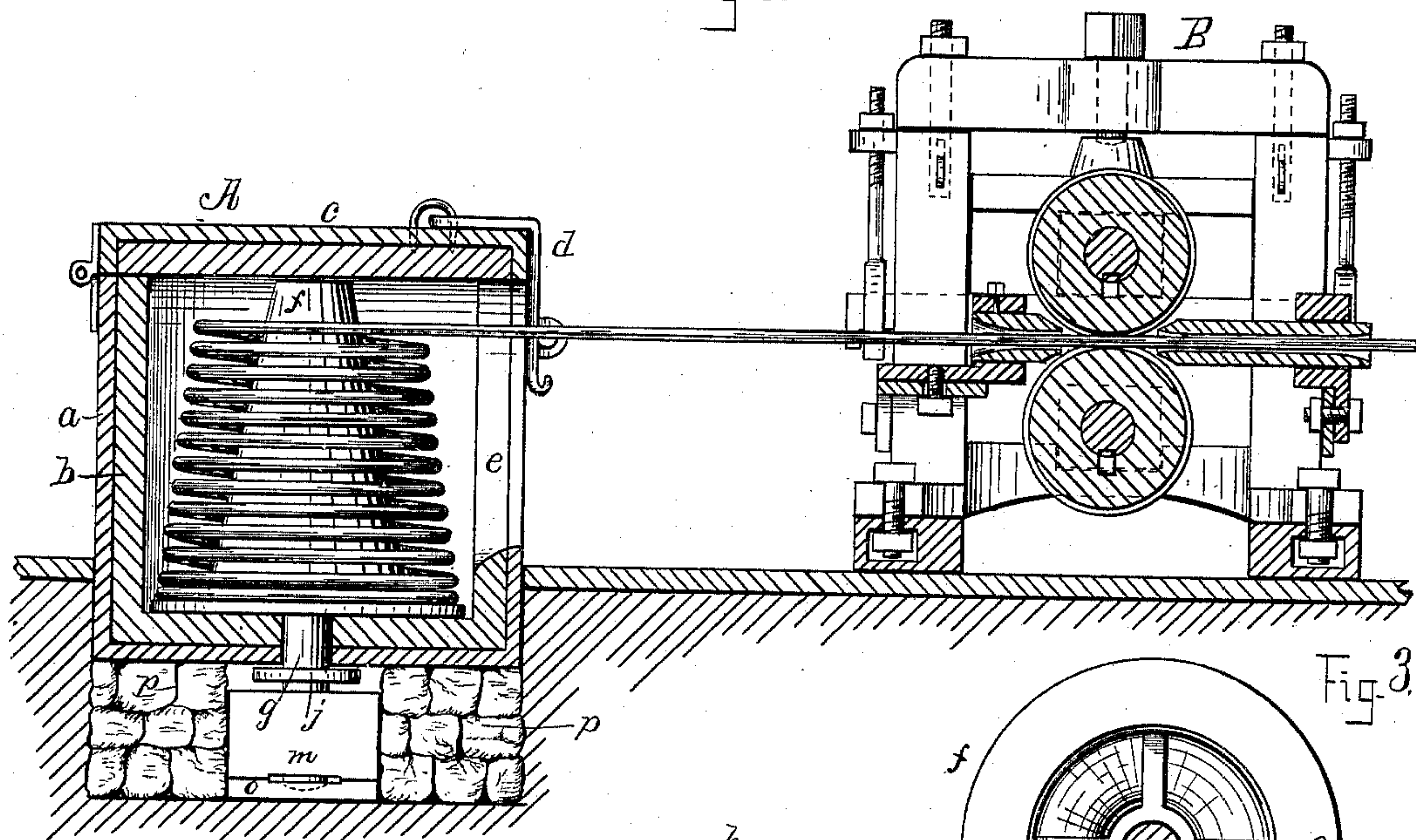


Fig. 2.

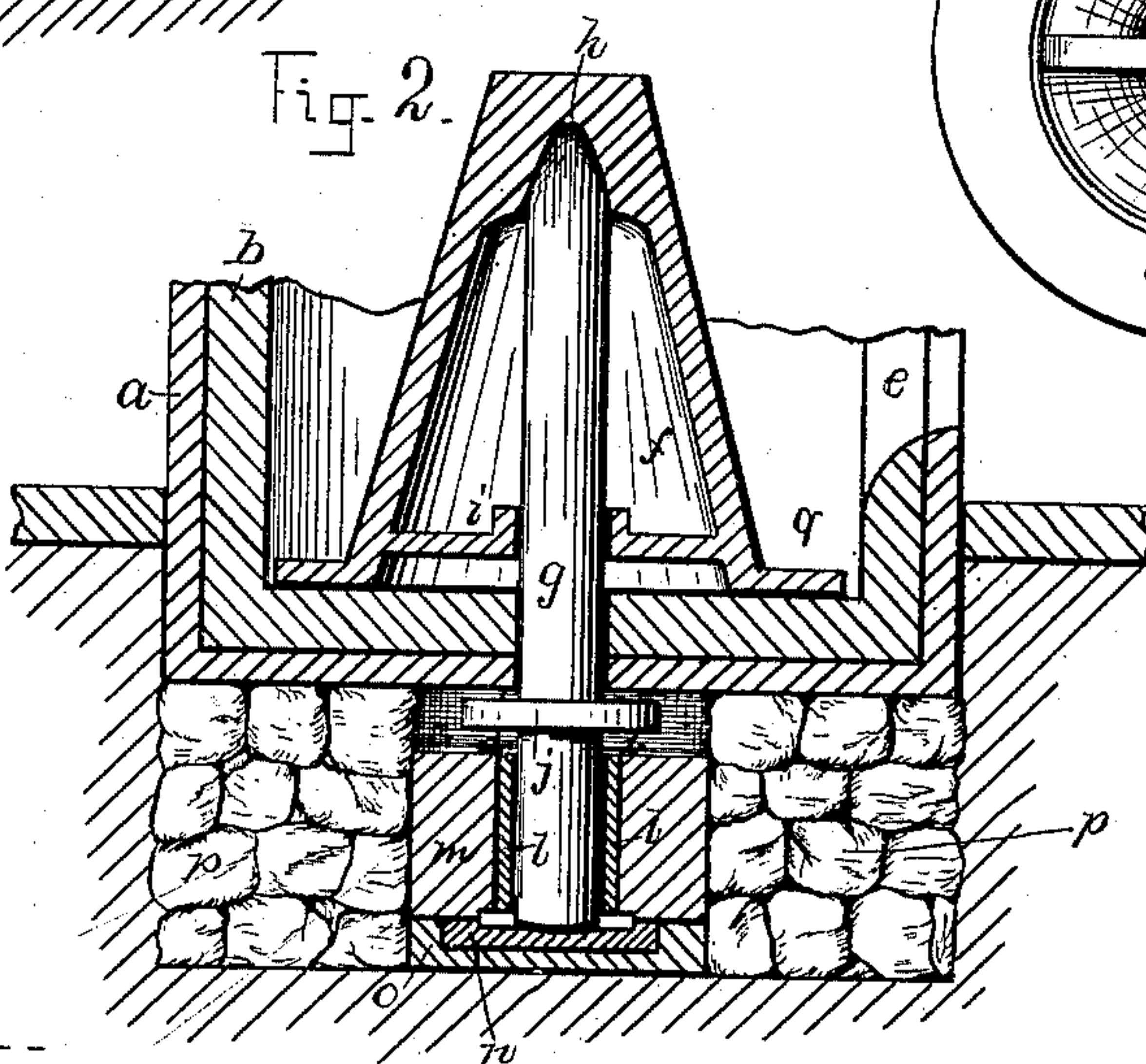


Fig. 3.

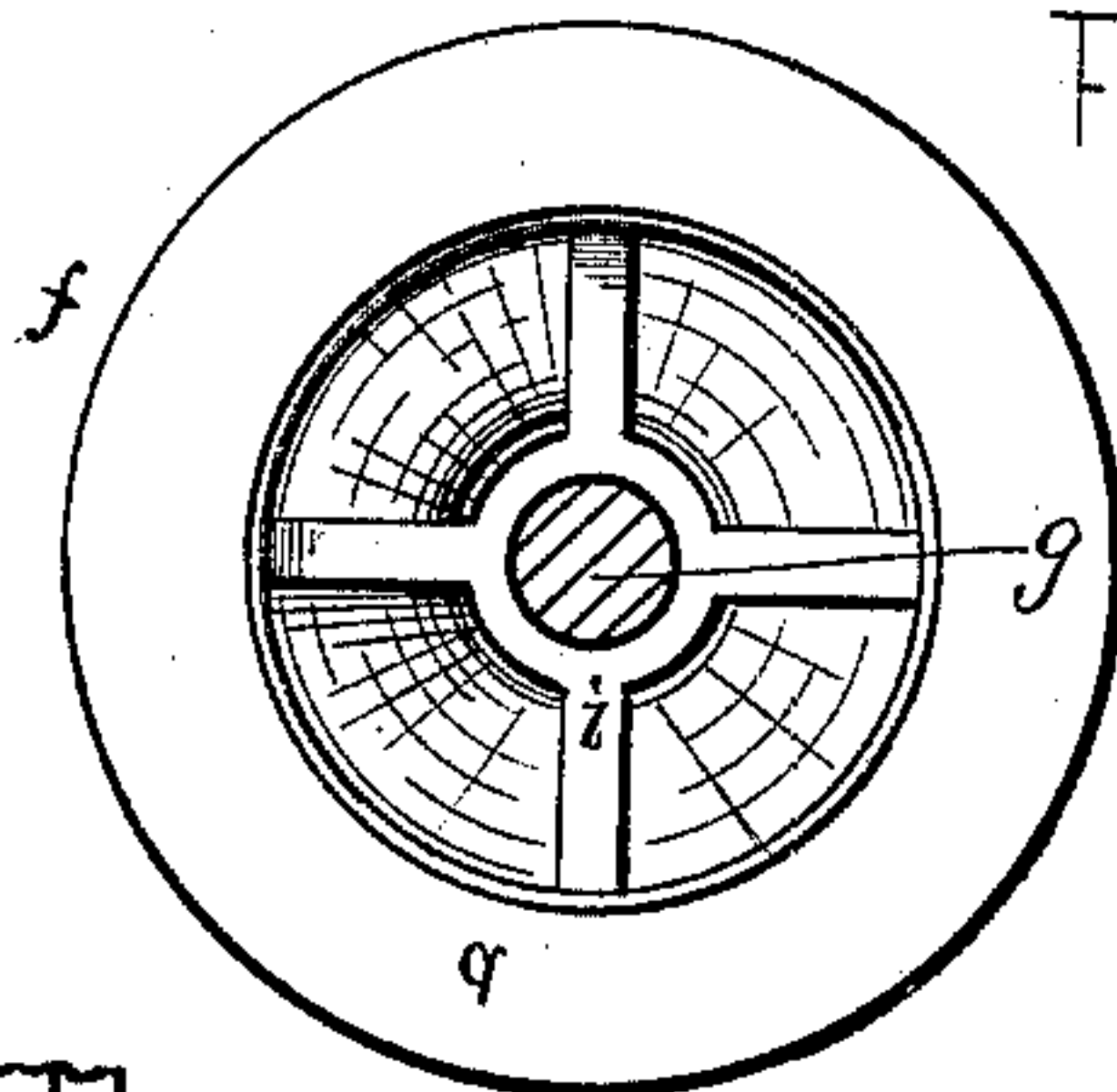
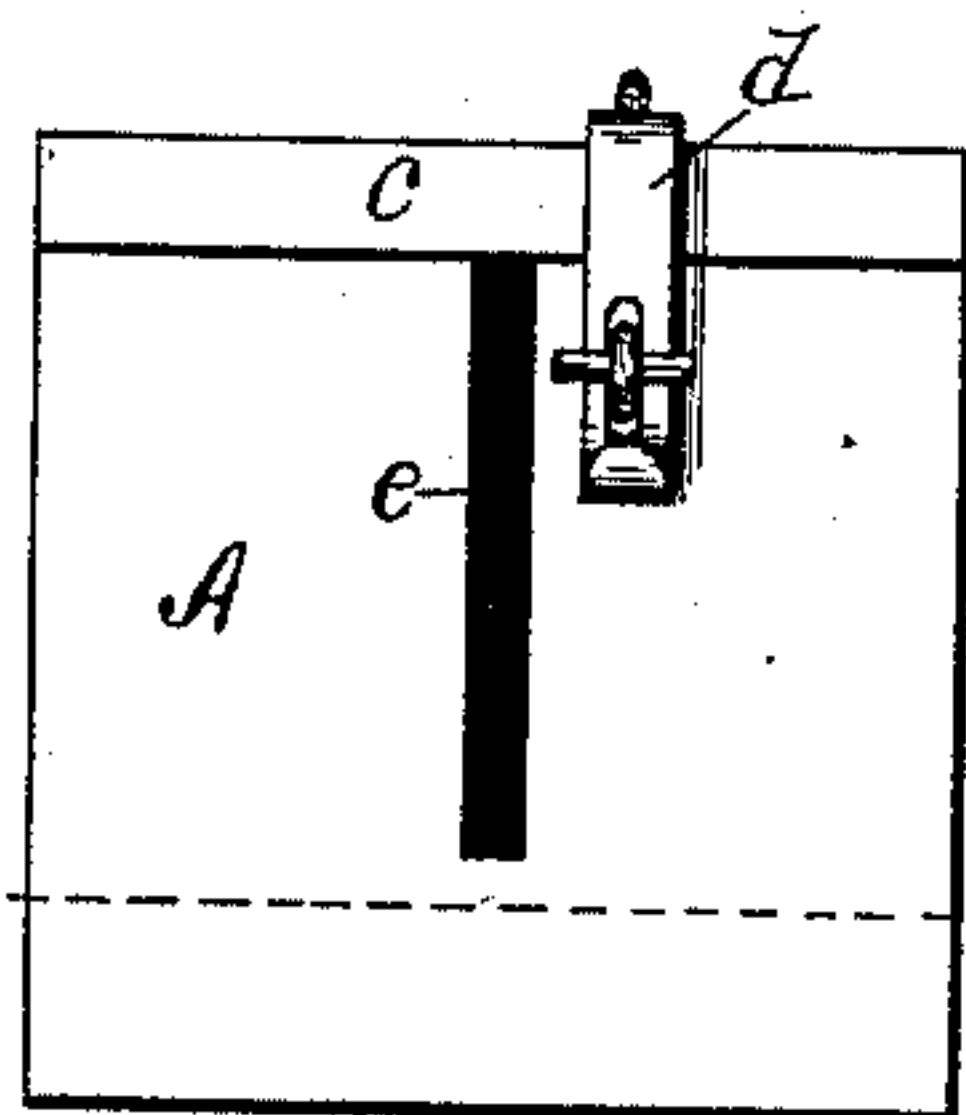


Fig. 4.



Witnesses
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By his Attorney
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UNITED STATES PATENT OFFICE.

CLIFTON B. BEACH, OF CLEVELAND, OHIO.

ROLLING-MILL PLANT.

SPECIFICATION forming part of Letters Patent No. 370,521, dated September 27, 1887.

Application filed April 6, 1887. Serial No. 233,851. (No model.)

To all whom it may concern:

Be it known that I, CLIFTON B. BEACH, a citizen of the United States, residing at Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Metal-Rolling Plants; and I do hereby declare the following to be a description of the same, and of the manner of constructing and using the invention, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it appertains to construct and use the same, reference being had to the accompanying drawings, forming a part of this specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle so as to distinguish it from other inventions.

The object of this invention is to provide a box in which a coiled billet may be placed while it is being uncoiled immediately preparatory to its being rolled down into rod form, said box being adapted to retain the heat of the billet, and thus prevent the loss of heat incident to exposure free from inclosure.

To have a clear understanding of the invention it is proper for me to refer to United States Patent application, Serial No. 233,926, filed by me April 6, 1887, said application covering as its subject-matter, as a new article in metal rolling, a coiled billet, said coiled billet being of great weight, far in excess of billets heretofore used. The weight of my said coiled billet may of course vary according to the particular circumstances; but, preferably, the proposed weight thereof ranges, say, from one thousand to two thousand pounds. The manner of producing such a coiled billet and the value thereof are set forth fully in said coiled-billet application, and it is unnecessary for me here to enter upon the explanation thereof. Suffice that the coiled billets have been charged in a furnace and reheated preparatory to being respectively rolled down into rod form. To maintain these coil-billets in a heated condition while they are respectively rolled down to rod form is the purpose and intent of this present invention, which I call a "heat-retaining box." It is apparent that if a billet of such unusually great weight as above described were to be exposed to open radiation it would be practically impossible to reduce it to the desired rod form by reason of the loss of heat

by radiation while thus exposed to the open air of the mill.

My invention therefore contemplates inclosing each of these reheated coiled billets in the heat-retaining box while the same is being uncoiled adjacent to the first stand of rolls in the rod-train.

Referring now to the drawings, I would state that the same represent an illustration of one form of embodiment of the principle of my invention, care not being therein had to the details or mere mechanical provisions, inasmuch as the latter two features of the construction are considered to be within the province of the mere mechanic, and may be of any character to suit the individual mind.

Figure 1 is a view representing my invention as in use, the heat-retaining box being shown in vertical section while its inclosed rotary drum is shown in side elevation and as having a coiled billet fitted thereon, said box being shown in position adjacent to the first stand of rolls in a rod-train, said stand of rolls being shown in vertical transverse section. Fig. 2 is a detail view representing the lower portion of the heat-retaining box in vertical section, upper portion of the box being torn away and representing the rotary drum in vertical central section, the spindle of the drum being shown in side elevation. Fig. 3 is a detail view in reverse plan of the drum. Fig. 4 is a detail view in front elevation of heat-retaining box, the same being drawn on a smaller scale than the other figures of the drawings.

The heat-retaining box A is constructed with plate or cast iron for its covering *a*, and is provided with an interior lining, *b*, of fire-brick or other refractory substance. Its lid *c* is similarly constructed with outer and inner sections, respectively, of the same material with the body of the box. The lid may be hinged onto the body of the box and provided with a temporary locking device, *d*. In the front wall of the box, facing the stand of rolls is made a central vertical slot, *e*, which serves as a delivery-opening for the passage of the uncoiled portion of the billet as the same is fed into the stand of rolls. The box is located close to and in front of the first stand of rolls, B, in a rod-train. The location of the box is such as to cause its delivery-opening to be in the same vertical plane with the roll-pass into which the billet is fed.

Within the box is centrally located a conical drum, *f*, said drum being of such proportion relative to the interior dimensions of the box and the dimension of the coiled billet as to cause the latter to fit loosely within the box upon the drum, and at the same time be snugly inclosed within the box. A central vertical spindle, *g*, passes through the interior central portion of the drum, and has conical bearing *h* with the upper portion of the drum. Said spindle passes through a central ring, *i*, formed in the lower portion of the drum, said ring serving as a lateral support for the drum as the latter rotates upon the conical bearing *h*. The spindle passes through a suitable opening formed in the bottom of the box, and is provided with a collar, *j*, formed thereon at a point just below the lower surface of said box-bottom, said collar being adapted by engagement with the box-bottom to act as a guard against any tendency of the spindle to displacement out of its vertical position. The lower longitudinal portion of the spindle is loosely fitted within a metal sleeve, *l*, which latter is tightly fitted in a suitable opening formed in a beam, *m*. The lower end of the spindle loosely rests in conical bearing on a metallic plate, *n*, said plate being suitably embedded in a beam, *o*. Suitable foundation-work, *p*, incloses said beams *m* and *o*, and also serves as the foundation for the box itself, said foundation-work being located below the horizontal plane of the floor of the mill, and said box being fitted upon said foundation, with its own bottom below the plane of the floor of the mill. The drum is adapted to be readily rotated about said spindle *g* as its longitudinal vertical axis, the said conical bearing *h*, between the upper portions, respectively, of said drum and spindle, permitting the drum to be thus rotated thereon, the spindle itself being also adapted to be rotated about its own longitudinal axis, being loosely stepped in the socket-base described, so as to readily rotate therein. Thus the drum is given every opportunity to free rotary movement, incident to the uncoiling of the billet. The lower portion of the drum is formed with an annular horizontal outwardly-projecting flange, *q*, said flange forming a vertical support upon which the coiled billet rests, keeping the latter from coming in contact with the bottom of the box, and thus the rotation of the drum is not impeded by friction between the rotated billet and the interior stationary portion of the box.

The mode of operation is substantially as follows: The long billet having been formed by previous process, coiled and reheated in a suitable furnace, it is taken out from the latter and placed in the heat-retaining box fitting upon the drum. The lid is then temporarily locked in closed position, and the free end of the coiled billet is passed through the delivery-opening of the box and stuck into the opposite roll-pass of the first stand of a rod-mill. The mill is at this initiatory stage of operation to be run at a slow speed, thereby permitting the

introduction of the rolling metal into the respective roll-passes of the different stands of rolls throughout the length of the train. The billet is thus proportionately uncoiled as it delivers the rolling metal into the mill, the drum being rotated during this operation and turning easily upon its bearings, thus permitting of the ready uncoiling of the billet. When the roll-passes throughout the train length are filled with the rolling metal, the train may be speeded up quickly to a very high rate of speed, said high rate of speed being continued until said billet has been passed through the train, whereupon the train may be slowed down to its first-mentioned rate of speed and the foregoing described operation be duplicated. During the time occupied in rolling to said rod form, the coiled billet, the latter is maintained in heated condition by and within the said heat-retaining box. The heat held by the coiled billet as the latter is brought directly from the reheating-furnace to the heat-retaining box is thus prevented from loss by radiation, and the coiled billet is thereby maintained in a heated condition suitable for rolling for a period of time long enough to permit of its entire great length being rolled down to the desired rod form. The heat which the coiled billet has upon being placed in the heat-retaining box is to some degree given out therefrom, the same, however, being imparted to the heat-retaining box and held by the latter. This constant supply of the heat-retaining box successively with billets fresh from the reheating-furnace causes said box to reach and be maintained at a high degree of temperature. By this means a coiled billet of the great weight heretofore described may maintain itself in rolling condition until reduced throughout its entire portion to the desired rod form.

It will of course be understood that the coiled billet shown in this application constitutes no part of the latter, and the claim to said coiled billet is rested in said application, Serial No. 233,926, hereinbefore referred to.

I claim as my invention—

1. In a metal-rolling plant, the combination, with a train of rolls, of the coiled-billet heat-retaining box A, said box inclosing a reheated coiled billet as the latter, taken from a reheating-furnace, is being uncoiled and fed into the roll-train, substantially as set forth.

2. In a metal-rolling plant, the combination, with the first stand of rolls, B, in a roll-train, of the coiled-billet heat-retaining box A, located in front of and close to said stand of rolls, said box provided with interior rotary drum, *f*, and having delivery-opening *e*, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 2d day of April, A. D. 1887.

CLIFTON B. BEACH.

Witnesses:

J. B. FAY,
E. J. CLIMO.