

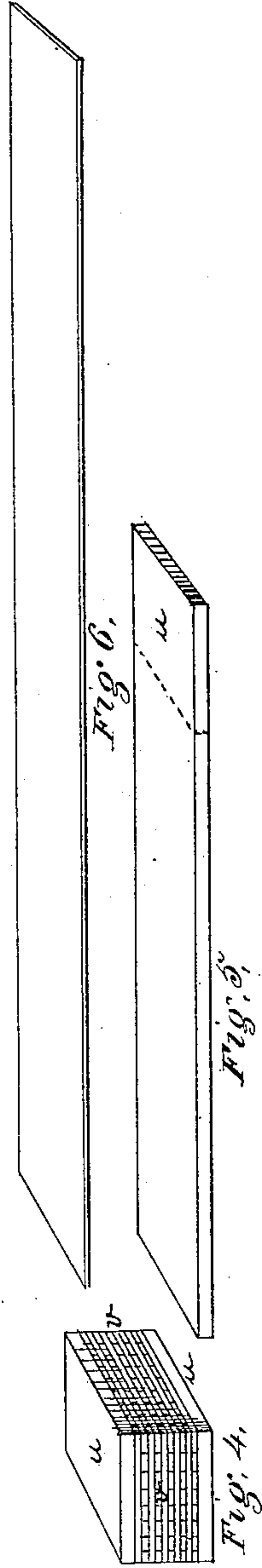
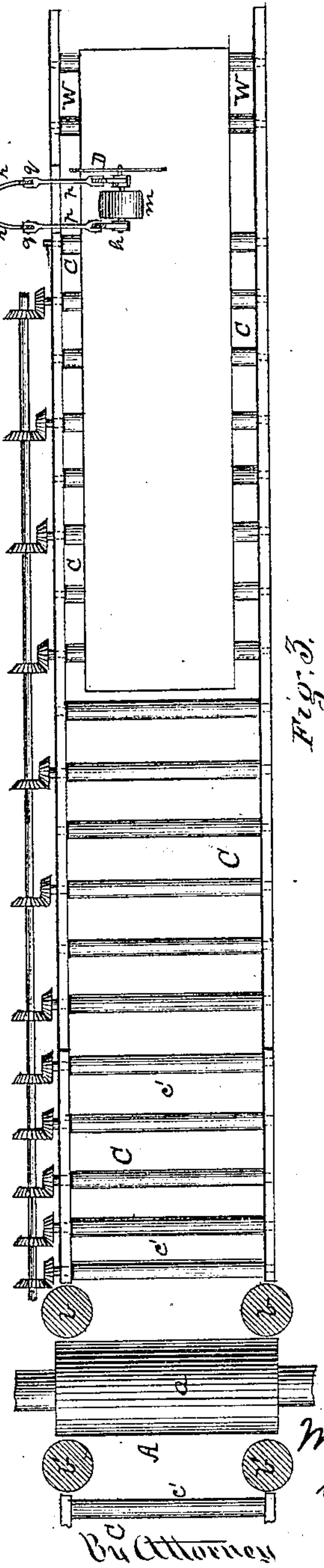
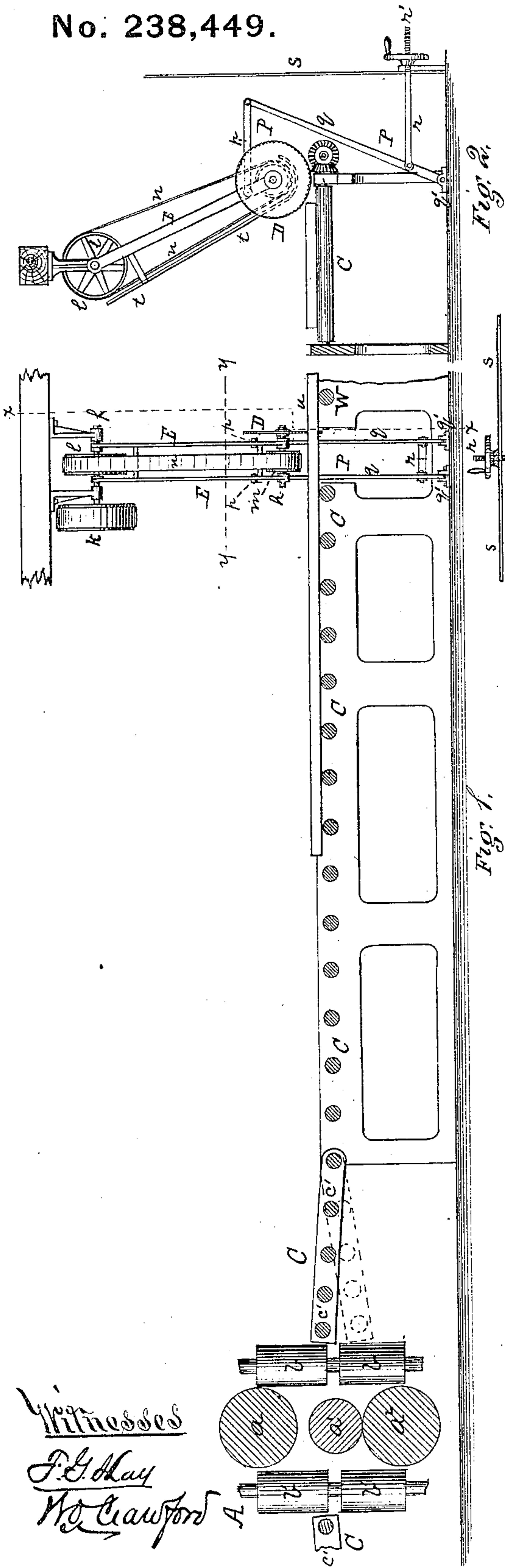
(No Model.)

M. V. SMITH.

Method of and Apparatus for Rolling Iron.

No. 238,449.

Patented March 1, 1881.



Witnesses
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MARTIN V. SMITH, OF McKEESPORT, PENNSYLVANIA.

METHOD OF AND APPARATUS FOR ROLLING IRON.

SPECIFICATION forming part of Letters Patent No. 238,449, dated March 1, 1881.

Application filed October 19, 1880. (No model.)

To all whom it may concern:

Be it known that I, MARTIN V. SMITH, of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Methods of Rolling Iron; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a longitudinal section of apparatus employed in carrying out my invention. Fig. 2 is a cross-section on the line xx , Fig. 1. Fig. 3 is a plan view, partly in section. Fig. 4 is a view of the pile before rolling, and Figs. 5 and 6 are views of the finished plates of different thicknesses.

Like letters of reference indicate like parts in each.

My invention relates to the rolling of metal plates and sheets for various purposes, such as for the manufacture of tubing and general merchantable uses.

Its object is to form from the same pile or billet plates of different thicknesses or gages, to be used for different purposes, and by this means to subject the finished plates or sheets obtained to more work or a greater reduction in the rolls, to the consequent improvement of the quality of the iron, as well as to economize the space required in rolling the metal.

Its special object is to form from the pile the covers or protecting-plates for some subsequent pile, and to roll the balance of the pile down to the finished plate or sheet.

My invention consists, first, in forming plates of different gage or thickness from the same pile or billet, by reducing the plate between rolls to the thickest gage required, sawing off the plate or plates desired, and at the same heat reducing the balance in rolls to the thin gage required; and, second, in the apparatus employed in carrying out my invention.

To enable others skilled in the art to practice my invention, I will describe it more fully.

In the drawings referred to, A represents an ordinary three-high universal rolling-mill, which is arranged to operate in any desired way, being preferably adjusted by hydraulic power. The mill is provided with the horizontal rolls $a a'$, and with the vertical rolls

$b b'$ on either side opposite the upper and lower passes between the horizontal rolls. On either side of the mill A are the series of messenger-rollers C C, the rollers on one side of the mill only being shown. These messenger-rollers are operated by suitable bevel-gear along one side to feed and receive the iron during its reduction in the mill, the rollers being necessary in rolling plates too heavy for ordinary manual labor. The messenger-rollers c' , near the mill, are so arranged as to rise and fall to suit each pass in the rolls, the plate being received at one pass, and, by reversing the messenger-rollers C and raising or lowering the end rollers, fed into the other pass of the three-high mill. At the end of the messenger-rollers is mounted the swinging saw D, the course of which extends across the messenger-rollers, so as to cut the plate when carried under it by the rollers. The saw D is supported on the saw-frame E, which is suspended on a shaft or axle, f , mounted in hangers or other support g above the messenger-rollers. At the base of the saw-frame E is the shaft h , which extends out at one side and carries the saw D, rigidly secured thereto. The shaft f is provided with the band wheel or pulley l in the saw-frame E, from which a belt, n , passes over and around a pulley, m , on the shaft h at the base of the frame, the power being transmitted from the pulley k , through the pulleys $l m$, to the saw D.

The saw-frame E is advanced and retracted by means of the lever mechanism P, formed of the lever q and rods p and bifurcated bar r . The rods p are pivoted to the frame E and to the top of the levers q , which levers are pivoted at their bases q' below the messenger-rollers. The bar r is pivoted near the base of the levers q , and is provided with the threaded end r' , which fits into certain screw mechanism for imparting to it a longitudinal motion. The bar r passes behind the spark-screen s , behind which the operator stands in operating the saw. Supported on the saw-frame in front of the pulley-belt n is the spark-guard t , which prevents the burning of the belt by the sparks in sawing the metal. Beyond the saw D, on the same line as the messenger-rollers C, are a series of idle-rollers, W, upon which the plate severed from the main plate by the saw rests.

The apparatus above described has been found well adapted to carry out my invention, being operated in the following manner: The pile or billet from which the plates of different gage are to be rolled is formed of the covers *u* and muck-bar *v*, piled between them, the covers holding the muck-bar in place during reheating and rolling of the pile. This pile is brought to the desired heat and is fed to the mill A, through which it passes, by means of the messenger-roller feeding mechanism, until it is reduced to the size of the thickest plates to be obtained—for example, about one inch, the thickness of the covers *u*. It is then carried back by the movement of the rollers C until brought under the saw D, the part to be cut from the main plate resting on the idle-rollers W, and the saw is advanced by the lever mechanism P until it saws off the desired plate, the operation being repeated if two plates are desired. The messenger-rollers now carry the main plate back to the mill A, and it is fed through in the usual manner until reduced to a plate of the gage desired. The plates severed from it are left on the idle-rollers W after the sawing, and are removed to be used for the purposes desired. During the subsequent rolling of the billet another plate of thinner gage may be cut therefrom and the remainder reduced still further, if desired. The sawing of the plate is so rapid that the metal is not materially cooled during the operation.

In rolling heavy plates for boiler, tank, vessel, and armor sheathing, tubing, and like purposes, I am enabled by this apparatus to form plates of different thicknesses from the same pile at the same heat, and by using a larger pile to subject the metal to greater reduction in the rolls, to the consequent improvement of its quality, without requiring so large a rolling-space, the space used being only about half the length needed for the same re-

duction of the iron in the usual way. I am also enabled to increase the production of the furnaces twenty-five per cent. by using a pile one-fourth larger, saving about two dollars per ton on the finished product, as the increased cost of heating and manipulating the larger pile is trifling. I also render unnecessary the separate furnace and machinery for forming the covers for subsequent piles, their manufacture being only incidental to the manufacture of the finished plates. The finished iron in the thick and thin plates is also of a better quality, on account of the greater reduction, as several extra passes are necessary in rolling it to the size of the pile heretofore used.

It is evident my invention can be employed in the manufacture of bars as well as plates or sheets, and this I include within my invention.

What I claim as my invention, and desire to obtain by Letters Patent, is—

1. The method herein described of forming metal plates or bars of different qualities and different gage from the same pile, consisting in making the pile of unusual relative thickness, reducing it between rolls to the thickest gage required, cutting off the plate or bar, and at the same heat reducing the balance to the thin gage required, substantially as and for the purposes set forth.

2. In apparatus for rolling iron, the combination of the rolling-mill A, messenger-rollers C in line with the rolling-mill, swinging saw D, adapted to swing across the line of the messenger-rollers, and idle-rollers W back of the saw, substantially as and for the purposes set forth.

In testimony whereof I, the said MARTIN V. SMITH, have hereunto set my hand.

MARTIN V. SMITH.

Witnesses:

F. G. KAY,
JAMES I. KAY.