(No Model.) 3 Sheets—Sheet 1.

A. MURE.

DEVICE FOR PRESENTING FORGINGS TO STEAM HAMMERS.

No. 253,088. Patented Jan. 31, 1882.

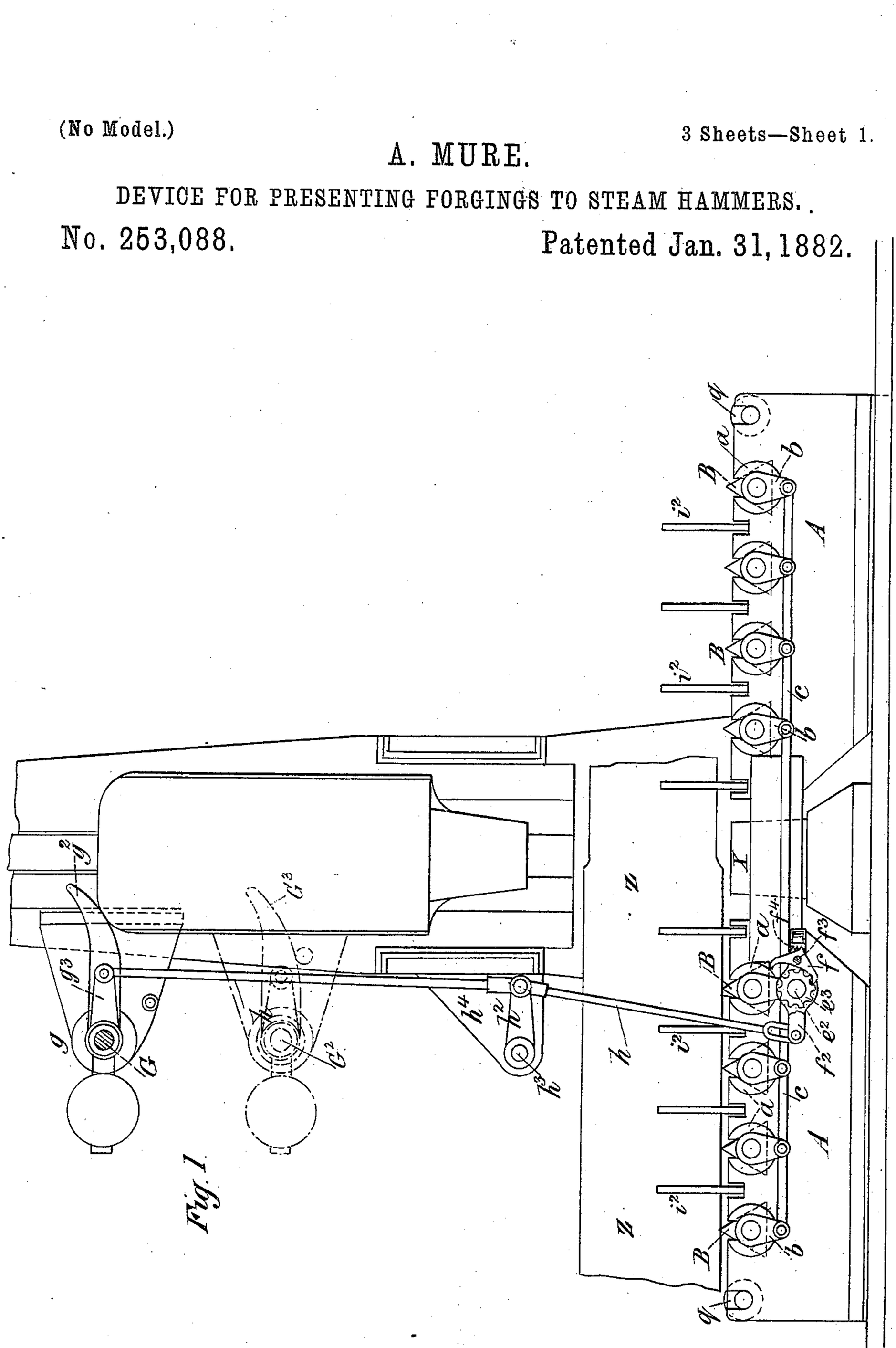

Fig. 1.

Witnesses,
E. F. Dick
Geo. P. Lyngford.

Inventor
Andrew Mure
by his attorney
H. W. Bailey

(No Model.) 3 Sheets—Sheet 2.

A. MURE.

DEVICE FOR PRESENTING FORGINGS TO STEAM HAMMERS.

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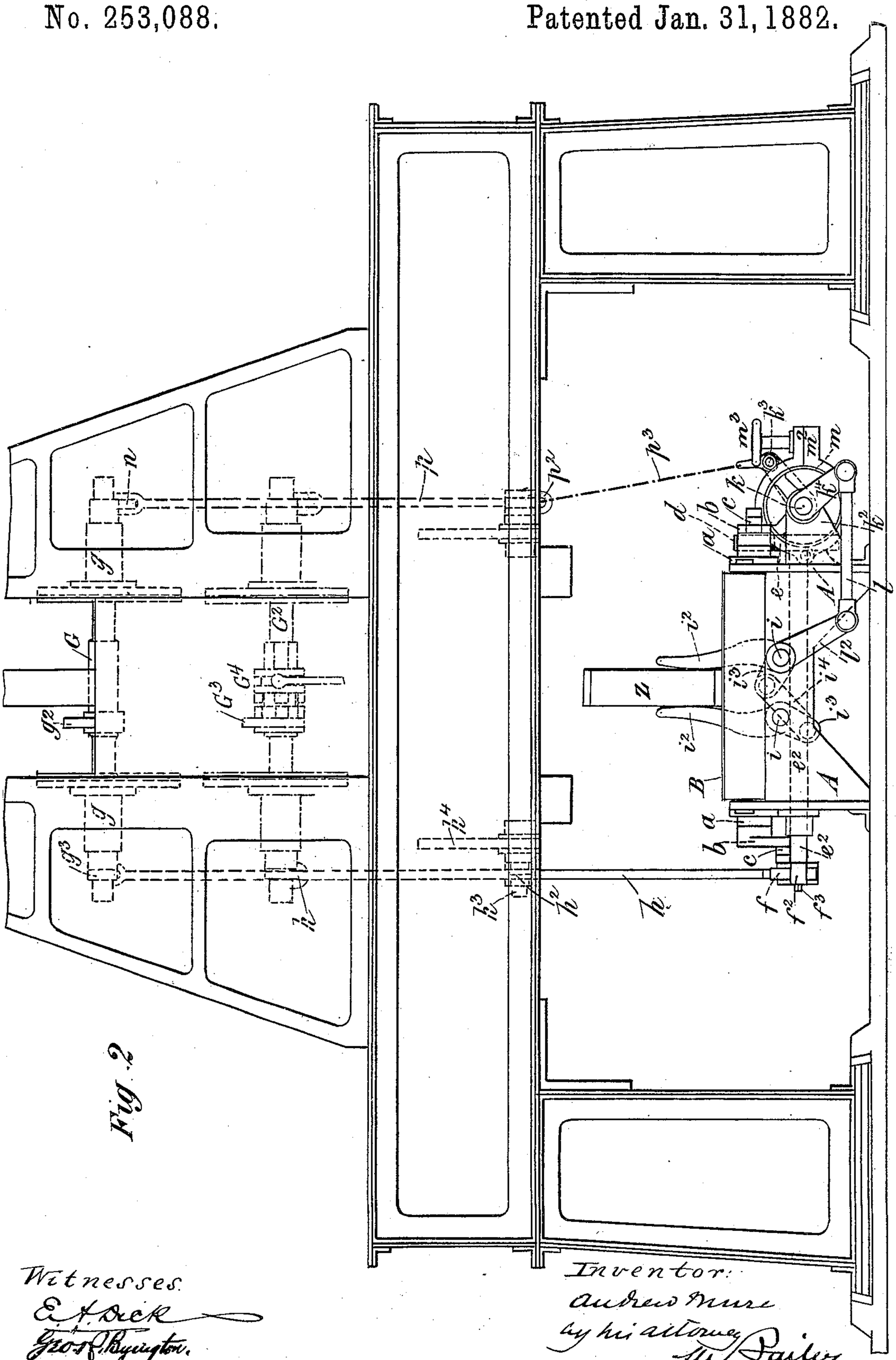

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

A. MURE.

DEVICE FOR PRESENTING FORGINGS TO STEAM HAMMERS.

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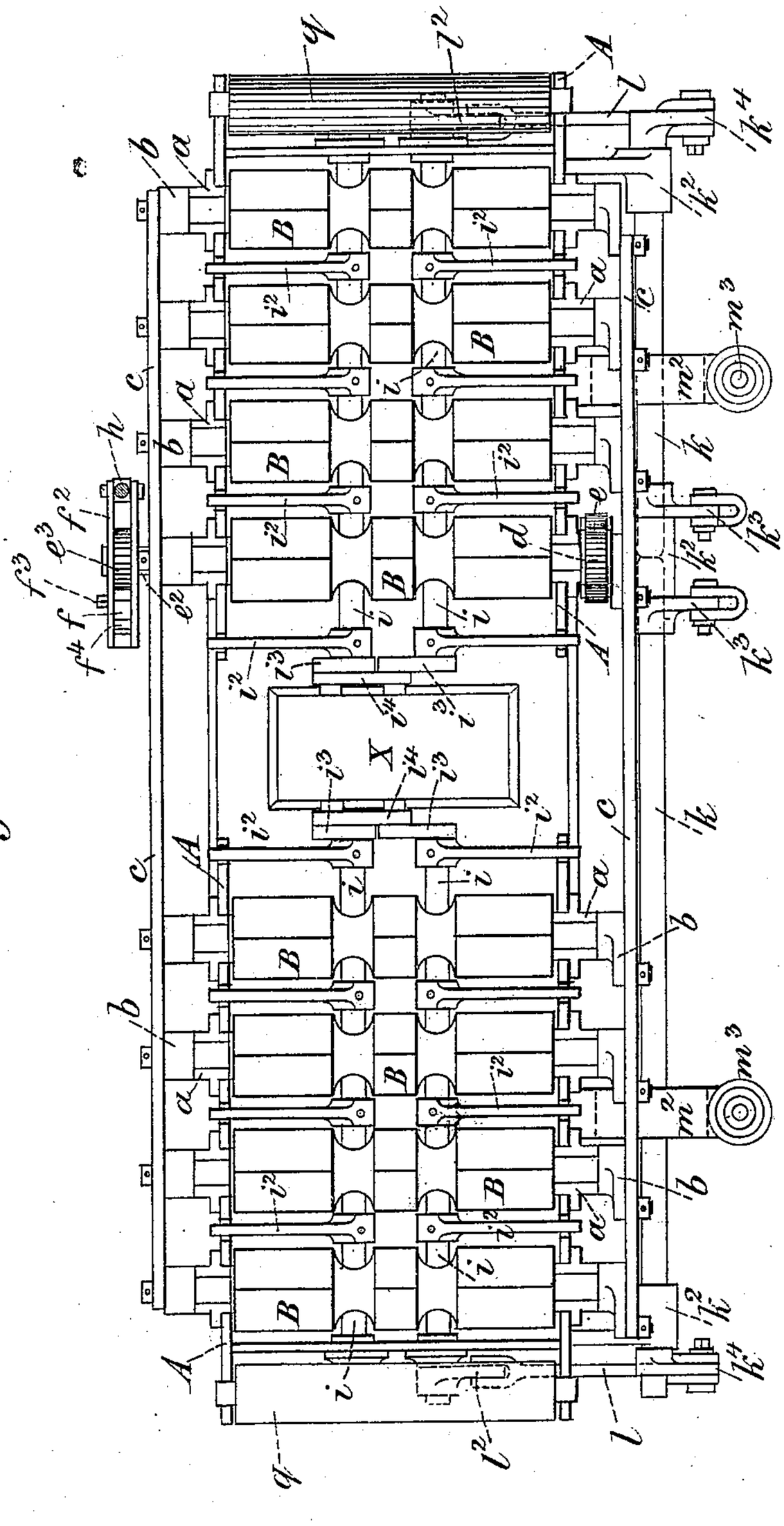

Fig. 3.

Witnesses
E. A. Dick
Geo. P. Byington.

Inventor
Andrew Mure
by his attorney
M. Bailey

UNITED STATES PATENT OFFICE.

ANDREW MURE, OF GLASGOW, COUNTY OF LANARK, SCOTLAND.

DEVICE FOR PRESENTING FORGINGS TO STEAM-HAMMERS.

SPECIFICATION forming part of Letters Patent No. 253,088, dated January 31, 1882.

Application filed December 10, 1881. (No model.) Patented in England August 4, 1881.

To all whom it may concern:

Be it known that I, ANDREW MURE, of Glasgow, in the county of Lanark, North Britain, have invented Improvements in Moving or Traversing and Holding Forgings or Ingots under Steam-Hammers, or equivalent hammering apparatus, and in the means employed therefor, (for which I have received Letters Patent of the United Kingdom of Great Britain and Ireland, No. 3,381, dated August 4, 1881,) of which the following is a specification.

My said invention has for its object to dispense as much as possible with the manual labor at present employed in moving and holding ingots or forgings upon the anvil of hammering apparatus by providing machinery for these purposes, consisting of a series of carriers which are so formed that on being rotated, or partly rotated, after the hammer has delivered a blow they lift and feed the ingot or forging being hammered for the next blow of the hammer.

Figure 1 represents in side elevation and Fig. 2 in end elevation machinery constructed according to my invention in position beneath a steam-hammer. Fig. 3 is a plan of the said machinery.

In a strong framing, A, are carried bearings *a*, in which are mounted triangular carriers B, capable of revolving in the said bearings. The flat surfaces of these carriers B are slightly below the level of the face of the anvil-block X, but the angular edges or apices of the said carriers, when uppermost, are above the level of the said anvil-block. The carriers B are coupled together by the rods *c*, centered to cranks *b*, fixed at each end of each carrier B, so that the motion given to one carrier is transmitted to the other carriers. Upon the axis of one of the said carriers is a pinion, *d*, with which gears another pinion, *e*, on a counter-shaft, e^2, carried in bearings beneath the said carrier; and at the opposite end of this counter-shaft e^2 is keyed a ratchet-wheel, e^3, and a pawl, *f*, is carried in the lever f^2, mounted loosely upon the said shaft e^2. This pawl *f* is a double-acting pawl, and may be of any suitable construction. As shown in the drawings, it is mounted by its axis f^3 in the lever f^2, one end of this axis f^3 projecting and being squared for the reception of a handle to turn the pawl *f* into position to engage the one or the other of its ends with the teeth of the wheel c^3, or to place it in a neutral position. A spring catch-piece, f^4, formed with three V-notches, bears upon the back of the pawl *f*, and upon the said back of the pawl is a corresponding projection to take into one or other of these V-notches in accordance with the position which the pawl *f* is to take. A shaft, G, is mounted in bearings *g*, carried by brackets on the framing of the hammer, to which shaft G a motion of partial rotation is given at each ascent of the hammer by the tup of the said hammer bearing upon a wiper, g^2, keyed upon the said shaft G. This shaft G also carries an arm, g^3, keyed thereto, the outer end of the said arm being connected to one end of a connecting-rod, *h*, the other end of the said rod *h* being connected by a slotted connection with the pawl-lever f^2. The rod *h* is shown as being in two parts, jointed to the arm h^2, turning upon the pin h^3, carried in the bracket h^4, attached to the framing of the hammer, so as to give steadiness to the said rod *h*.

The hereinbefore-described mechanism is for the purpose of rotating the carriers B. The said carriers B are arranged in two sets, one set on either side of the anvil X; but all the rolls of both sets are connected by the rods *c*, so as to simultaneously receive the same movement.

In order to lift the ingot or forging upon its edge or side for hammering the ingot or forging in another direction, the following mechanism is provided: Underneath each set of carriers B two shafts, *i*, are mounted in bearings in the framing of the machine, the length of the said shafts being at right angles to the length of the carriers B. Each of these shafts has keyed to it a number of arms, i^2, situated between the carriers B, and, when in their lowest position, resting in recesses in the framing A, beneath the level of the upper parts of the said carriers B.

In bearings k^2 are mounted two shafts, *k*, one for operating the pair of shafts *i* under one set of carriers and the other for operating the pair of shafts *i* under the other set of carriers. Each shaft *k* has keyed to it arms k^3 and k^4, the arm k^3 having a hook or eye, to which a chain pulled upon by the hammer, as hereinafter described, can be attached. The arm k^4

of each shaft k is connected by the link l to the arm l^2, keyed upon one of the shafts i of each pair of such shafts. The two shafts i of each pair are connected together by the arms i^3, keyed thereto and the connecting-link i^4, so that the motion given to the one shaft i is transmitted to the other in the reverse direction, so that the arms i^2 of both shafts i are moved upward. The shafts k are each provided with a friction-pulley, m, and binding-clutch m^2, which, being tightened upon the said pulley by the screw m^3, fixes the shafts k and consequently the shafts i and arms i^2 in the position to which they have been brought. The requisite movement to cause the lifting of the arms i^2 is obtained from the movement of the shaft G, an arm, n, and rod p, similar to to those, g^3 and h, hereinbefore described for giving the motion to the carriers, being connected with the said shaft G at its other end to cause the lifting of an arm, p^2, to which is attached a chain, p^3, which is connected at its other end by a hook or other connection to one or the other of the arms k^3, according to which set of arms i^2 is to be raised—that is to say, whether the arms i^2 between the carriers on the one side or those on the other side of the anvil are to be raised. Rollers q are placed at each end of the framing A to facilitate the reception and delivery of the ingot or forging by the machine.

When the machine is in operation the ingot or forging to be fed under the hammer by the said machine is laid upon the carriers B at one side of the anvil X, and at each ascent of the hammer the wiper g^2 is tilted by the tup of the hammer coming into contact therewith, and a motion of partial rotation is given to the shaft G, which is transmitted through the arm g^3 and rod h to the pawl-lever f^2 and pawl f, which, engaging with the ratchet-wheel e^3, gives a motion of partial rotation to the counter-shaft e^2, which motion is transmitted to the carrier B above through the pinions e and d. The carriers B all being connected together by the cranks b and rods c, they all receive a corresponding motion, the stroke of the pawl f and the diameters of the pinions e and d being so proportioned in the example shown as to turn the carriers B through a third of a revolution at each lift of the hammer. By this movement the ingot or forging (which is indicated at Z) is fed beneath the hammer so as to rest upon the anvil X, a repetition of the said movements thereafter at each lift of the hammer lifting the ingot or forging, after each blow of the hammer thereupon, clear of the anvil and feeding it forward for the next blow. The position of rest of the carriers B is with one or other of their flat sides in a horizontal position, and each movement of the said carriers brings the next succeeding flat sides into a horizontal position, so that the angular parts of the carriers, during the movement thereof, lift the ingot or forging to carry it clear of the anvil. When the series of movements of the carriers B in one direction have caused the ingot or forging to pass beneath the hammer, so as to be hammered throughout its length, the said ingot or forging is resting upon the set of carriers B at the opposite side of the anvil from that at which the said ingot or forging approached the hammer. To pass the ingot or forging again beneath the hammer, the motion of the carriers B is reversed by turning the rod h over to the other side of the axial line of the counter-shaft e^2, which can be readily done when the hammer is at the top of its stroke and the pawl-lever f^2 consequently in a vertical, or nearly vertical, position, the slotted connection of the rod h to the pawl-lever f^2 being for the purpose of allowing of this throwing over of the said rod. The pawl f is then reversed by turning it by a handle placed upon the squared end of its axis f^3, so that the V-projection at the back of the said pawl engages in the V-recess at the opposite side of the retaining-spring catch-piece f^4, and movement in a direction opposite to that which was previously given to them is consequently transmitted to the carriers B to feed the ingot or forging back beneath the hammer. When the other sides of the ingot or forging are to be hammered the ingot is turned at right angles to its former position and supported in this position by the arms i^2, the movement of the said arms to effect this being obtained by attaching the chain p^3 to that arm k^3 of the shaft k which is in connection with the arms i^2 of the set of carriers B upon which the ingot or forging is resting, and giving a lift to the hammer to exert a pull upon the chain and through the intermediate mechanism cause the lifting of the arms i^2. The shaft k is then clamped by the friction-clamp m^2 to retain the arms i^2 in position. The ingot or forging is now fed forward beneath the hammer by the motion of the carriers B, as hereinbefore described. When the said ingot or forging has passed the first pair of arms i^2 of the set of carriers on the opposite side of the anvil the arms i^2 of the opposite set of carriers are also raised by connecting the chain p^3 to the arm k^3 of the shaft k in connection with these said arms, and the said shaft is likewise clamped by its friction-clamp m^2.

In the arrangement of the tappet g^2 shown in the drawings it will be evident that the hammer must be raised to a height sufficient to cause its tup to come into contact with the said tappet whether the ingot or forging is being hammered upon its edge or upon its flat side.

In order to render it unnecessary to raise the hammer to as great a height when hammering on the flat side of the ingot or forging, or when the ingot or forging is at but a small elevation upon the anvil, the arrangement shown in dot-and-pick lines in Figs. 1 and 2 may be employed. The shaft G^2 is carried in brackets at such a distance beneath the shaft G as that the tup of the hammer passes it when raised to an insufficient distance to come into

contact with the tappet g^2. This shaft G^2 carries a tappet, G^3, loose upon the said shaft, but capable of being engaged with the said shaft by the clutch G^4. Thus when a flat ingot or forging is being hammered the clutch G^4 is engaged with the boss of the tappet G^3, and consequently the tup of the hammer, coming into contact with the said tappet, turns the said shaft G^2, and through the arms h^2 p^2, which are in this case keyed upon the said shaft, operates the carriers B and shafts k, as before described.

Although in the drawings I have shown the sets of carriers B as consisting of four each, yet I do not limit myself to this number, as there may be more or less than four, as may be found convenient; nor do I limit myself to the triangular form of the said carriers, as they may be square, elliptical, or of other form, provided that they have a portion or portions which are brought to a level above that of the anvil for feeding the ingot or forging forward and a portion or portions at or below the level of the anvil for the ingot or forging to rest upon while being hammered, essentially as hereinbefore described; and, if desired, the angular edges and surfaces of these carriers may be cut away at parts, leaving projections upon which the ingot or forging rests and is carried forward. Neither no I limit myself to the use of the cranks b and rods c for transmitting the motion to all the carriers B, as other suitable means may be adopted for this purpose. For example, the said motion may be transmitted by toothed gearing. Neither do I limit myself to the means described for giving the requisite motion to the carriers B, nor to the means described for raising the holding and guiding arms i^2, as any other suitable or convenient means may be employed for these purposes.

Although I have shown and described the machine as being provided with the arms i^2 for turning and guiding the ingot or forging to present a fresh surface beneath the hammer, yet where this is not required the machine may be constructed without these arms and their operating appliances; or when such turning is required it may be effected by other suitable or convenient means—as, for example, by manual labor.

I wish it to be understood that I do not limit myself to the precise details herein described, and illustrated in the accompanying drawings, as the same may be varied without departing from the nature of my invention.

I claim—

1. In machinery for moving and holding forgings or ingots under steam-hammers or other hammering apparatus, the carriers B, of a form and operated in a manner to form a resting-surface for the ingot or forging during hammering, and to lift and feed the said ingot or forging under the hammer between the strokes, as described.

2. In machinery for moving and holding forgings or ingots under steam-hammers or other hammering apparatus, the combination, with the carriers B, of the means for operating the same, consisting of the wiper g^2, acted upon by the hammer, the shaft G, arm g^3, rod h, pawl-lever f^2, pawl f, and ratchet-wheel e^3, and shaft e^2 and transmitting-wheels d e, as hereinbefore described, and illustrated in the accompanying drawings, and the combination, with these parts, of the extra shaft G^2 and tappet G^3 and clutch G^4, as and for the purpose described.

3. In machinery for moving and holding forgings or ingots under steam-hammers or other hammering apparatus, the combination, with the carriers B, of the means for turning and supporting the ingot or forging, consisting of the arms k^3 k^3 k^4 k^4, shafts k k and i i i i, and arms i^2 i^2, and their connections, as hereinbefore described, and illustrated in the accompanying drawings.

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

ANDREW MURE. [L. S.]

Witnesses:

ROBERT ADAM GUNN,

JAMES SMITH BEGG,

Both of 115 *St. Vincent Street, Glasgow.*