Feb. 28, 1939. M. A. JOLIET 2,148,625

EXTRACTOR HEAD FOR INGOT STRIPPERS

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Fig. 1.

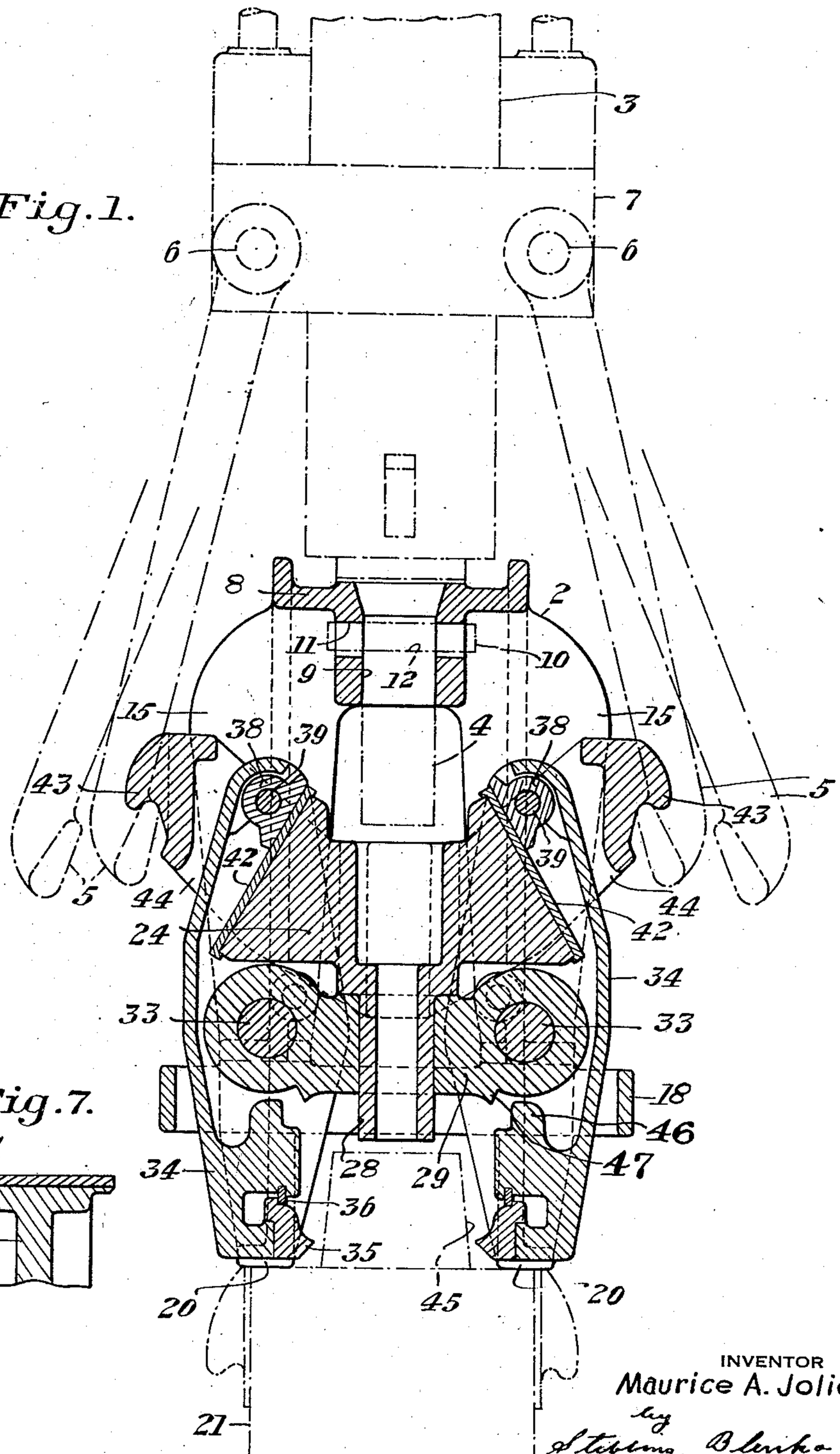

Fig. 7.

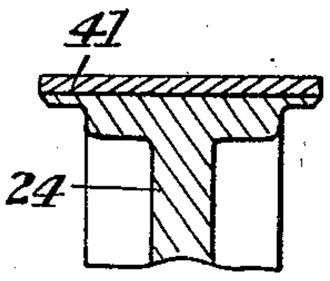

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Fig. 3.

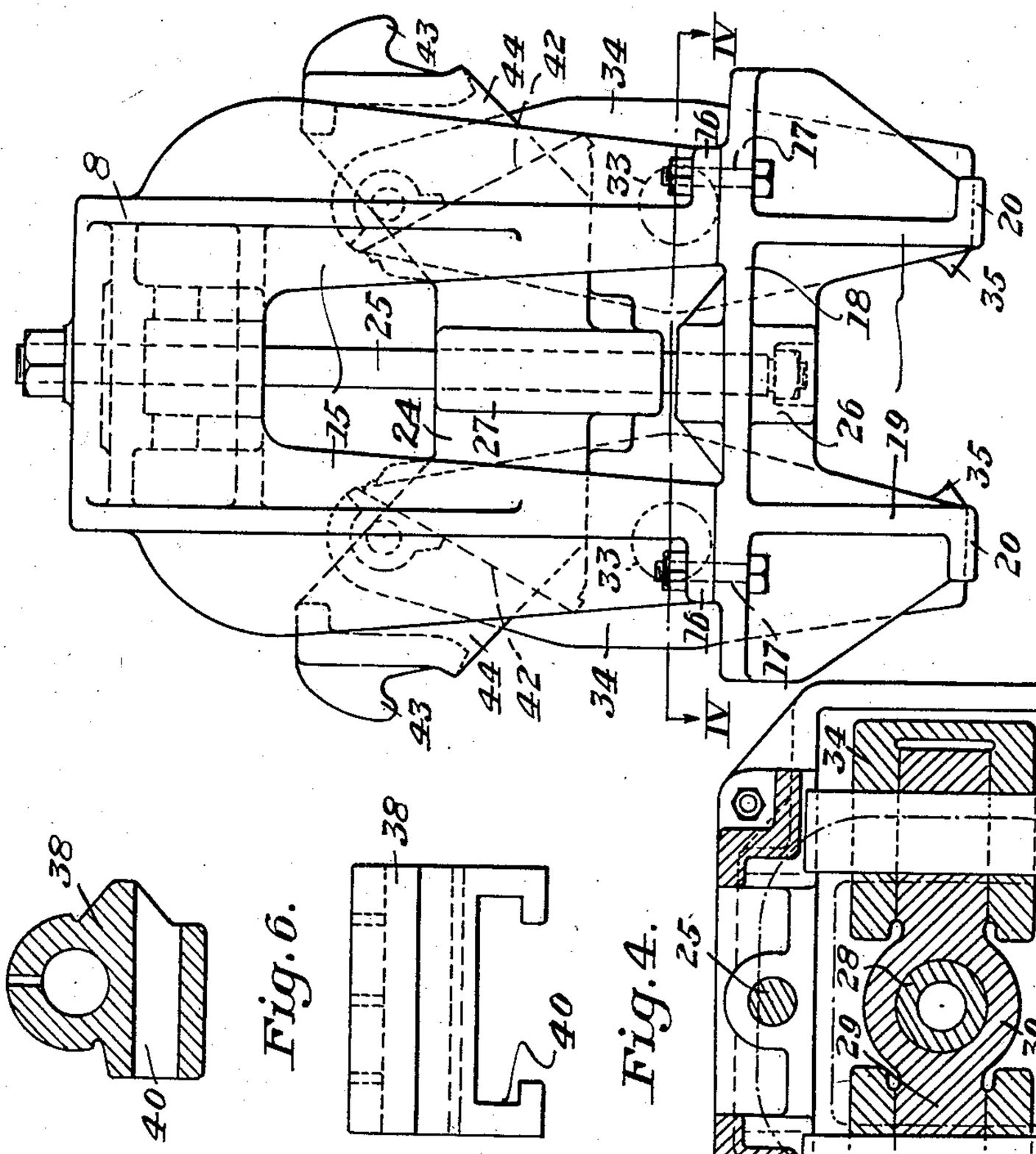


Fig. 5.

Fig. 6.

Fig. 4.

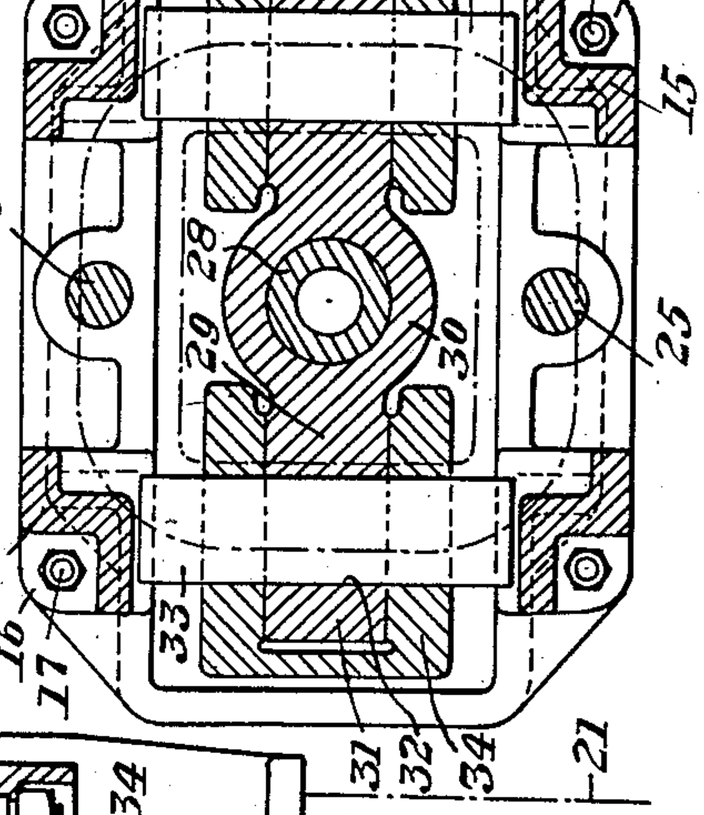
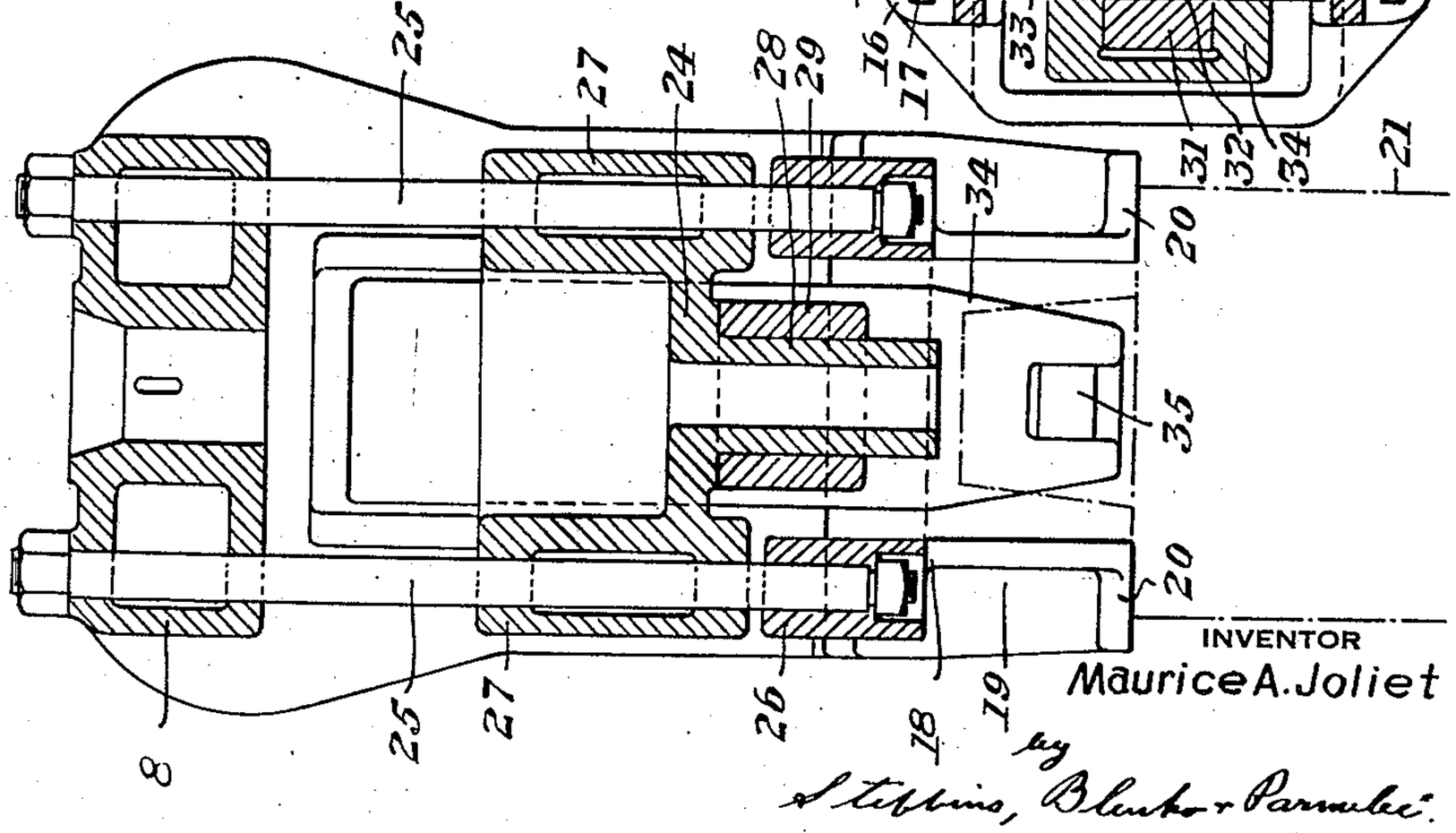


Fig. 2.



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UNITED STATES PATENT OFFICE

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EXTRACTOR HEAD FOR INGOT STRIPPERS

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Application October 9, 1937, Serial No. 168,240

7 Claims. (Cl. 22—95)

This invention relates generally to devices for stripping or extracting ingots from molds. It relates more particularly to an extractor head which can be connected to an ordinary ingot stripper in order to convert the stripper into an extractor.

In stripping big end down ingots from molds, it is common practice to engage the link tongs of a stripping crane with the lugs on the mold, and to exert upward pressure on the mold while at the same time exerting downward pressure on the ingot by means of a bull head or ram so as to strip the mold from the ingot. It is this type of operation which is referred to herein as a stripping operation, namely, one which is applied to stripping big end down ingots. It is also known to extract big end up ingots from molds by exerting upward pressure on the ingot while at the same time exerting downward pressure on the mold. Such types of devices are referred to herein as extractors and are employed for extracting big end up ingots from molds.

The present invention provides an extractor head which may be easily and quickly connected to or disconnected from the ram of an ordinary stripping crane which would ordinarily be employed for stripping big end down ingots, in order to convert the stripper into an extractor for extracting big end up ingots. The extractor head may be readily applied to existing stripper cranes. By employing a separate extractor head, the extractor head may be repaired or lubricated while the crane is being used as a stripping crane. This cannot be done where the extractor head forms a permanent part of the stripping crane. Furthermore, the use of a separate extractor head has the advantage that when the crane is being employed for stripping, no unnecessary weight is carried by the crane.

In the accompanying drawings which illustrate the present preferred embodiment of my invention.

Figure 1 is a vertical section through an extractor head, portions of a stripping crane and ingot mold being shown in chain lines;

Figure 2 is a vertical section through the extractor head taken in a plane at right angles to Figure 1;

Figure 3 is a front elevation of the extractor head;

Figure 4 is a horizontal section taken on the line IV—IV of Figure 3;

Figure 5 is a detail vertical transverse section through a slide block used for operating the ingot tongs;

Figure 6 is a detail side elevation of the slide block shown in Figure 5; and

Figure 7 is a section through the portion of the cross head which cooperates with the slide block shown in Figures 5 and 6.

Referring more particularly to the accompanying drawings, the extractor head, indicated generally by the reference numeral 2, may be employed with any suitable type of stripping crane, such for example as the screw type, the rope type, or the column type. It is here shown as applied to a column type crane having a column or ram 3 and a bull head 4. The crane is also provided with link tongs 5 pivoted as indicated by the reference numeral 6 to a head 7 which may be raised and lowered so as to raise and lower the tongs and to open and close them. The means for operating the tongs is not shown herein because it is well known and forms no part of the present invention.

Generally speaking, the present invention provides an extractor head having a portion engageable by the link tongs so that as the latter are raised, they cause the ingot tongs to grip and extract a big end up ingot from the mold. Thus, the upward motion of link tongs which ordinarily is employed for raising a mold from a big end down ingot is converted into an operation which raises a big end up ingot from a mold.

The extractor head 2 has a top portion or bracket 8 provided with a central opening 9 which receives the bull head 4. The extractor head is secured to the bull head by a key 10 passing through a slot 11 in the bracket 8 and through a corresponding slot 12 in the bull head. The extractor head is generally rectangular in cross section, as shown in Figure 4, and has four legs 15 secured to and depending from the top bracket 8. The feet 16 of the legs are connected by bolts 17 to a bracket 18 which has depending legs 19 and feet 20. The feet 20 rest on the top of an ingot mold 21, as shown in Figure 1, and since the feet are connected by the rigid frame of the extractor head to the ram 3, the feet exert downward pressure on the mold during the extracting operation.

A cross head 24 is supported by the extractor head 2, but is mounted in such manner as to be movable relative thereto. For this purpose guide rods 25 are secured adjacent their top to the bracket 8 of the extractor head and adjacent their bottom to lugs 26 formed in the lower bracket 18. There are two guide rods 25, one at the front and one at the rear of the extractor head. The cross head 24 (see Figure 2) is provided with sleeve portions 27 which fit over the guide rods 25. The lower cylindrical extension 28 of the cross head has a sliding fit in a yoke 29. As shown most clearly in Figure 4, the yoke 29 has a central cylindrical portion 30 which fits around the extension 28 of the cross head. The yoke at its ends is formed into eyes 31 which provide horizontal openings 32 for the reception of pivot pins 33. As shown in Figs. 1 and 3, these pivot pins are supported on the bracket 18 but

are raised therefrom when the yoke is raised in extracting an ingot, as later described. Pivotally mounted on each of the pins **33** is an ingot tong **34**. Each ingot tong is provided at its lower end with a bit **35** of hard material, the bit and tong being connected by a key **36** so that the bit may be easily replaced.

The upper end of each ingot tong **34** is provided with a slide block **38** which is pivoted by a pin **39** to the tong. As shown in Figures 5 and 6, the slide block is provided with a T slot **40** which receives a correspondingly shaped projection **41** (see Figure 7) formed on the inclined cam surface **42** of the cross head **24**. The T slot connection maintains the cross head and slide block always engaged with each other.

The cross head **24** is provided with two lips **43** engageable by the link tongs **5**. Each of the lips **43** is rigidly connected to the body of the cross head by two arms **44**, one extending in the front and the other in the rear of the cam surface **42**. Thus, raising of the link tongs raises the lips **43** and also the cam surfaces **42** of the cross head.

In extracting a big end up ingot from a mold, in accordance with the present invention, the extractor head is secured to the ram of the stripping crane by inserting the key **10**. The crane is then moved so as to be over the mold **21** and the feet **20** of the extractor head are placed on the top of the mold. The link tongs **5** are then brought into engagement with the lips **43** of the cross head **24** and the link tongs are then raised. This raises the cross head **24**. During the first part of the upward movement of the cross head, the ingot tongs **34** simply rock about their pivots **33** without being raised. This rocking is caused by the slide blocks **38** sliding on the cam surfaces **42** which moves the upper ends of the tongs outwardly and the lower ends inwardly, so that the bits **35** bite into the sink head **45**. During this part of the upward movement of the cross head, the lower extension **28** of the cross head slides in the yoke **29** which remains stationary and is supported on the bracket **18** by the pivot pins **33**. After the tongs have gripped the ingot, continued upward movement of the cross head raises the tongs, the pivot pins and the yoke together and the ingot is extracted from the mold.

In order to limit the minimum opening of the tong bits **35** when the cross head is raised without an ingot sink head being in place, the tongs and yoke are provided with cooperating lugs **46** and **47**.

It will be noted that the rocking axes **6** of the link tongs **5** and **33** of the ingot tongs **34** extend in the same general direction. By this arrangement, the operator has a clear view of the extracting operation. Furthermore, the extractor may be moved along a row of ingots without raising and lowering the crane a considerable height in order to allow the ingot tongs to clear the sink heads, as would be the case if the ingot tongs were mounted on axes extending at right angles to the axes of the link tongs.

Although I have illustrated and described a present preferred embodiment of my invention, it is to be understood that the invention is not limited thereto, but may be otherwise embodied or practiced within the scope of the following claims.

I claim:

1. In an ingot extractor, a ram, link tongs movable relative to the ram, an extractor head carried by the ram and adapted to exert downward pressure on a mold, means supported by the extractor head and movable relative thereto and provided with means for engagement by the link tongs for extracting an ingot from a mold upon movement of the link tongs.

2. In an ingot extractor, a ram, link tongs movable relative to the ram, an extractor head carried by the ram and adapted to exert downward pressure on a mold, means supported by the extractor head and movable relative thereto and provided with means for engagement by the link tongs for extracting an ingot from a mold upon upward movement of the link tongs.

3. In an ingot extractor, a ram, link tongs movable relative to the ram, an extractor head carried by the ram and adapted to exert downward pressure on a mold, a cross head provided with means for engagement by the link tongs, and pivoted ingot tongs operable to engage an ingot upon movement of the cross head, the cross head and ingot tongs being supported by the extractor head but movable relative thereto.

4. In an ingot extractor, a ram, link tongs movable relative to the ram, an extractor head carried by the ram and adapted to exert downward pressure on a mold, a cross head supported by the extractor head and provided with means for engagement by the link tongs, a yoke for receiving within it a portion of the cross head, the cross head and yoke being movable relative to each other, and ingot tongs pivoted to the yoke and operable to engage an ingot upon movement of the cross head relative to the yoke, the cross head and yoke and ingot tongs being movable relative to the extractor head.

5. In an ingot extractor, a ram, link tongs movable relative to the ram, an extractor head carried by the ram and adapted to exert downward pressure on a mold, a cross head supported by the extractor head but movable relative thereto, the cross head having means for engagement by the link tongs, a yoke movable relative to the cross head, ingot tongs pivoted to the yoke, a slide block pivoted to each ingot tong, and an inclined cam face on the cross head engageable by the slide block.

6. An extractor head for extracting big end up ingots from molds, comprising a frame having means for connecting it to the ram of a stripping device so that the frame is carried by the ram, the frame having a portion adapted to contact with an ingot mold, a cross head supported by the frame but movable relative thereto and provided with means for engagement by the link tongs of the stripping device, and pivoted ingot tongs slidably connected to the cross head and operable to grip and extract an ingot from the mold upon raising the cross head relative to the frame.

7. An extractor head for extracting big end up ingots from molds, comprising a frame having means for connecting it to the ram of a stripping device so that the frame is carried by the ram, the frame having a portion adapted to contact with an ingot mold, a cross head supported by the frame but movable relative thereto and provided with means for engagement by the link tongs of the ingot stripper, a yoke slidable on the cross head, and ingot tongs pivotally mounted on the yoke, the ingot tongs being slidably connected to the cross head and operable to grip and extract an ingot from the mold upon raising the cross head relative to the frame.

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