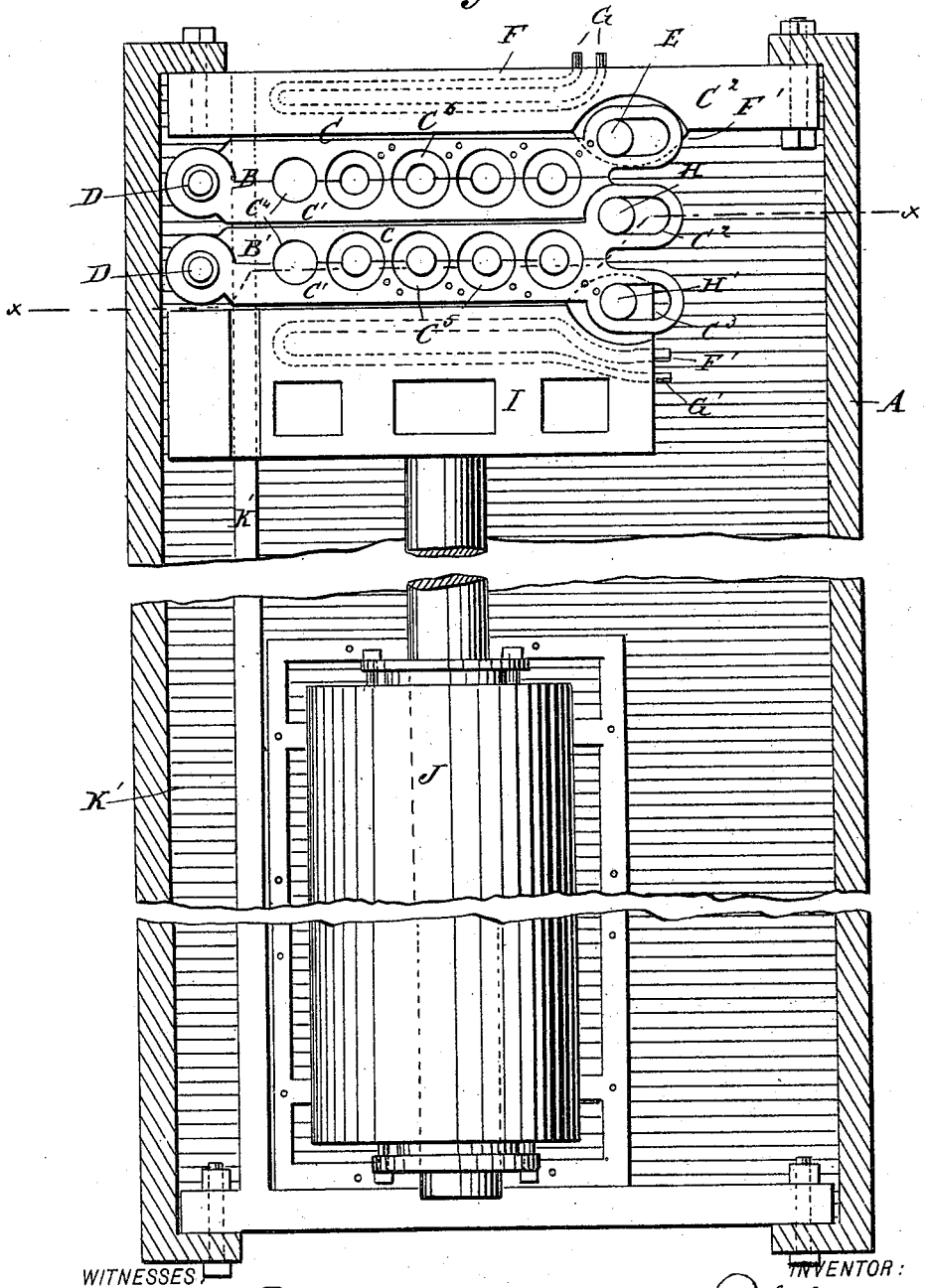
(No Model.) 5 Sheets—Sheet 1.

J. S. GRIFFIN.

CASTING MACHINE.

No. 455,200. Patented June 30, 1891.

Fig: 1.



WITNESSES:

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C. Sedgwick

INVENTOR:

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(No Model.) 5 Sheets—Sheet 2.

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Fig: 2.

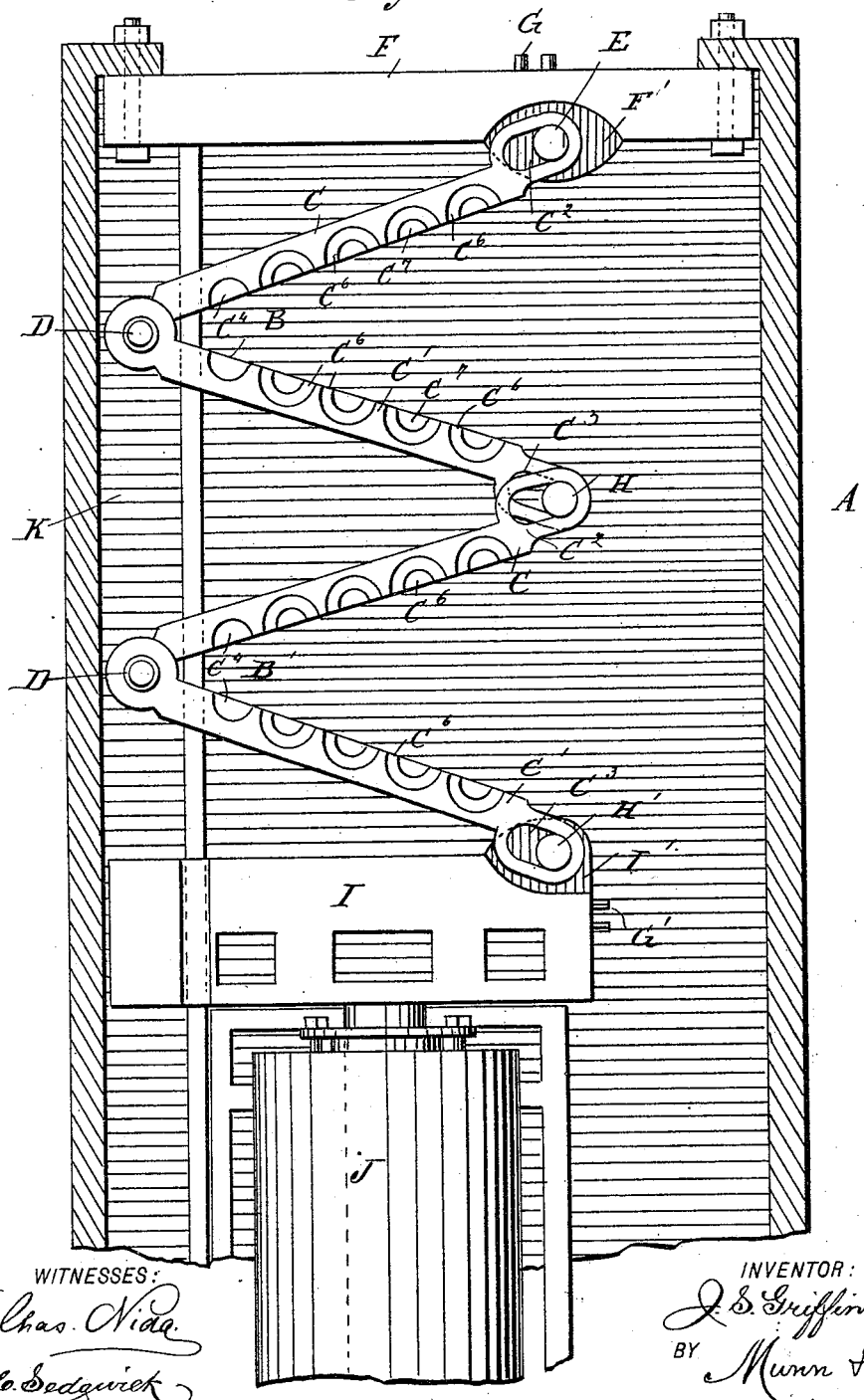

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Fig: 3.

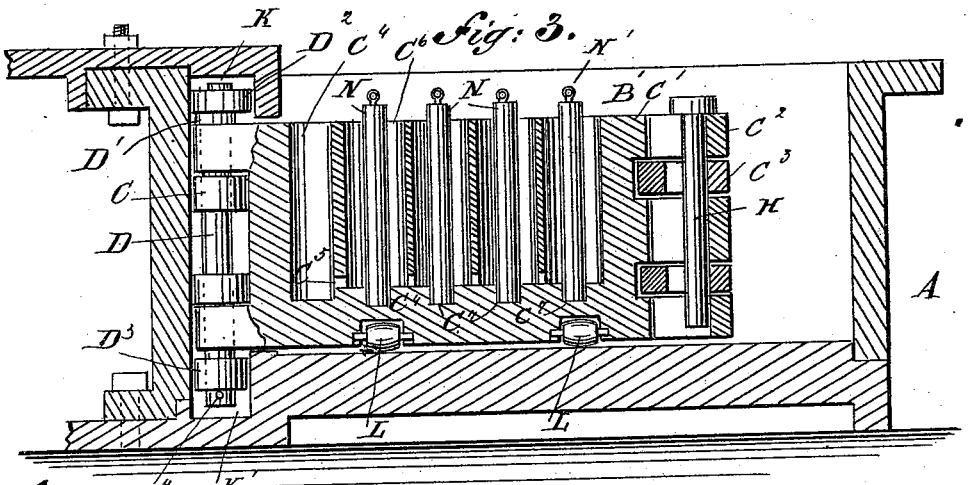


Fig: 6.

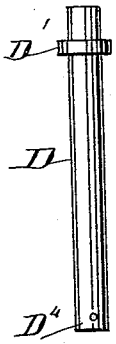


Fig: 4.

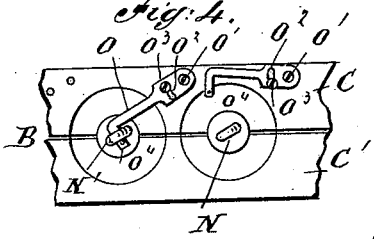


Fig: 5.

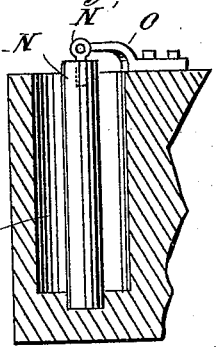


Fig: 7.

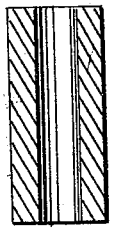
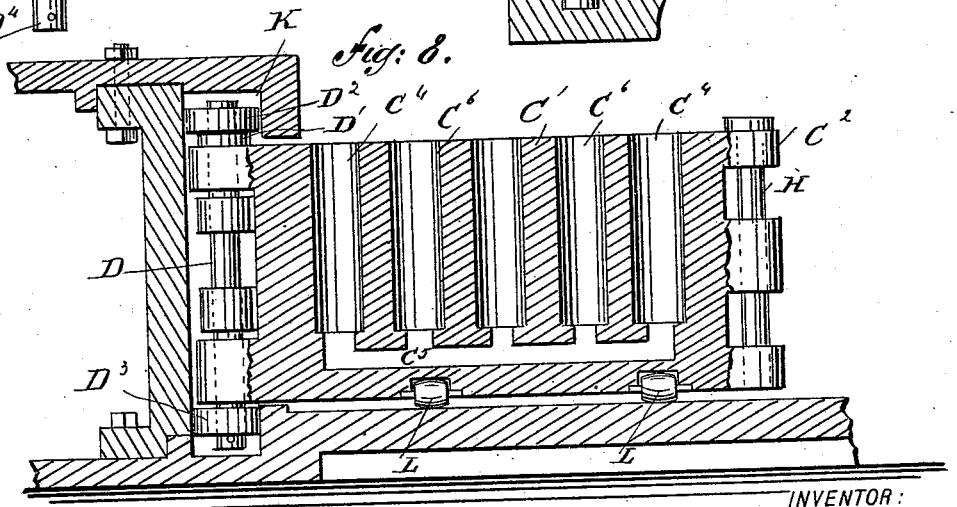


Fig: 8.



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No. 455,200. Patented June 30, 1891.

Fig: 9.

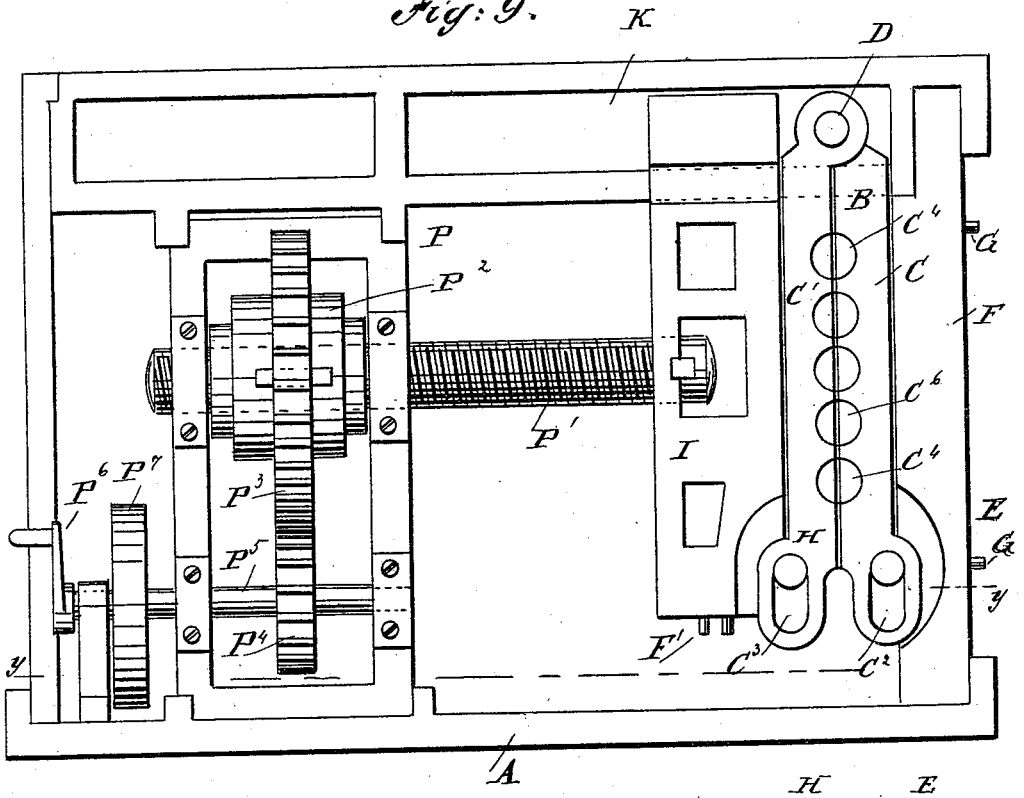
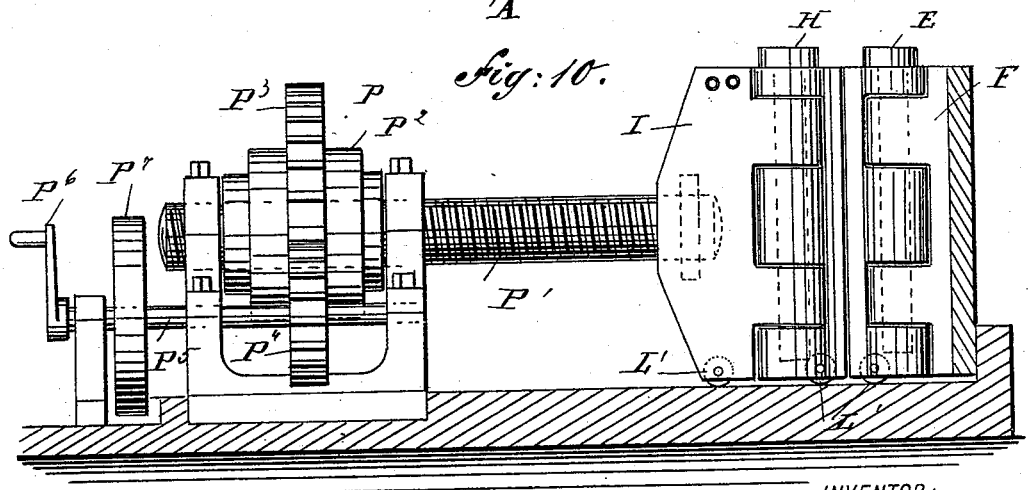


Fig: 10.



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CASTING MACHINE.

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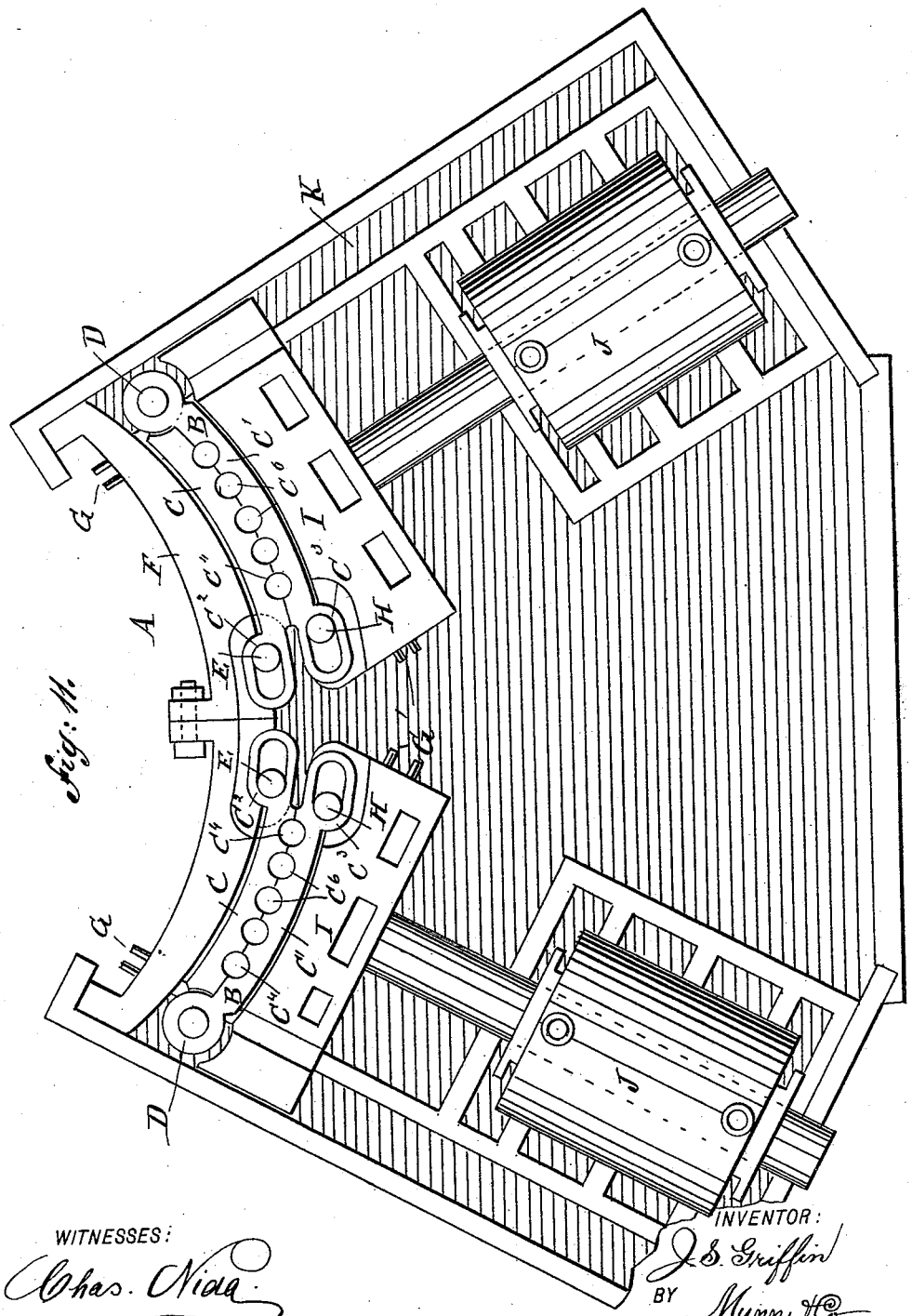

Fig. 1.

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UNITED STATES PATENT OFFICE.

JOHN STEWART GRIFFIN, OF ROSLYN, WASHINGTON.

CASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 455,200, dated June 30, 1891.

Application filed December 26, 1890. Serial No. 375,807. (No model.)

To all whom it may concern:

Be it known that I, JOHN STEWART GRIFFIN, of Roslyn, in the county of Kittitas and State of Washington, have invented a new and Improved Casting-Machine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved casting-machine designed for conveniently and rapidly casting billets, hollow ingots to be manufactured into seamless tubes, and other articles.

The invention consists of certain parts and details and combinations of the same, as will be hereinafter fully described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the improvement in a closed position and with the casing in section. Fig. 2 is a like view of the same with the molds in an open position. Fig. 3 is a sectional side elevation of the same on the line $x\ x$ of Fig. 1. Fig. 4 is an enlarged plan view of part of one mold-core and device for holding and locking the core in place. Fig. 5 is a transverse section of the same. Fig. 6 is a side elevation of one of the pivots. Fig. 7 is a sectional side elevation of one of the ingots. Fig. 8 is a sectional side elevation of a modified form of the improvement for casting billets. Fig. 9 is a plan view of a modified form of the improvement. Fig. 10 is a sectional side elevation of the same on the line $y\ y$ of Fig. 9, and Fig. 11 is a plan view of the double casting-machine designed for use in Bessemer-steel work.

The improved casting-machine is provided with a suitably-constructed casing A, open on top and in which are arranged one or more vertical molds B B′, &c., each of which is made of two parts C and C′, hinged together at D, as is plainly shown in the drawings. On the free end of the mold part C are formed slotted eyes C^2, engaged by a vertical pivot-pin E, secured in lugs F′, projecting from one end or head F of the casing A. The end or head F is preferably made hollow and provided with suitable pipes or chambers G, through which water or other fluid may be circulated to keep said head or end cool. The other mold part C′ is also provided with a number of slotted eyes C^3, engaging a pivot-pin H, also engaged by the slotted eyes C^2 of the next following mold part C of the next mold B′. The mold part C of this mold B′ is provided again with the slotted eyes C^3, engaging a pivot-pin H′, held in lugs I′, secured or formed on the head I, adapted to slide in suitable bearings in the casing A and actuated either by a hydraulic machine J, of any approved construction, or by means of screw-rods and gear-wheels, as illustrated in Figs. 9 and 10.

Each of the molds B B′, &c., is provided with oppositely-arranged semicircular pouring-holes C^4, which when the mold parts C and C′ are closed form a cylindrical opening into which the metal is poured. The lower ends of the openings C^4 are connected by a channel C^5 with the openings C^6, arranged in the mold parts according to the shape of the article to be cast.

In order to insure a proper opening and closing of the molds B B′, &c., each of the pivot-pins D is provided near its upper end with a collar D′, resting on top of the mold B, the said pivot-pin being provided above the said collar D′ with a friction-wheel D^2, mounted to travel in a suitable groove K, formed on the top of the casing A. A similar wheel D^3 is held at or near the lower end of each of the pivot-pins D, and is adapted to travel in a guideway K′, formed in the bottom of the casing A. The lower pulley D^3 is held in place by a transversely-extending pin D^4 passing through the lower end of the pivot-pin D.

In order to insure an easy traveling of the molds in opening and closing, friction-rollers L are mounted to turn in the under side of each mold part C and C′, (see Fig. 3,) the said friction-rollers traveling on the bottom of the casing A. If it is desired to cast hollow ingots for manufacturing seamless tubes or for other purposes, then in each of the molds when closed is inserted a core N, extending through the mold-opening C^6 into a recess C^7, formed concentrically in the bottom of each opening C^6, so that the core also extends concentrically with the respective opening C^6. On the upper end of each core N is formed an eye N′, adapted to be engaged by the free

end of a hook O, fulcrumed at O′ on one of the sections C or C′ and provided with a slot O^2, through which passes a screw O^3, so as to limit the movement of the hook O. The slot O^2 is segmental, the center being the center of the fulcrum O′. When the hook O has engaged the corresponding eye N′ of the respective core N, then a pin O^4 is passed through the projecting end of the hook, so as to securely lock the hook O in place on the upper end of the core.

In order to prevent the head I for opening and closing the molds from getting too hot when the metal is poured, the said head is made hollow and provided with pipes G′, through which water or other suitable fluid may be passed, so as to cool the said head and the adjacent mold. As illustrated in Figs. 9 and 10, and as previously mentioned, the head I is actuated by a screw-rod and gear-wheels, preferably of the construction presently to be described. In the middle of the head I is mounted to turn one end of a screw-rod P′, screwing in a nut P^2, mounted to turn in suitable bearings in the frame A. On the nut P^2 is keyed a gear-wheel P^3, in mesh with a pinion P^4, secured on a shaft P^5, also mounted to turn in suitable bearings on the casing A. The shaft P^5 can be rotated by means of a crank-arm P^6 or a pulley P^7, connected with suitable machinery for imparting a rotary motion to the said shaft. The rotary motion of the shaft P^5 is transmitted by the pinion P^4 to the gear-wheel P^3, which thus rotates the nut P^2, so that the screw-rod P′ screws in the said nut, and thus draws the head I inward or outward, so as to close or open the molds B.

As is illustrated in Fig. 11, the machine is specially for use in Bessemer-steel works, in which a ladle traveling in a circle is used for pouring the metal. The casing A is consequently made in the shape of a sector, and the mold parts C and C′ on each mold B are in the shape of segments of a circle, as is plainly indicated in the said figure. The heads I may be operated by a hydraulic machine or mechanical means, as desired. Otherwise the machine is similar in construction to the one above described.

The machine is used as follows: When it is desired to cast hollow ingots, for instance, as illustrated in Figs. 1, 2, 3, 4, and 5, then the hydraulic machine J is set in motion, so that its piston moves outwardly until the several connected molds are closed. (See Fig. 1.) The cores N are then set in place, and locked therein by means of the hooks O. Water or other cool fluid is then circulated through the pipes G and G′, so that the heads F and I are kept cool and also cool the adjacent parts of the molds B and B′. The metal is then poured through the pouring-opening C^4, from the bottom of which it flows through the opening or channel C^5 into the next opening C^6, from which it flows to the bottom opening C^5 into the next opening, &c., so that the molten metal rises equally in the several openings C^6 around the core N. As soon as the metal is sufficiently hard or cooled, then the motion of the hydraulic machine is reversed, so that the head I pulls with the pivot-pin H′ on the mold part C′ of the mold B′ and the two molds are opened, as is plainly illustrated in Fig. 2, so that the cast ingots can be easily removed from the molds. When it is desired to cast billets, as illustrated in Figs. 8, 9, and 11, then the metal may be poured into the closed molds at both ends, so that the metal rises equally in the openings C^6 and C^4. When the metal is sufficiently cool, the molds are opened and the cast billets are removed. As illustrated in Fig. 11, the pouring-openings of the molds are arranged in line of a circle, so as to be in proper place for the mouth of the ladle, which swings in a circle.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a casting-machine, a mold consisting in two horizontal swinging sections hinged together at one end and provided thereat with upper and lower anti-friction wheels, substantially as described.

2. The combination, with a casing, of a mold therein comprising two horizontally-swinging sections hinged together at one end and having a sliding connection thereat with the said casing, the distal end of one mold-section being pivoted to the said casing, and mechanism for opening and closing the mold, substantially as described.

3. The combination, with a casing, of molds therein, each formed of two horizontally-swinging sections, the hinged ends of which have a sliding connection with the casing, the distal ends of the two outer mold-sections being respectively pivotally connected with the casing and an operating mechanism, and the corresponding ends of the intermediate mold-section being pivoted together, substantially as described.

4. In a casting-machine, the combination, with a casing and guideways formed therein, of a mold made in two parts hinged together at one end, the pivot-pin being fitted to slide in the said guideways and one of the said mold parts being pivotally connected with one end of the said casing, substantially as shown and described.

5. In a casting-machine, the combination, with a casing and guideways formed therein, of a mold made in two parts hinged together at one end, the pivot-pin being fitted to slide in the said guideways and one of the said mold parts being pivotally connected with one end of the said casing, and a head pivotally connected with the free end of the other mold part and fitted to slide in the said casing, substantially as described.

6. In a casting-machine, the combination, with a casing and guideways formed therein, of a mold made in two parts hinged together

at one end, the pivot-pin being fitted to slide in the said guideways and one of the said mold parts being pivotally connected with one end of the said casing, a head pivotally connected with the free end of the other mold part and fitted to slide in the said casing, and means, substantially as described, for imparting a sliding motion to the said head, substantially as set forth.

7. In a casting-machine, the combination, with a casing and guideways formed therein, of a mold made in two parts hinged together at one end, the pivot-pin being fitted to slide in the said guideways and one of the said mold parts being pivotally connected with one end of the said casing, a head pivotally connected with the free end of the other mold part and fitted to slide in the said casing, and means, substantially as described, for cooling the said head and the end of the said casing on which one part of the mold is pivoted, as set forth.

8. The combination, with the two horizontally-swinging mold-sections hinged together at their inner vertical edges and provided with pouring-openings connected with the casting-openings, of removable cores arranged centrally in the casting-openings, and core-fastenings pivoted to the upper edge of one mold-section to swing over and engage the upper ends of the core, substantially as set forth.

9. In a casting-machine, the combination, with a mold made in two parts hinged together and provided with pouring-openings connected by channels with the casting-openings, of a core arranged centrally in the said casting-openings, each of the said cores being provided with an eye, and a hook pivoted on one of the said mold parts and adapted to engage with its free end the said eye, substantially as shown and described.

10. In a casting-machine, the combination, with a casing provided with guideways, of a series of connected molds, each made of two hinged parts and a pivot-pin, one of the said mold parts being pivotally connected at its free end with one end of the said casing and the other mold part being pivotally connected with a mold part of the next following mold, the free end of the mold part of the last mold being pivotally connected with a sliding head, substantially as described.

11. In a casting-machine, the combination, with a casing provided with guideways, of a series of connected molds, each made of two hinged parts and a pivot-pin, one of the said mold parts being pivotally connected at its free end with one end of the said casing and the other mold part being pivotally connected with a mold part of the next following mold, the free end of the mold part of the last mold being pivotally connected with a sliding head, and friction-rollers held to turn on the pivot-pins of each of the molds and fitted to travel in the said guideways of the casing, substantially as shown and described.

12. In a casting-machine, the combination, with a casing provided with guideways, of a series of connected molds, each made of two hinged parts and a pivot-pin, one of the said mold parts being pivotally connected at its free end with one end of the said casing and the other mold part being pivotally connected with a mold part of the next following mold, the free end of the mold part of the last mold being pivotally connected with a sliding head, friction-rollers held to turn on the pivot-pins of each of the molds and fitted to travel in the said guideways of the casing, and a second set of friction-rollers journaled in the under side of the mold parts and mounted to travel on the bottom of the said casing, substantially as shown and described.

JOHN STEWART GRIFFIN.

Witnesses:

J. M. HOAGLAND,

JOSEPH OSTLIFF CLARK.