(No Model.)

J. REAGAN.

FIRE BRIDGE FOR BOILER FURNACES.

No. 580,506. Patented Apr. 13, 1897.

FIG 1

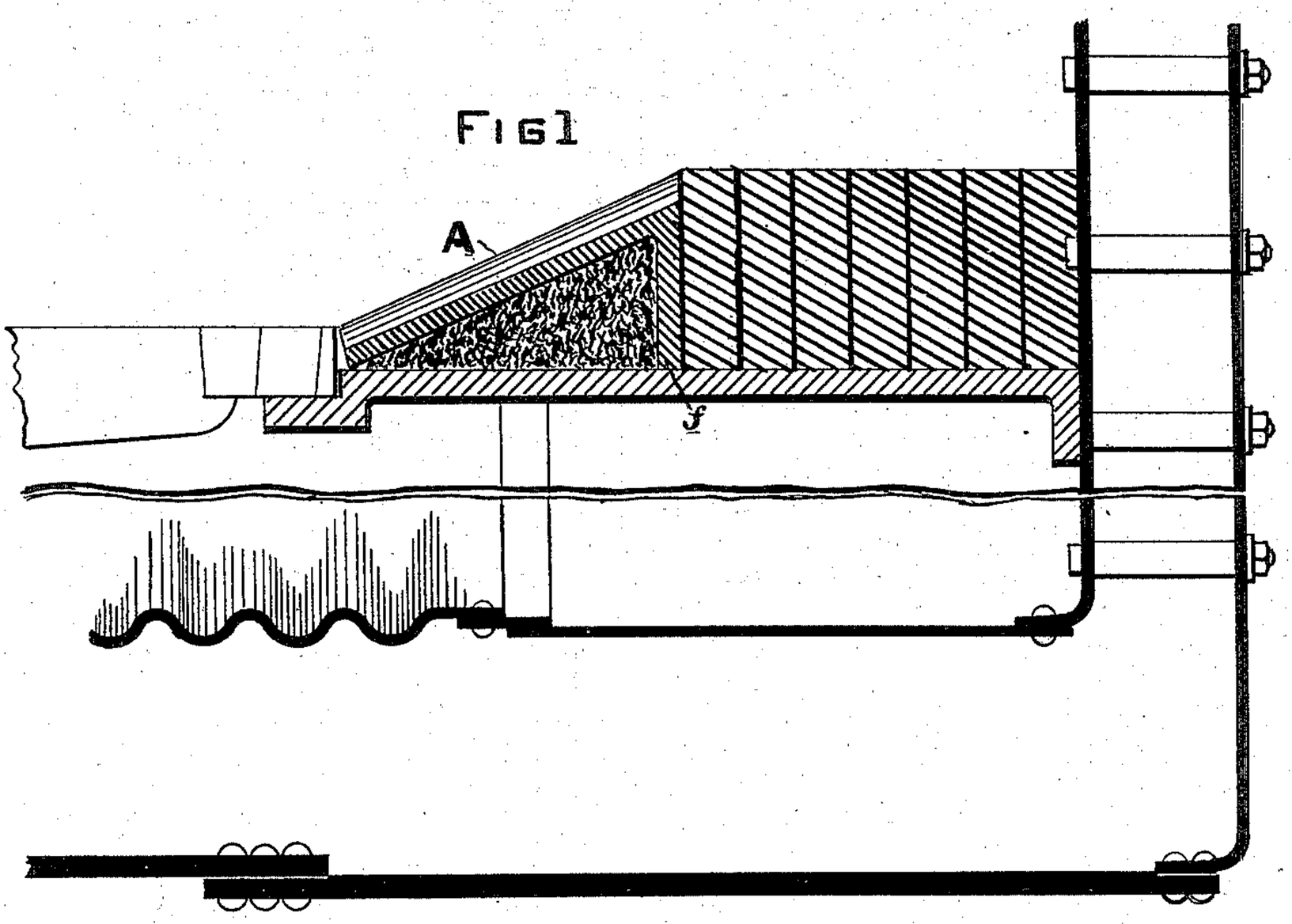


FIG 2

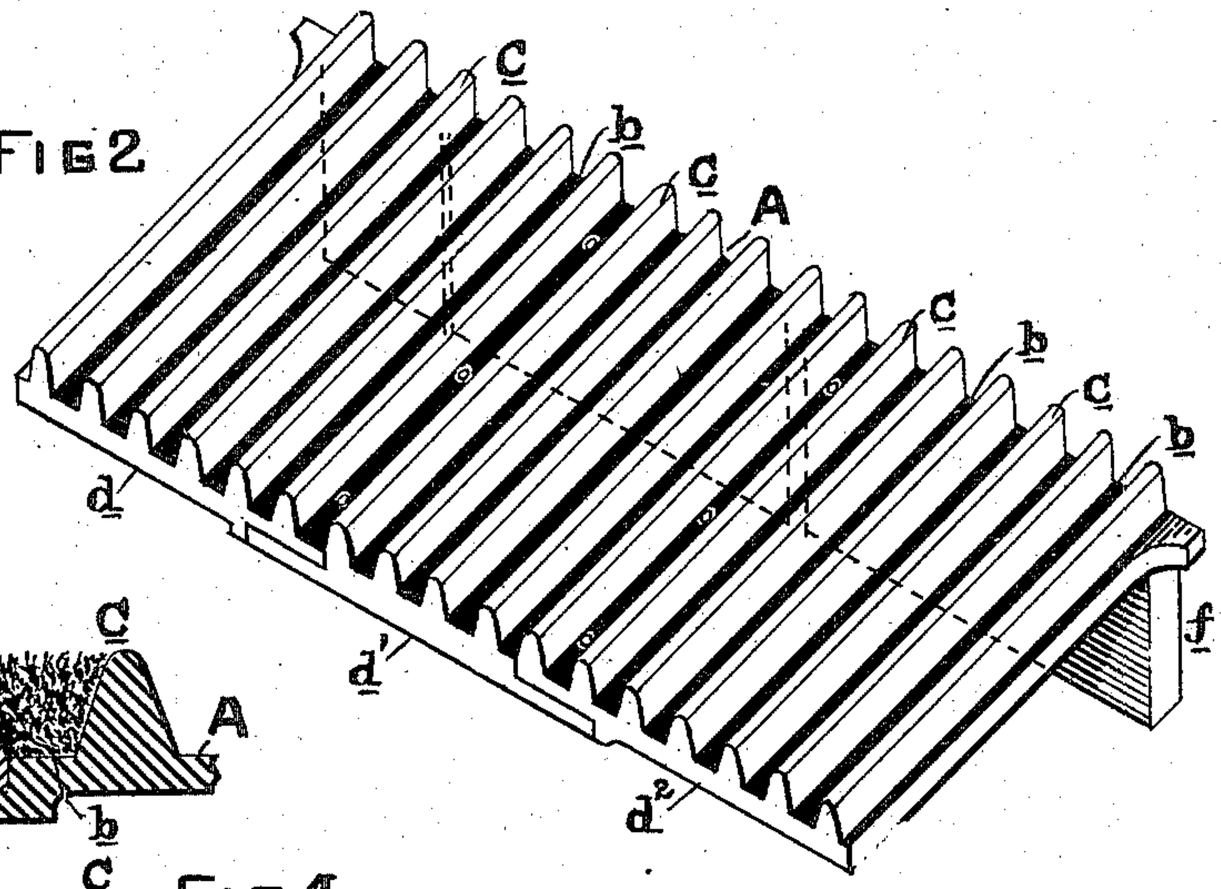


FIG 3

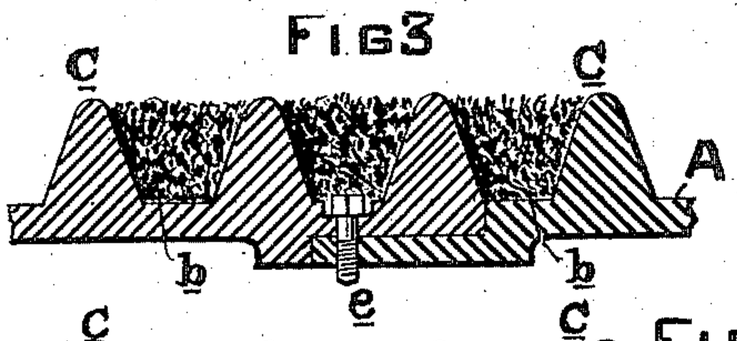


FIG 4

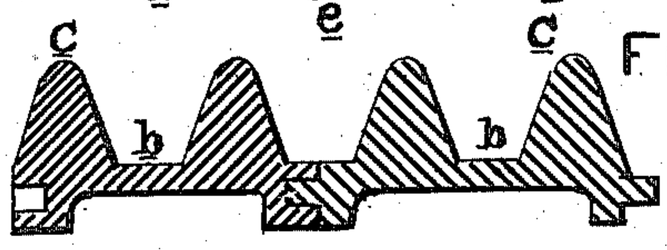
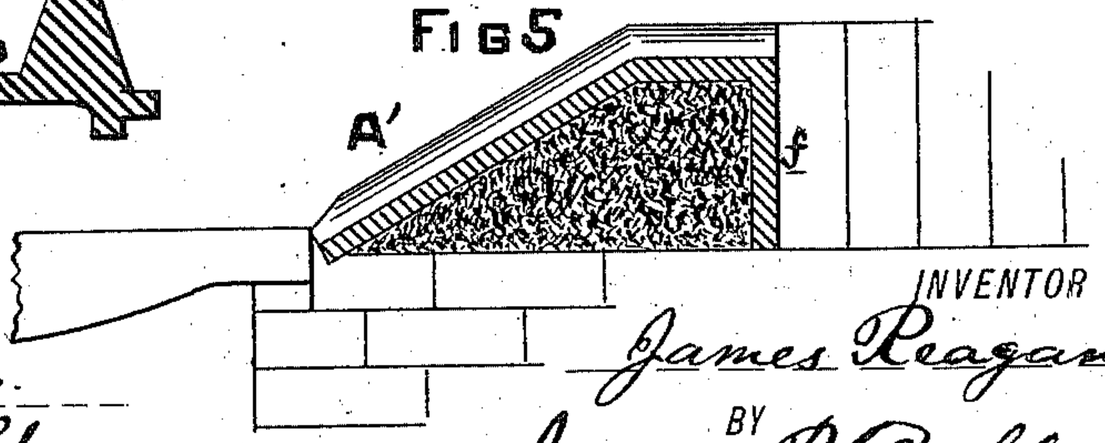


FIG 5



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FIRE-BRIDGE FOR BOILER-FURNACES.

SPECIFICATION forming part of Letters Patent No. 580,506, dated April 13, 1897.

Application filed December 26, 1896. Serial No. 617,092. (No model.)

To all whom it may concern:

Be it known that I, JAMES REAGAN, of the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Insulated Fire-Bridges for Furnaces of Marine or other Boilers; and I do hereby declare that the following is a full, clear, and exact description of the same.

The object of my invention is to provide a durable bridge which will effectually resist the action of the intense heat to which it is subjected under heavy firing in the furnace and which will remain intact under all conditions.

In furnaces, especially of steamships, where the bridge-wall is composed of fire-brick they are liable to become displaced by the slice-bar striking them in loosening clinkers and are often pushed up by the bar into the combustion-chamber, where they impede the draft and prevent a proper combustion of fuel. The trouble, expense, and delays involved in the matter of bridge-walls in furnaces of steamships, where fire-bricks are used, are of considerable moment, inasmuch as the fire-bricks knocked loose in attempting to remove the adhering clinkers are often thrown overboard with the ashes, thus necessitating the rebuilding of the bridge-wall every time the ship arrives in port.

My invention consists of a sectional bridge-plate provided on the upper surface with a series of parallel grooves, channels, or depressions for the lodgment of ashes and supported on the shelf running across the furnace-flue separating the combustion-chamber, with the open space underneath packed with ashes. The plate is thus sandwiched between layers of ashes, which are non-conductors of heat. Consequently it is insulated and cannot be burned out, warped, or twisted, and, if properly applied, will remain intact for years or as long as the life of the boiler. The heat otherwise absorbed by the ordinary brick bridge-walls will also be saved and the efficiency of the boiler increased.

Reference being made to the accompanying drawings, Figure 1 is a vertical longitudinal section through the rear portion of a marine-boiler furnace and part of the combustion-chamber, showing my invention applied. Fig. 2 is a perspective view of my invention removed from the furnace-flue. Fig. 3 is a vertical section, enlarged, of a portion of the grooved bridge-plate. Fig. 4 is a modification of the same. Fig. 5 is a vertical longitudinal section of my invention as applied to furnaces of stationary boilers.

The plate A, Fig. 1, which extends across the furnace-flue and forms the bridge proper, is provided on the upper surface with a series of grooves, channels, or depressions *b*, with intervening tapering ridges *c* to form receptacles for ashes. The grooves or channels *b* may extend across the plate in different directions, but they are arranged, preferably, in parallel rows extending from front to rear edges of plate, so that the top or apex of the ridges *c* form a suitable support for the slice-bar or hoe and permit the same to slide freely over without disturbing or dislodging the ashes. The said plate A is made in three or more sections d d' d^2 of such dimensions as to be readily passed through the fire-door or other convenient opening, with their joining edges overlapping and secured by means of tap-bolts *e*, Fig. 3. By this means the fire-bridge may be erected or removed without dismantling or disturbing any part of the boiler. Other methods may be adopted for joining these sections to one another to conform to different types of boilers, and in some cases it may be desirable to divide the fire-bridge into numerous narrow strips and connect the abutting edges of same by means of lugs formed at intervals along one edge, interlocking with corresponding sockets formed in the edge of the adjoining plate, as shown in Fig. 4.

At the rear end of each section d d' d^2 is formed a downward-projecting flange or foot *f* to support the bridge at any suitable angle upon the shelf or plate between the furnace and combustion-chamber of a marine or internally-fired boiler, or if it is desired to lay the plate flat the foot is dispensed with.

When the bridge is to be inserted, the sections d d' d^2 are separated and passed through the fire-door. The right and left hand sections d and d^2 are first placed in position and fine or sifted ashes packed underneath them and in the space covered by the intermediate section d', after which the tap-bolts are inserted and the whole held firmly together.

It will be observed that when the plate A

is embedded in ashes heat cannot ascend to cause any damage from this direction, and with the grooves filled with the same earthy or mineral particles the heat cannot penetrate from the top. Thus by the interposition of ashes or other non-conductors of heat the plate is insulated and fully shielded from the fire. Any other substance which is a non-conductor of heat may be employed for filling underneath the plate and for the grooves, but ashes are preferred as being the most suitable, as they will remain sufficiently porous within the grooves to permit air to pass through, and thus keep clinkers or vitrified matter loose at all times, so that it will not adhere to any portion of the plate and may be easily dislodged and pulled off with a hoe over the top of the fire, whereas in bridge-walls of brick or other construction the clinker will knit fast, and to remove it the fire must be allowed to burn down, thus causing a corresponding loss of steam-pressure.

Fire-bricks can be set on edge against the flange *f*, which is beyond the point of formation of clinker, as shown in Figs. 1 and 5, in or next to the combustion-chamber, so as to be flush with the top of said plate, that when the hoe is used it will not get fast, but will slide over the bricks and, resting on the ridges *c* of the plate, will be drawn forward without disturbing the ashes in the grooves.

The plate may be made of various sizes and shapes, according to the type of boiler in which it is to be used, and for stationary boilers it may, if desired, be extended back from the top of the incline for a short distance in a horizontal direction, as shown at A′, Fig. 4, and backed with fire-bricks, as previously described.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. An insulated fire-bridge provided on the upper surface with a series of grooves, channels or depressions for the retention of ashes or other non-conductors of heat, and embedded in similar substances, substantially as and for the purpose described.

2. An insulated fire-bridge plate, A, composed of the sections *d*, *d′*, *d*², and provided with a flange or foot, *f*, grooves, channels or depressions, *b*, and ridges, *c*, substantially as specified.

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