

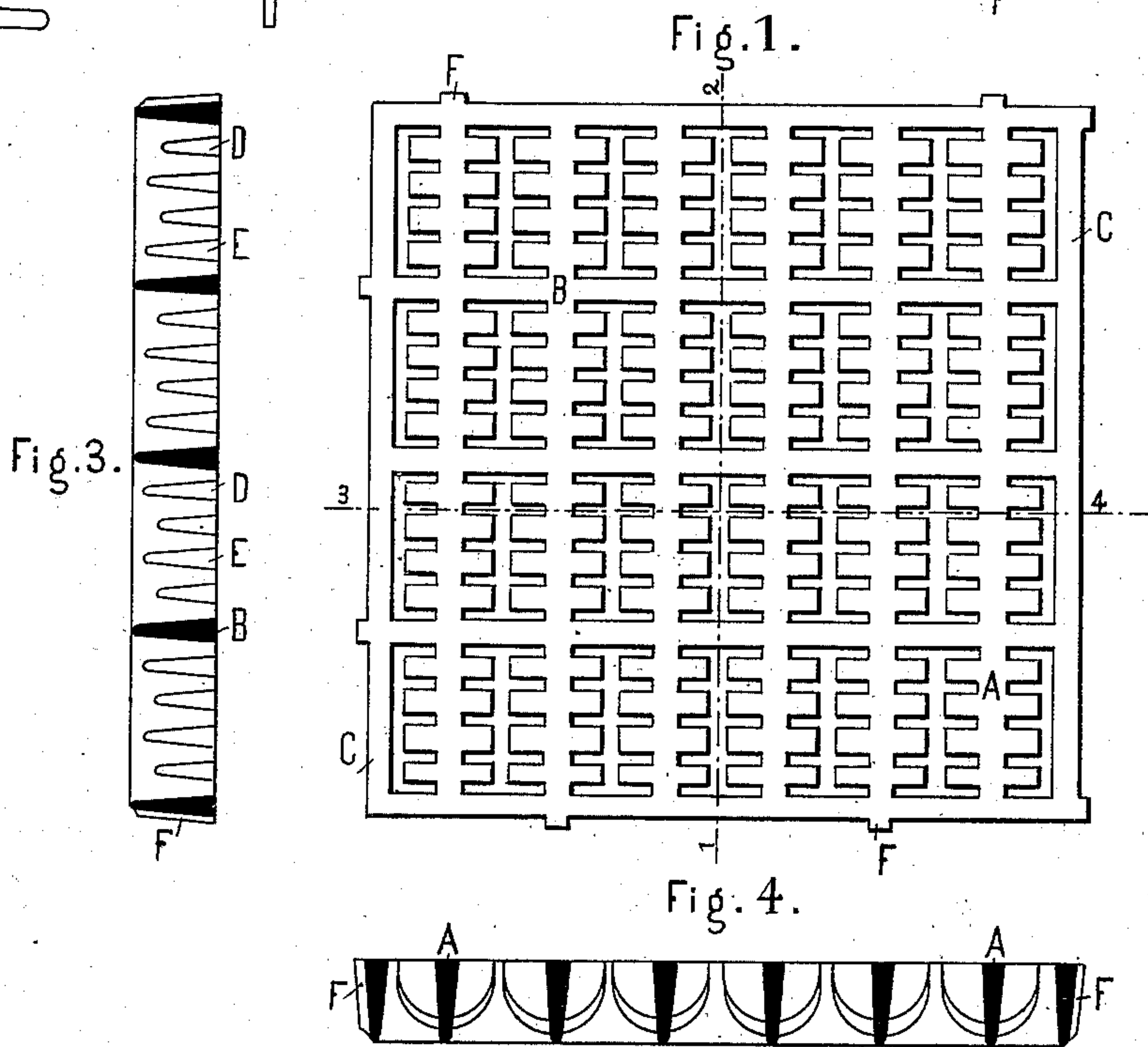
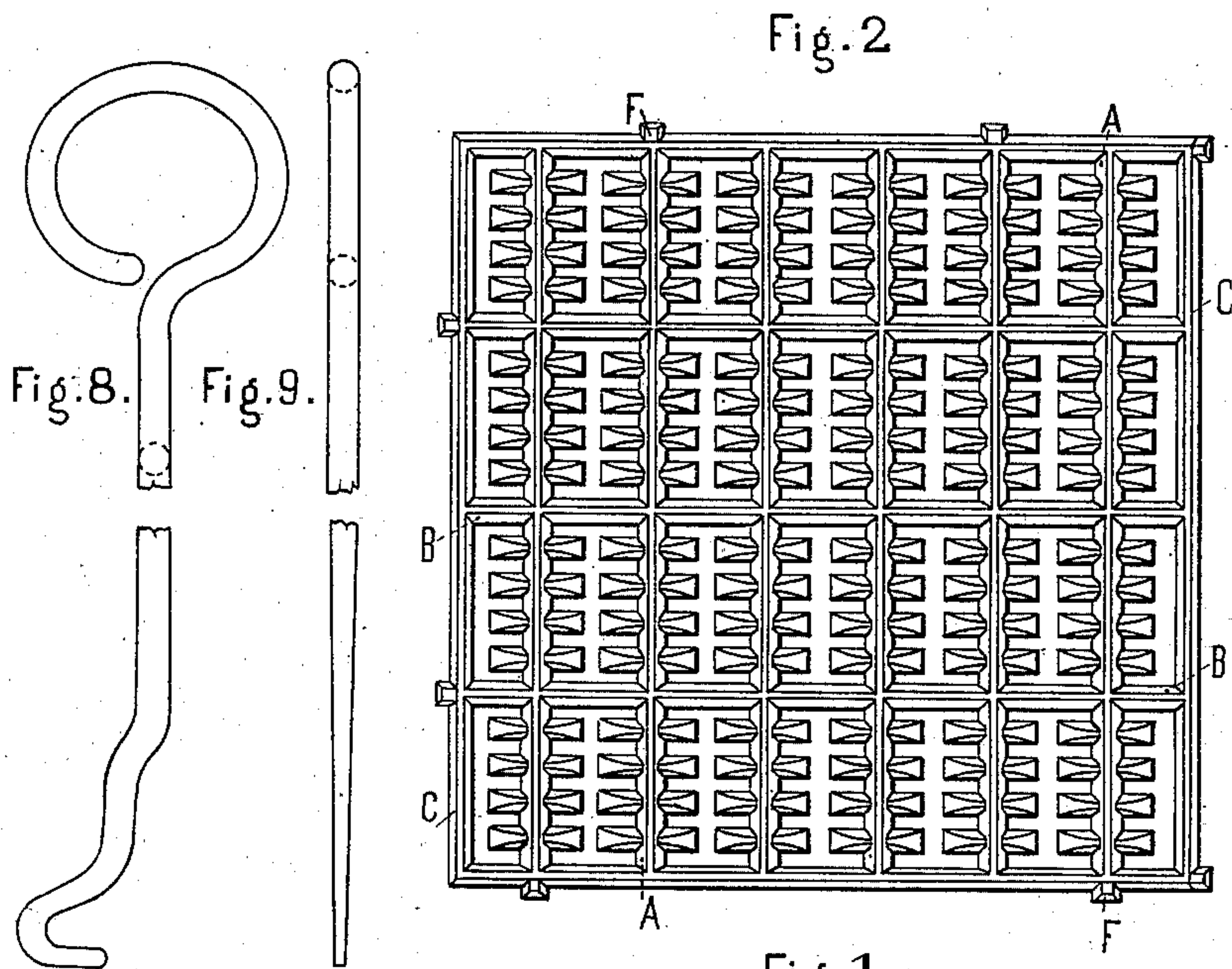
(No Model.)

2 Sheets—Sheet 1.

C. NIKIFOROFF.
Fire Grate.

No. 242,964.

Patented June 14, 1881.



Attest:
Harry E. Knight
L. M. Hopkins.

Inventor
Constantin Nikiforoff.
By Knight & Co. Attys.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 7.

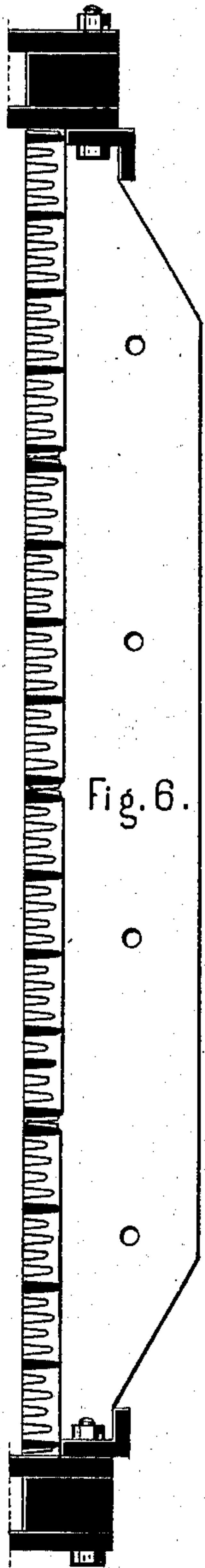
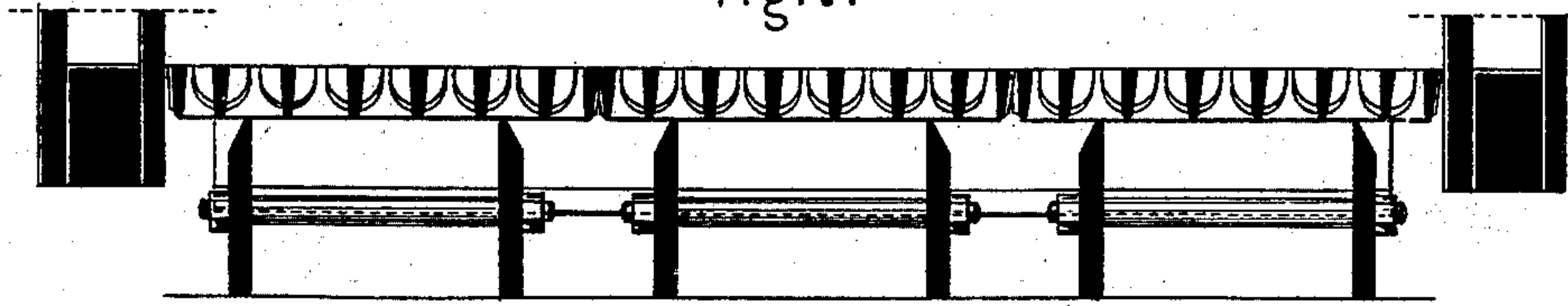


Fig. 6.

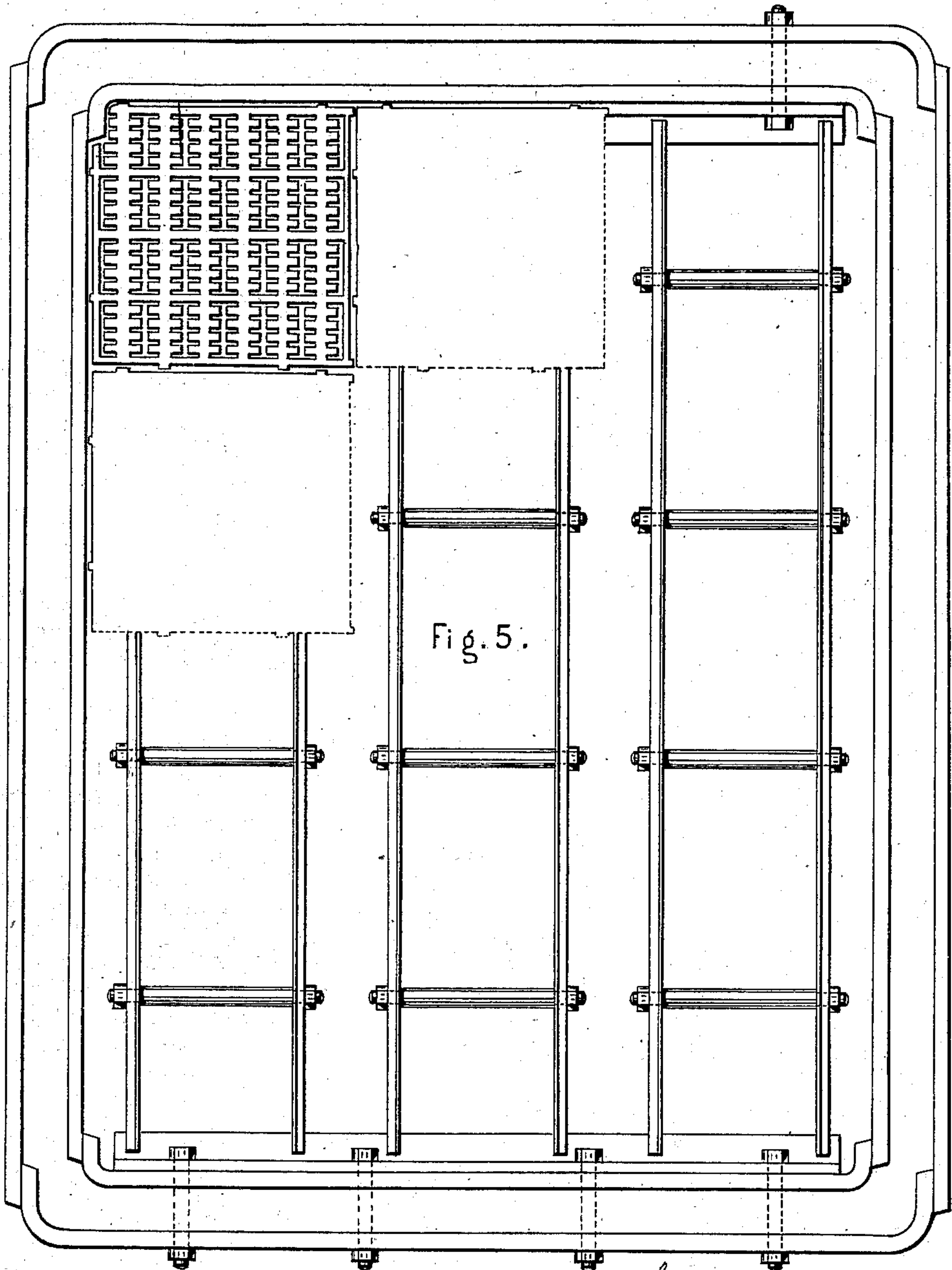


Fig. 5.

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UNITED STATES PATENT OFFICE.

CONSTANTINE NIKIFOROFF, OF WARSAW, RUSSIA.

FIRE-GRATE.

SPECIFICATION forming part of Letters Patent No. 242,964, dated June 14, 1881.

Application filed March 16, 1881. (No model.) Patented in Russia October 28, 1880.

To all whom it may concern:

Be it known that I, CONSTANTINE NIKIFOROFF, colonel of artillery, residing in Warsaw, Russia, have invented new and useful Improvements in Fire-Grates, (for which I have obtained a patent in Russia on the 28th October, 1880,) of which the following is a specification.

This invention relates to a grate consisting of plates, slabs, or parts formed by the intersection of a number of ribs provided with short transverse projections or branch ribs. A grate of this kind is represented on the annexed two sheets of drawings.

Figures 1 and 2 show a single plate or slab from above and from below, respectively. Fig. 3 is a section according to line 1 2, and Fig. 4 a section on line 3 4 of Fig. 1, while Figs. 5, 6, and 7 represent the arrangement in a locomotive-boiler of a grate constructed according to this invention.

Each plate, which may have a square, rectangular, or other shape adapted to the form of the fire-place, is a single casting. It consists of a frame, C, and of the ribs A and B, crossing each other at right angles or in other suitable manner, the longitudinal ribs A being provided with the projections or short branch ribs D E, which are lower than the transverse ribs B, and, moreover, of unequal height as compared with each other. The upper edges of all the said parts lie in a plane, as is required in a fire-grate.

By arranging the ribs B and the branch ribs or projections D E transversely to the air-current entering by the door of the ash-pit, and by making them of different heights, a more advantageous distribution of the air and introduction of the same into the layer of fuel is attained.

With ordinary grates the air passes along the grate-bars and rises in an irregular manner, and mainly at such points where, at the time being, it finds the least resistance, whereas in the new arrangement the air, by impinging against the ribs placed transversely to its current, is caused to be distributed uniformly over the whole grate, and is at the same time forced to rise by being deflected upward from its more or less horizontal direction.

By the construction of the slab out of a number of ribs intersecting each other, a great

strength is, moreover, attained with but little weight.

The ribs A B, the projections D E, and the parts of the frame C should all be tapered in section toward their bottom edge, as is ordinarily the case with common fire-bars. Besides, each slab is provided on the outside with ledges F, for the purpose of causing a slit for the passage of the air to remain free between the slabs.

When the fire-place is small—as, for instance, in a stove—the whole grate may consist of a single slab, whereas larger grates are composed of a number of slabs placed on suitable bearers.

In the arrangement of grate of a locomotive-boiler shown in Figs. 5, 6, and 7, the bearers consist of bars of iron united in pairs by means of stay-bolts and beveled at the top, so as to present less resistance to the current of air entering into the grate. The arrangement of these bearers may, however, be varied according to what is considered advantageous with regard to the size and shape of the furnace.

Each slab can easily be lifted out of the grate and replaced by means of the hook represented in Figs. 8 and 9. The end of this tool is of such a thickness that it may be introduced into one of the longitudinal slits of the slab, and it is bent in a suitable manner, so as to allow a transverse rib to be laid hold of. The removal of a slab affords great convenience for clearing the grate of slags, as well as for drawing out the fire.

The advantages which the described grate presents may be summed up as follows:

First, on account of the more uniform distribution of the air, and the promotion of its passage through the grate, a more perfect combustion is attained, so that even such sorts of fuel which, from their inferior quality, cannot be burned on ordinary grates may yet be utilized by means of the new grate.

Secondly, a larger area of air-passages can be attained, as the main ribs, as well as the branch ribs projecting therefrom, may be made much narrower than common grate-bars. From this reason, also, the combustion becomes more perfect.

Thirdly, on account of the small width of

the ribs and the improved passage of the air between them, the grate is heated but very little, and is therefore not exposed to any deformation or burning. The same may for this reason also be made lighter than an ordinary grate, and will, nevertheless, last longer. It was, for example, found possible to replace in a locomotive-boiler a common grate weighing one thousand three hundred and fifty-four pounds by a grate of the described kind having the weight of five hundred and fourteen pounds only.

Fourthly, the grate remaining comparatively cool, slags will never adhere to the same, so that the management of the fire is facilitated.

Fifthly, the more complete combustion attained causes a considerable saving of fuel, and in the case of steam-boilers, &c., an increased generation of steam. At the same time the formation of smoke and the ejection of sparks from the chimney are avoided.

It need barely be mentioned that the described grates may be used in any kind of fire-place, and for all different sorts of fuel.

I am aware that grate-bars have been made in one or more sections, consisting of a number of concentric bars of unequal depth, all united by a longitudinal web or downwardly-projecting central rib; also, that bars have been made up of an assemblage of vertical

ribs of unequal depth with interstices between them. My invention differs essentially from the above, in that my grate is made up of one or more connected plates or slabs of quadrangular or analogous form, completely surrounded by a continuous curb, the sides of which are connected by a number of longitudinal and transverse bars parallel with the respective sides and extending to the whole depth of the curb, between which are interposed lugs or branch ribs projecting horizontally from the longitudinal ribs and extending to various depths.

I claim as my invention—

A fire-grate consisting of one or more plates, slabs, or parts composed of a frame, C, of the ribs A and B, intersecting each other, and of the branch ribs D E, projecting from the longitudinal ribs A, the branch ribs D and E differing in height from each other and from the transverse ribs B, for the purpose of promoting the passage of the air through the grate, and of insuring its uniform distribution, substantially as hereinbefore described.

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

CONSTANTINE NIKIFOROFF.

Witnesses:

EDWARD WESLICHE,
WILBAR ZABICNORRS.