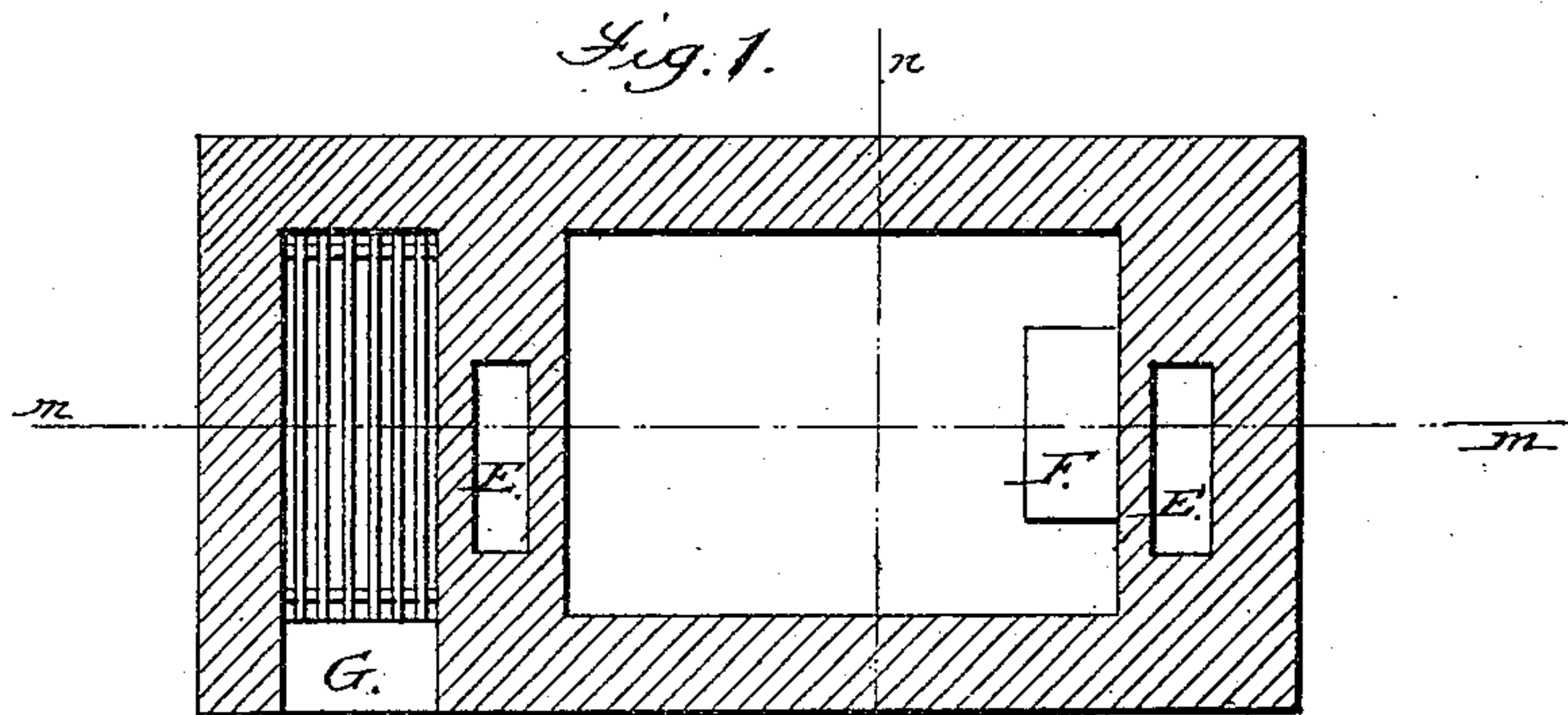
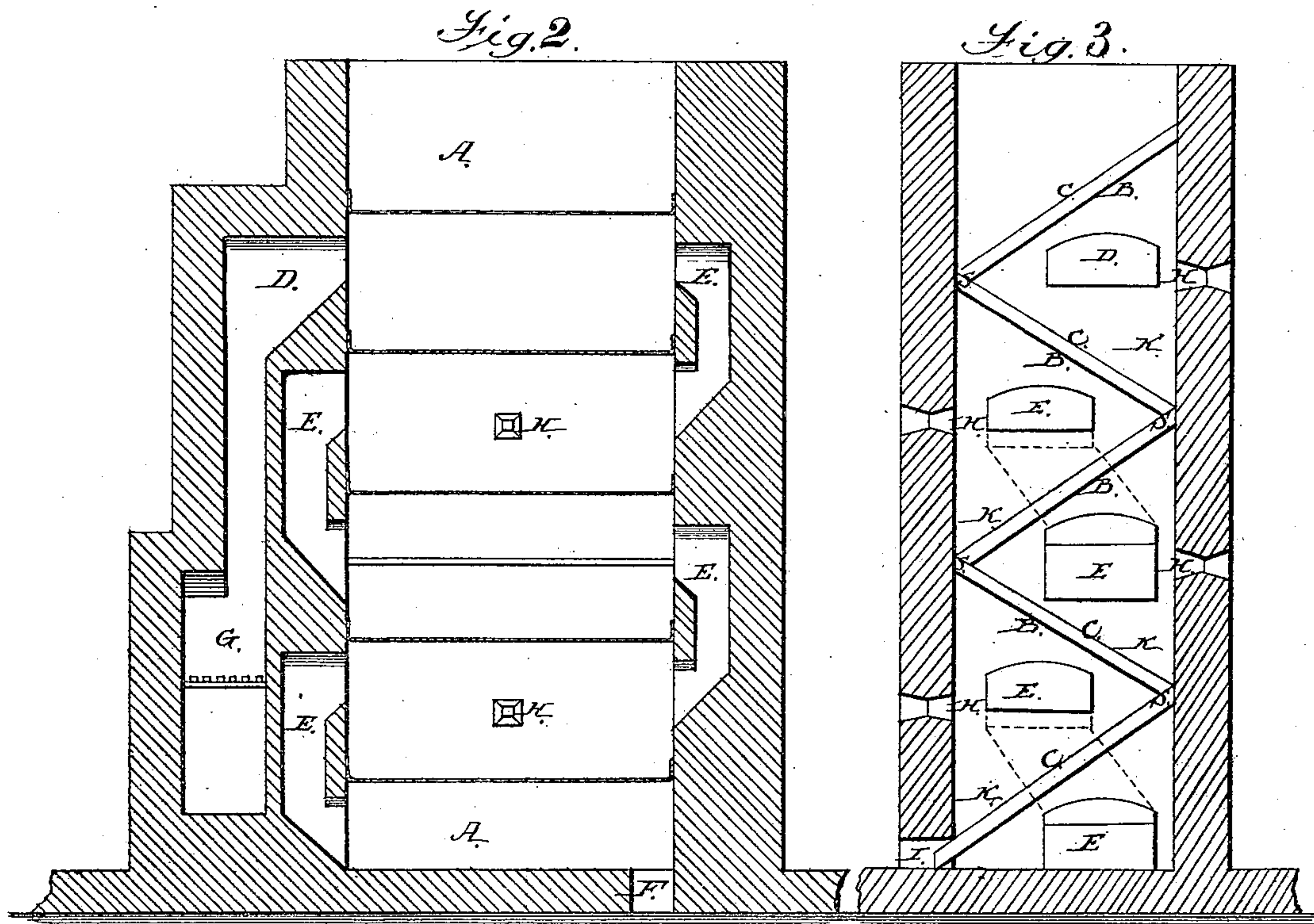


C. STETEFELDT.
Furnace for Drying Ores.

No. 238,455.

Patented March 1, 1881.



Witnesses;
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UNITED STATES PATENT OFFICE.

CHARLES STETEFELDT, OF SAN FRANCISCO, CALIFORNIA.

FURNACE FOR DRYING ORES.

SPECIFICATION forming part of Letters Patent No. 238,455, dated March 1, 1881.

Application filed December 3, 1879.

To all whom it may concern:

Be it known that I, CHARLES STETEFELDT, of the city and county of San Francisco, in the State of California, have invented an Improved Furnace for Drying Ores, which is fully set forth in the following specification and accompanying drawings.

The object of my invention is to provide a furnace for completely removing the moisture from ores in lumps which have to be finely pulverized by dry-crushing machinery preparatory to their treatment by roasting.

The construction of my improved furnace is based upon what is known to metallurgists as the "Hasenclever" principle for roasting ores.

In order to fully describe my invention reference is had to the accompanying drawings, of which—

Figure 1 is a horizontal section. Fig. 2 is a vertical section taken through *m m*. Fig. 3 is a vertical section taken through *n n*.

A is a shaft of brick walls, filled with iron shelves B, which are best set at an inclination from thirty-five to thirty-eight degrees. These shelves have borders C on three sides, to stiffen them, and rest upon each other, as shown in the drawings, leaving a slit, S, from three to four inches wide between them. This slit is closed by ore when the furnace is charged. The ore rests upon the iron shelves in a stratum, (forming a slope from thirty-five to thirty-eight degrees,) the thickness of which is determined by the width of the slit S.

H are openings, through which the ore can be stirred in case the charge should not slide down by itself.

The gases from the fire-place G enter the furnace below the top shelf through the flue D, circulate, by means of the flue E, through the triangular spaces K, and finally escape, charged with the moisture of the ore below the bottom shelf, through a flue, F, which is connected with a chimney.

The operation of my furnace is as follows, viz: The wet ore, as it comes from the mine, after having been reduced by a crusher to pieces of egg size, is dumped upon the upper shelf, which serves as a hopper. After all the shelves are covered with ore, fire is lighted and maintained in the fire-place. The dry ore is gradually removed from the bottom shelf through the slit I. Whenever a portion

of dry ore is taken away a motion takes place through the whole furnace, from shelf to shelf, and the ore removed at the bottom is replaced from the supply on the top shelf.

I am aware that several furnaces with shelves constructed on the Hasenclever principle are in use, and have been patented for roasting ores, which also may be claimed to answer the purpose of dry-kilns. I am further aware that in the process of drying fruit and in the automatic kilns for desiccating lignites for the manufacture of briquettes, hot air is introduced on the top of the apparatus, where the material to be desiccated is charged, and withdrawn at the bottom; but I claim that the Hasenclever principle of construction, in combination with a downward draft of the hot gases, is not used in any of these furnaces or kilns, and that this combination is new and useful.

That such a construction has really great advantages will be easily seen. The ore from many mines, working below water-level, carries as much as from ten to eighteen per cent. moisture. If the heat were introduced at the bottom of the furnace a large percentage of the evaporated water would condense again by coming in contact with the cold shelves and moist ore above. This cannot take place if a downward draft is used. Another important point is that the overheating and burning out of the iron shelves is avoided by introducing the flame below the top shelf, the same being constantly covered with moist and cold ore. If, on the contrary, the flame is introduced below the bottom shelf the heat there would become very intense, said shelf being covered with dry and hot ore. In consequence these shelves would warp and burn out rapidly, causing expensive repairs and a stoppage of the furnace.

What I claim, and desire to secure by Letters Patent, is—

The described drying furnace or kiln, consisting of a shaft, A, with inclined iron shelves B, and a fire-place having a flue through which the products of combustion enter the shaft below the upper shelf, while they are discharged at or near the bottom of such shaft.

CHARLES STETEFELDT.

Witnesses:

S. H. NOURSE,
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