

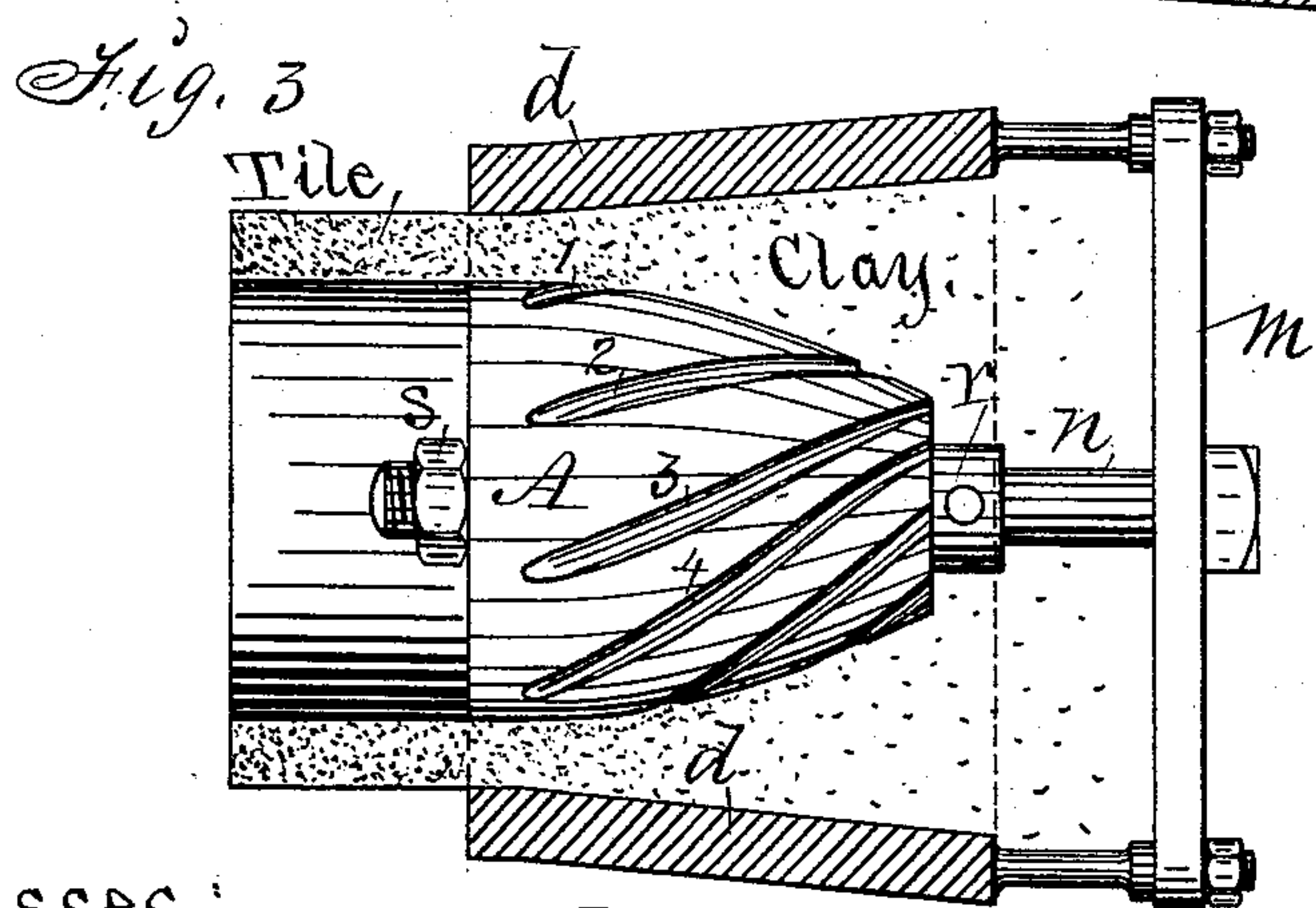
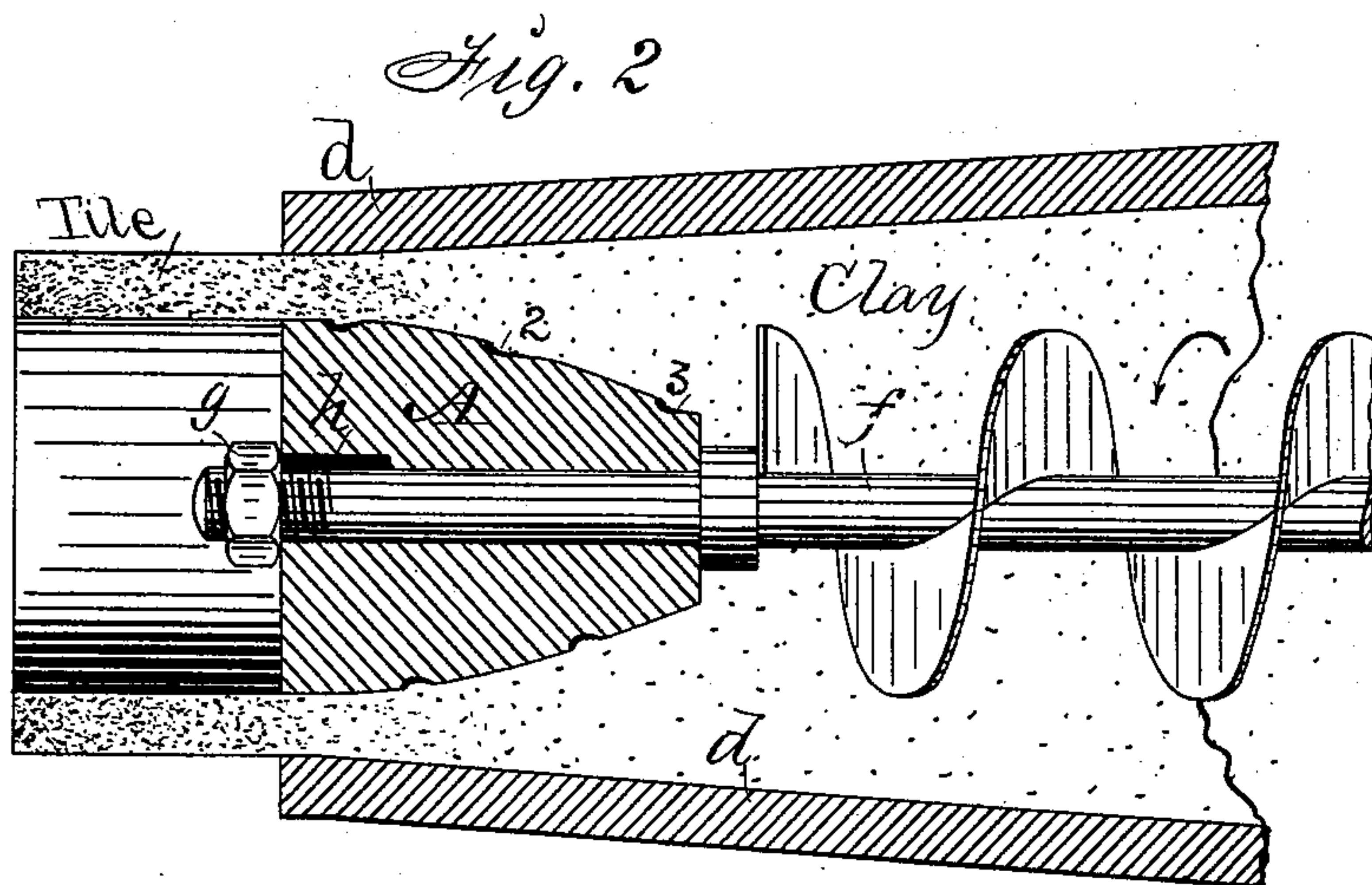
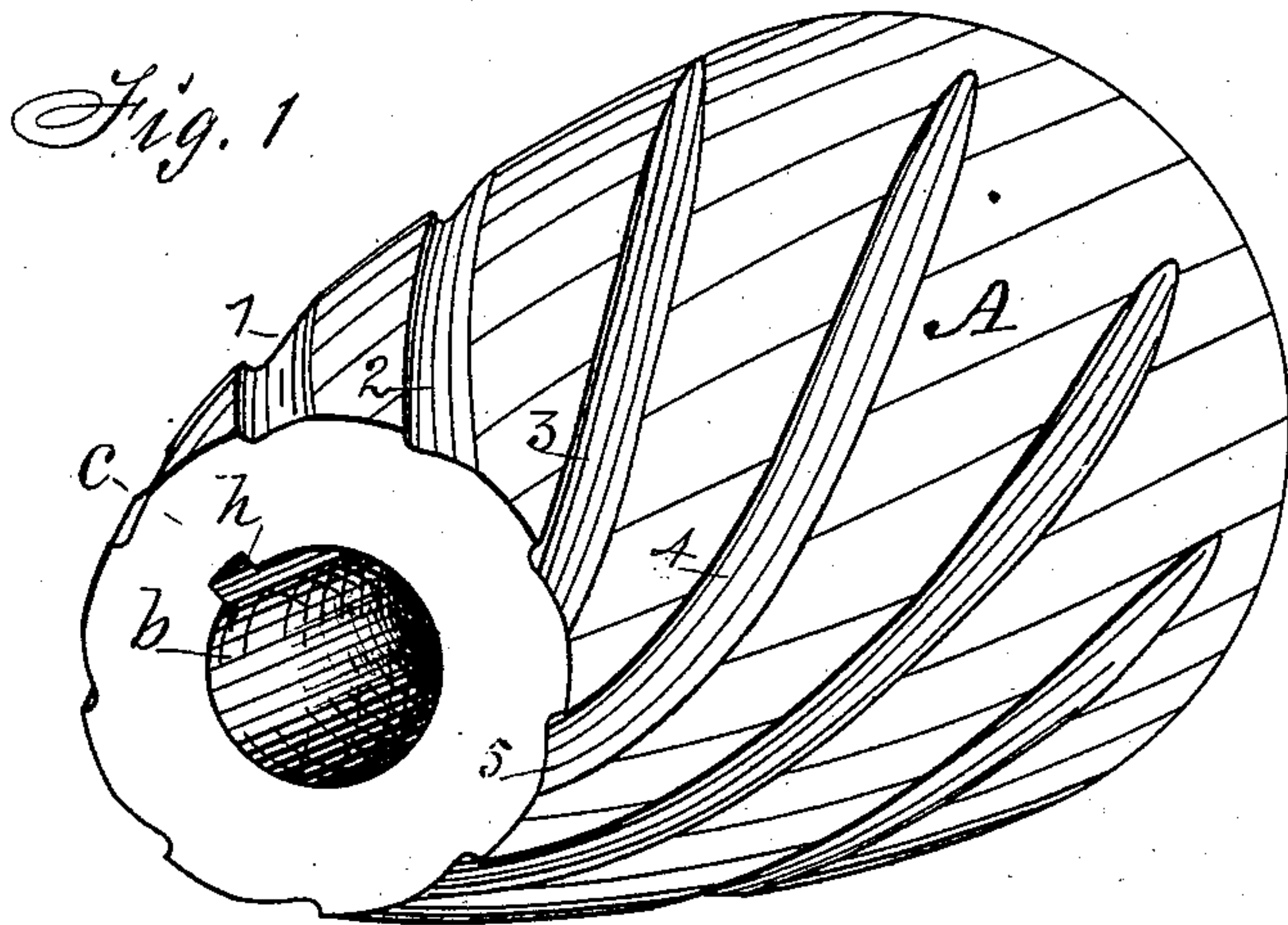
(No Model.)

C. J. MERRILL.

TILE MACHINE.

No. 281,711.

Patented July 24, 1883.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

CALVIN J. MERRILL, OF DES MOINES, IOWA.

## TILE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 281,711, dated July 24, 1883.

Application filed April 23, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, CALVIN J. MERRILL, of Des Moines, in the county of Polk and State of Iowa, have invented an Improvement in Drain-Tile Machines, of which the following is a specification.

My invention relates to that class of machines in which tempered plastic clay is forced through an annular space to produce a cylindrical clay tube and drain-tile.

Heretofore a solid cone-shaped die or former has been fixed to a rotating shaft and screw-conveyer within a cylinder having a hopper in such a manner that the former would rotate as the clay was forced through the dod or outside die or former at the end of the cylinder; but it had no function to perform, except to produce a bore and smooth inside surface in the tile. A former has also been fixed within the dod of a machine in which the clay is pressed out of the cylinder by a piston in such a manner that the clay was separated in passing the cross-bar used for fastening the former, and not firmly united again, as it passed straight through the annular space or throat produced by the combination of the stationary dod or outside former and the inside die or former, also thus made stationary.

My object is to facilitate the movement of clay through a machine and the dod or dies, to mix it more thoroughly, and to advance it in a screw-shaped or twisted mass, for the purpose of making more tile in a given time without increasing speed of motion and power, and also for the purpose of producing an improved tile having a spiral grain and no longitudinal seam, line, or grain that is liable to cause it to split and fall apart in drying and burning.

My improvement consists in constructing an inside die or former and fixing it to a rotating shaft, or to a stationary dod or outside die, as hereinafter fully set forth, in such a manner that it will speed the advance of the clay and move the clay in spiral lines to mix and wrap or wind it as the tile is being formed.

Figure 1 of my accompanying drawings is a perspective view of my improved tile-former. Fig. 2 is a longitudinal section, showing my former attached to a rotating shaft and within a dod or outside die. Fig. 3 shows it fixed to a dod or outside die that is designed to be

stationary in a machine. Jointly considered, these figures clearly illustrate the construction and operation of my complete invention.

A represents a cone-shaped die or former, made of cast metal. It is square at its ends, and has a bore, *b*, through its longitudinal axis and a smooth periphery at its largest diameter.

1 2 3 4 5 represent a series of spiral grooves formed in the surface of the tapering portion. They begin at the smallest diameter and face *c*, and terminate near the large end. These grooves may vary in size and number as required to be adapted to formers of different sizes. They are produced by means of a suitable pattern and mold in the manner irregular forms are generally cast, and then made smooth by filing or grinding. In place of forming grooves that are concave in their cross-sections, spiral ribs may be made to project from the plain surface of the tapering end to accomplish the results contemplated.

*d d* (shown in Figs. 2 and 3) represent the dod or outside die or former of a drain-tile machine, that may vary in size and shape as required to be adapted to be fastened to various forms of machines.

*f* (shown in Fig. 2) represents the rotating shaft of a screw-conveyer, such as are commonly used to move clay from a cylinder and force it outward through the annular space or throat produced by the inner and outer dies or formers.

To combine my spirally-grooved former with the rotating shaft *f* to be operated thereby, I simply slide it upon the free end of the shaft to abut against the end of a screw-conveyer fixed to the shaft or a shoulder or fixed collar, and then secure it from longitudinal movement by means of a nut, *g*, and from rotary movement relative to the shaft by means of a spline, *h*.

To attach my former to a stationary dod or outside former, I affix a cross-bar or rigid frame, *m*, to the end thereof, and a shaft, *n*, to its center, as clearly shown in Fig. 3, and then fasten the former to the shaft *n* by sliding it against a shoulder or fixed collar, *r*, and placing a nut, *s*, on the projecting end of the shaft *n*, that extends through the bore *b* of the former.

In the practical operation of my spirally grooved or ribbed former, when fixed to a



rotating shaft, it will perform the function of a screw-conveyer in forcing, packing, and pressing the clay rapidly through the dod or outside former, and twist the clay between the  
5 two dies, form spiral ridges in it while it is advancing, and also rub them out again, and in so doing mix the clay more thoroughly and produce a spiral grain and improved tile that is not liable to crack or separate in handling,  
10 drying, burning, and using.

When my former is made stationary in a dod, as shown in Fig. 3, and the clay forced through between the two dies or formers by a screw-conveyer or piston, the clay will be di-  
15 rected in spiral lines of advance by means of the spiral grooves or ribs to produce a spiral grain and improved tile in the same manner as when the former is rotated, but it will not aid in moving the clay as rapidly as when it  
20 is rotated to simultaneously perform the function of a conveyer and a die and former.

A former that has an equal diameter its entire length and spiral grooves or ribs extending from one end over a portion of its periphery may be substituted for a cone-shaped or  
25 tapering die or former to operate in the same way.

I am aware that a solid tapering screw has

been combined with a conveyer in the hopper of a tile-machine, to aid in tempering clay and  
30 forcing it through the annular space existing between a dod and inside die or former; but the clay tempered and advanced spirally around the solid screw became a united mass  
35 at the small end of the screw before it reached the dies, and had to be pressed apart again and advanced in a straight forward movement as it passed between the dod and former, and was  
40 thereby molded into tubular form and drain-tile having a straight longitudinal grain, and not a spiral grain, such as is produced by the direct combination of my improved inside die or tile-former with the mouth or dod of a tile-machine.

I claim as my invention—

45 As an improved article of manufacture, a cylindrical die or former having spiral grooves or ribs extending from one end inward over its periphery and a smooth periphery at its opposite end, and adapted to be applied and  
50 operated in a tile-machine in the manner set forth, for the purposes specified.

CALVIN J. MERRILL.

Witnesses:

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