No. 771,772. PATENTED OCT. 4, 1904.

M. V. B. ETHRIDGE.

STEP.

APPLICATION FILED DEC. 5, 1903.

NO MODEL.

Fig. 1.

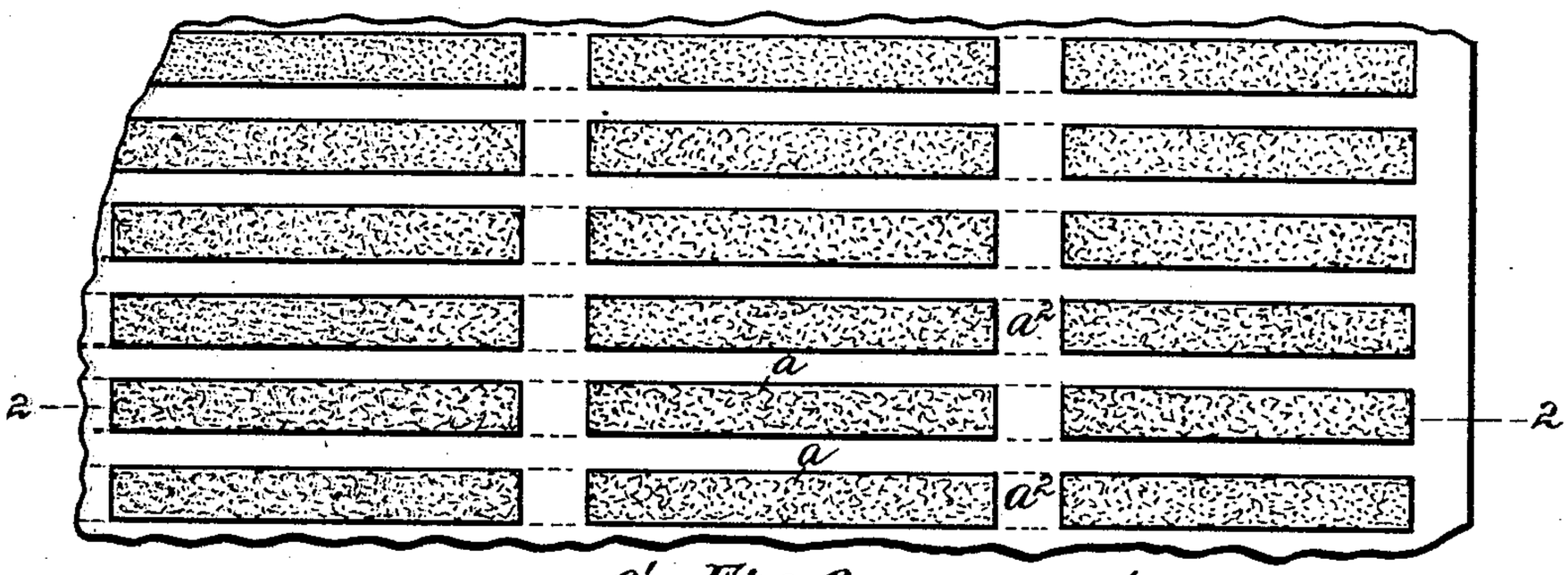


Fig. 2.

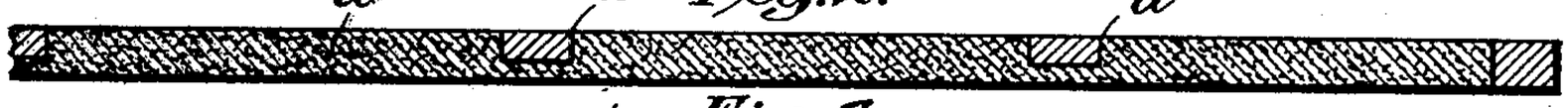


Fig. 3.

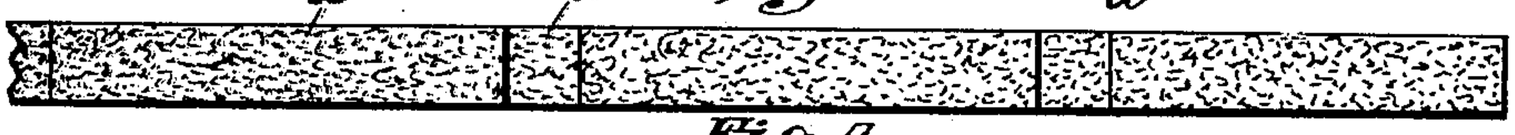


Fig. 4.

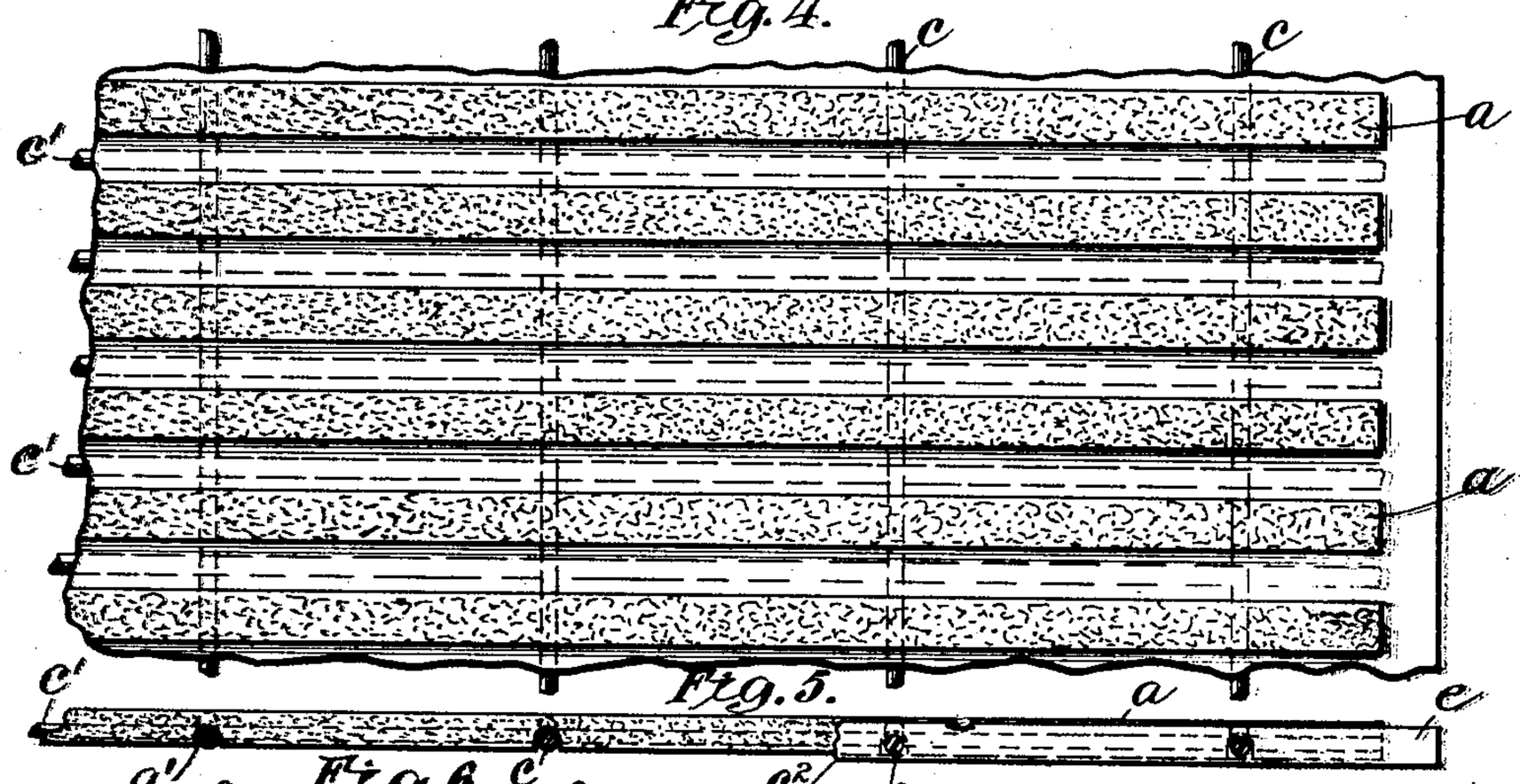


Fig. 5.

Fig. 6.

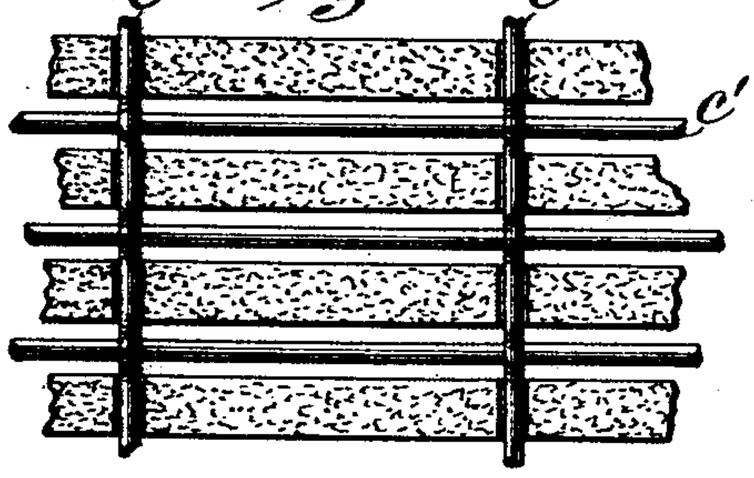
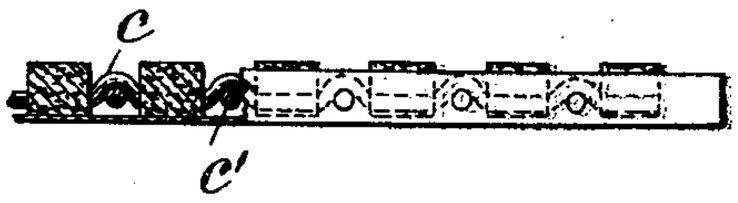


Fig. 7.



Witnesses
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Martin V B Ethridge
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By his Attorney
George H Huntington

No. 771,772. Patented October 4, 1904.

UNITED STATES PATENT OFFICE.

MARTIN V. B. ETHRIDGE, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO EMPIRE SAFETY TREAD COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF THE DISTRICT OF COLUMBIA.

STEP.

SPECIFICATION forming part of Letters Patent No. 771,772, dated October 4, 1904.

Application filed December 5, 1903. Serial No. 183,854. (No model.)

To all whom it may concern:

Be it known that I, MARTIN V. B. ETHRIDGE, a citizen of the United States, and a resident of New York city, in the county and State of New York, have invented a new and useful Improvement in Steps, of which the following is a specification.

This invention relates to safety-tread steps for use on car-steps or stairways where the traffic is very heavy and where there is great wear and extra danger of slipping.

It has for its object to provide a step the tread of which is composed of non-slipping rough artificial stone, such as carborundum, made in small sections and held in a metal bed-plate or foundation, the said artificial stone being much harder than the clamping portion of the bed-plate which holds it in place in order that the said clamping portion will wear away in advance of the non-slipping stone tread, leaving the latter always projecting and exposed to contact. To accomplish this result, I make wearing-strips of porous artificial stone, such as corundum or bicarborundum, which is made excessively hard and sufficiently rough to prevent slipping. The stone so made is first put together with a binding substance which renders it proof against the weather. Thus rain or other moisture and changes of temperature have no deteriorating effect upon the stone.

In the accompanying drawings, which form a part of this specification, my invention is fully illustrated, with similar letters of reference to indicate corresponding parts, as follows:

Figure 1 represents a top view showing a section of a completed step-tread. Fig. 2 represents a longitudinal sectional view on the line 2 2, Fig. 1. Fig. 3 represents a top view of one of the carborundum strips. Fig. 4 represents a top view showing a section of a completed step-tread with stay-wires introduced to bind and strengthen the structure. Fig. 5 represents a side elevation of the same, showing in section the finished edge with the surrounding metal, likewise the edge of the carborundum stone with the wires in place before the surrounding metal is applied. Fig. 6 illustrates a plan view showing a section of the carborundum stones and wires as they are united before the surrounding metal is applied. Fig. 7 represents an end elevation showing the location of the carborundum strips within the surrounding metal, likewise the ends of the carborundum strips without the surrounding metal, illustrating the manner in which the transverse wire is curved between the carborundum stone strips.

Referring to Figs. 2 and 3, *a* designates the carborundum strip, which is provided with depressions *a'*, running transversely of its surface at suitable intervals in order that the metal which surrounds the stones and holds them in place may be properly united between the strips, as shown at a^2, Fig. 1. The process of making this particular step where the transverse wires are not used is to place the stone strips *a* within the iron mold at suitable intervals, leaving sufficient space between them for a fluid metal to flow freely. A metal softer than the stone, which will contract in cooling, is then mixed and when sufficiently melted is poured within the mold around the carborundum stone strips, the same being held within the mold until the metal is cool, the result being that the contracting of the metal during the process of cooling shrinks itself so firmly around the carborundum strips after having penetrated its pores while hot that the strips become perfectly solid and fixed within the metal without a possibility of their becoming broken or detached by any amount of wear or use. In order, however, to reinforce the above-described structure and make it stiffer and less liable to bend where the traffic is excessively heavy, I employ the binding-wires *c* and *c'*, which may be woven together or placed with the transverse wires *c* on top of the longitudinal wires *c'*, as illustrated.

The carborundum strips *a* in the last-described construction are made precisely the same as those above described, although it is

not necessary to have them in one continuous strip. They could be made in short pieces, with the transverse wires *c* running between their ends, leaving each individual block of stone to be entirely surrounded by metal, with a stay-wire passing along its sides and across its ends.

When I use the last-named method of construction, I usually have the transverse depressions *a'* in the carborundum strips on the lower side of the stone, so that the metal which forms the bed-plate c^2, Fig. 5, covers the entire opening and leaves the carborundum strips *a*, Fig. 5, projecting slightly above the surrounding metal *e*, in which case the upper surface of the tread-step when finished will show, as illustrated in Fig. 4, with alternate strips of stone and metal. The process of combining the parts in this last-described method of construction is precisely the same as that previously described. The wires and carborundum strips are held in place within a suitable mold, and the contracting hot metal is poured within the mold and cast in the desired form, and the stay-wires being composed of tin and properly prepared the molten metal will solder itself fast to the wires and contract around the stone, as heretofore described, thus making a very strong and practically indestructible step. I would state, however, that this essential is necessary to the success of the invention, that the carborundum strips or pieces be embedded in and surrounded by a metal softer than the strips, which will receive and absorb the blow without permitting a possible movement of the carborundum stone. Soft metal, such as lead, might be used, or an alloy of lead and antimony might also be employed; but the invention is not limited to any precise metal or metallic alloy of the character mentioned. Hence the blows received by the strips *a* are transmitted to and absorbed by the metal surrounding the same, the metal serving as a bed and holding the strips absolutely solid and rigid in position.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A non-slipping tread-step having its tread-surface composed of carborundum or other hard artificial porous stone, and with a suitable body of metal softer than the carborundum, said metal forming the foundation or basis of the step.

2. A non-slipping tread-step composed of carborundum or other hard artificial-stone pieces molded within a bed of metal softer than the stone pieces, said metal being cooled and contracted around the said stone substantially as described.

3. A non-slipping tread-step composed of carborundum or other hard artificial-stone pieces surrounded by a metal softer than the stone pieces, said metal holding the said pieces in position, and forming the foundation or basis of the said step, and intermediate wires running in two directions within the said metal and forming suitable meshes, within which the said carborundum stone rests, the whole being molded together substantially as described.

4. In a non-slipping tread-step, a series of carborundum or hard artificial-stone strips provided with suitable transverse depressions, stay-wires seated in said depressions, and a metal bed softer than said strips contracted upon the same and in which said strips are seated.

5. A non-slipping tread-step composed of carborundum or other hard artificial-stone pieces, longitudinal and transverse wires surrounding said pieces, and a metal softer than the stone pieces shrunk upon the latter and said wires.

In testimony that I claim the foregoing specification I have hereunto set my hand this 17th day of November, 1903.

MARTIN V. B. ETHRIDGE.

In presence of—
E. A. PEEBLES,
J. W. SCOTT.