To all whom it may concern:

Be it known that I, PRESTON M. BRUNER, a citizen of the United States, residing in the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Processes of Laying Concrete Floors and the like, of which the following is a specification.

This invention relates more especially to the provision for an improved wearing surface of cement on top of old concrete floors, and especially on those constructed of reinforced concrete.

The primary object of this invention is to provide an improved floor of this character which will have a minimum degree of porosity and sponginess, and which will not become sandy or crumble away in the manner which is so prevalent at the present time.

Other and further objects will appear in the specification and be specifically pointed out in the appended claims, reference being had to the accompanying drawings exemplifying the invention, and in which,

Figure 1 is a vertical section of a floor constructed according to my improved process. Fig. 2 is a top plan view of the same, showing the various strata broken away to more clearly illustrate the idea.

Obviously, reinforced concrete itself does not form a satisfactory wearing surface for a floor under any circumstances. It has, therefore, become customary either to construct a wooden floor above the concrete, or to cover the reinforced concrete with an independent layer of a strong concrete mixture from three to four inches thick. In doing this, a dead load of from forty to fifty pounds per square foot is placed on the floors of a building merely to provide a satisfactory wearing surface. Even aside from this serious drawback, there are numerous other objections to heavy concrete floors which are laid according to present well-known processes. Thus, in laying such a floor, the cement must be deposited in a very moist condition in order to be readily molded into the desired form, after which, considerable time must elapse to permit the material to dry out sufficiently to adapt it to properly receive the finishing manipulations. This consideration oftentimes necessitates the idleness of a considerable gang of men who must be on hand and ready to perfect the finishing operation upon the floor within a short space of time, commencing with a certain critical moment in the setting of the cement. As a result, contractors for this class of work are subjected to much annoyance and considerable expense. Moreover, floors constructed by this method generally become porous and spongy so that even the mere sweeping of the floor detaches considerable dust and fine particles, which are very injurious to machinery, merchandise, etc., and moreover cause the rapid deterioration of the floor. The floor, in fact, becomes sandy, is easily broken, and as a rule crumbles readily. Of the make-shifts for overcoming these difficulties, the employment of paints to cover, or harden, has been only one form, and the use of various nostrums, mixed with the concrete, has been resorted to with the idea of binding the top surface securely, and forming a hard top surface. Where a thin wearing stratum may be laid, we overcome the objections to the heavy cement floor, but this thin layer is not adapted to withstand the ordinary blows or strains to which it is sure to be subjected, unless it is combined thoroughly with the concrete below it and thus is made an integral part in respect to the strength and solidity of the original structure. Obviously, a heavy stratum is employed to obtain the necessary strength without depending so much upon its adhesion to the concrete stratum therebelow. Even a thin layer of this character is more or less subject to becoming dusty or sandy on top when in use.

To eliminate all of the above mentioned difficulties and objections with thin or heavy coats, my improved process contemplates laying such coat upon the concrete below after the under concrete has been previously prepared in such a manner as to cause the upper layer to combine with it to form an integral part thereof, so as to partake of its inherent strength and solidity. In doing this, my process contemplates the elimination of all excess moisture while the cement is being compressed sufficiently so that the wearing layer is, in a very short space of time, prepared to be finished smoothly and of sufficient stiffness to be walked upon. According to this method, a wearing coat can be readily placed on the desired level or evenness, and then manipulated to a perfect finish without disturbing the adhesion between it and the underlying concrete.
structure. Most important of all, the entire process is completed before the cement adjacent to the old concrete has commenced to set, thus eliminating much of the difficulty arising from the formation of cleavage surfaces between the old concrete and the new wearing surface.

Referring more particularly to the drawings, in which the application of my improved process is illustrated in connection with the laying of the floor of a building, a rough finish stratum, such as, for example, is provided by a reinforced concrete floor, or other water-tight material, is first of all thoroughly cleaned, so that all loose, soft material, mortar, dust, and dirt is removed; and if the top surface of the same is undesirably smooth, or glassy, it is first roughened, thus providing it with projections and indentations, indicated at 3 in Fig. 1.

When this operation has been completed, a thin slush 5 (see Fig. 1) of rich fresh cementing material, made alkaline with potash or soda lye, is poured thereon and swept back and forth until it is thoroughly worked into the pores of the old concrete. While this slush is yet in the slushy and wet state, I place thereover a layer 4 of self-hardening material, or wearing surface.

After the wearing stratum has been properly laid, I lay thereon a fabric or netting, such as woven burlap, cheesecloth, or the like, so as to cover the entire surface. On this fabric or webbing 6, a dry layer of any suitable water-absorbing material 7 such as Portland cement with suitable aggregates or Sorel cement with suitable aggregates is placed for the purpose of taking up quickly the excess of water which is present in the wearing stratum 4, and which had been placed in such wearing stratum for the purpose of meeting the requirements connected with laying such surface. After the dry layer 7 has absorbed the excess of water from the wearing stratum 4, said layer 7 is removed from the wearing stratum by lifting the fabric 6. Preferably, this absorbent material is composed of the same material used as a wearing surface, but dry, and this is afterward used to form the wearing coat or topping of the next portion of the work. The action of this absorbent layer is immediate and rapid, and prepares the wearing stratum to be finally finished within the space of from ten to fifteen minutes after the same has been deposited. The liquid absorbed out of the first batch is thus transferred as part of the water required for plasticity of the topping which is to form the next batch. The damp material is therefore taken up and put in the mixing box and worked to a thin paste by the addition of a little more liquid, after which it is spread over the floor in the same manner already described.

By means of my process, the floor laying operation goes on without interruption, and enables the final finishing to be imparted to the wearing surface by a particular gang of men with smoothing tool who follow closely after the men that spread the wearing surface for successive portions of the same job, and who may thus complete their labors within a very short period after the first gang has ended its work. As is well known, the prevalent method of constructing the wearing strata ordinarily involves a long delay in the finishing, often for hours, to permit the excess of liquid to become sufficiently absorbed preliminary to the finishing operations which must then be carried on so hurriedly and violently that the cement bond between the strata 1 and 4 is commonly ruptured and ruined. Moreover, the incipient crystallization of the top of the wearing coat is broken up and partly ruined if disturbed so long after the same was placed.

What I claim is:

1. The herein described process of laying cement which consists in applying, upon a suitable foundation, a wet plastic layer of material, and then applying thereover a drying layer of finely divided absorbent material with an intervening sheet of porous fabric adapted to keep the drying layer physically separate from the plastic material while leaving it in drying relation thereto, and thereafter removing the sheet and drying layer.

2. The herein described process of laying cement in sections which consists in applying, upon one section of a suitable foundation, a wet plastic layer of material consisting of a self-harden binder and suitable filler, and then applying over said section a drying layer of finely divided absorbent material composed of the said self-harden binder material and said filler with an intervening sheet of porous fabric adapted to keep the drying layer physically separate from the plastic material while leaving it in drying relation thereto, permitting such drying relation to exist until the drying layer absorbs requisite moisture from the plastic section and then mixing the material of the drying layer with more moisture to produce the plastic topping material for the next section.

PRESTON MARTIN BRUNER.

In presence of—
M. C. Hammer,
H. G. Fletcher.