

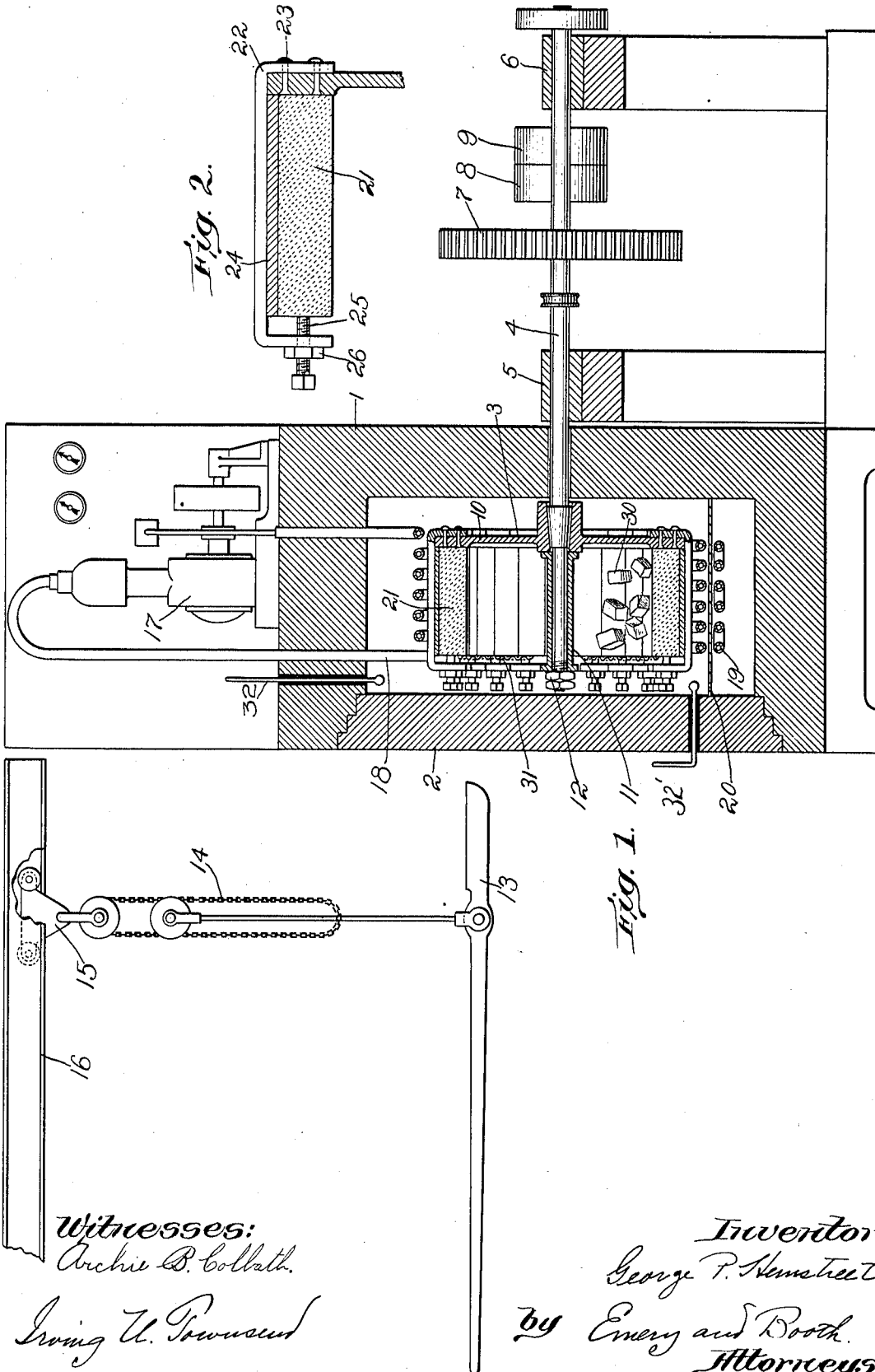
G. P. HEMSTREET.
RATTLER.

APPLICATION FILED MAR. 28, 1907.

970,373.

Patented Sept. 13, 1910.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3.

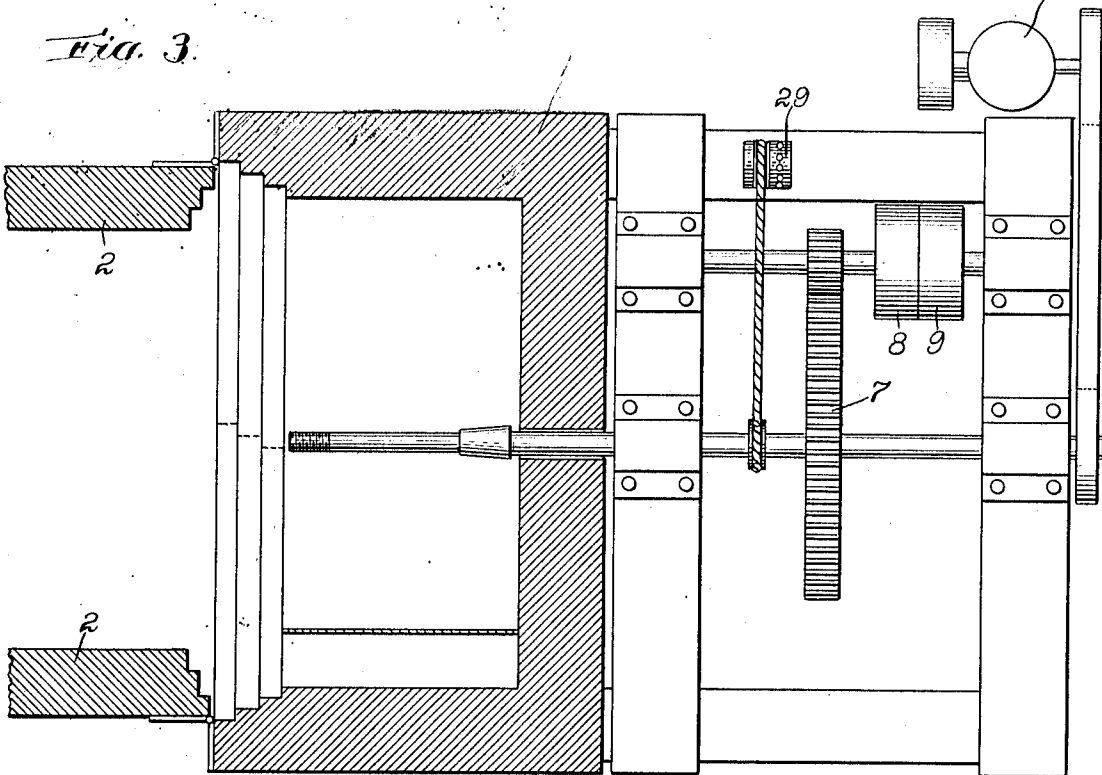


Fig. 4.

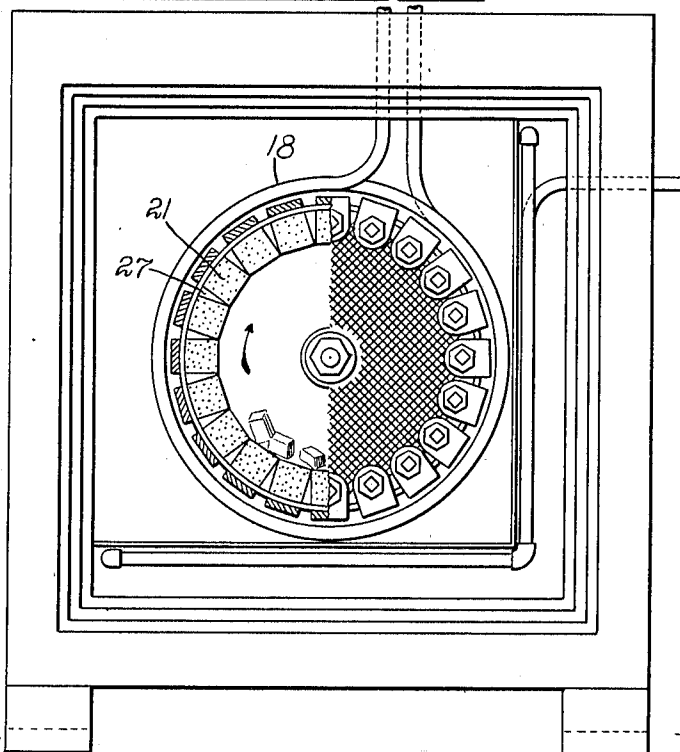
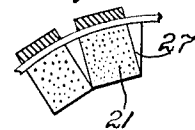


Fig. 5.



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UNITED STATES PATENT OFFICE.

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RATTLER.

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To all whom it may concern:

Be it known that I, GEORGE P. HEMSTREET, a citizen of the United States, residing at Hastings-upon-Hudson, in the county of Westchester and State of New York, have invented an Improvement in Rattlers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to rattlers intended primarily for testing asphalt and similar paving blocks, although it is apparent that the invention in certain of its relations is susceptible of use for other purposes.

Rattlers have heretofore been devised wherein paving blocks might be arranged in annular form and rotated at a high speed, metallic or other blocks being placed in the rattler and impacting, during the rotation thereof, upon the exposed surface of the blocks. By this rattler, paving blocks have been subjected to tests in similitude of the wear that such blocks would be subjected to in actual use.

Paving blocks as ordinarily constructed consist mainly of a body material composed of crushed stone or sand, very finely comminuted, stony material, dust or fines, and a cementing or binding agent commonly termed bituminous cement. The binding material commonly used has been asphaltic cement. A paving block so constructed becomes brittle under a low or freezing temperature and may be quite readily broken. Under a high temperature such as paving blocks would be subjected to in a summer heat or in a tropical or nearly tropical country these blocks become quite soft. Thus, under the wide range of temperature to which paving blocks must be subjected in view of the nature of their use, the changes in the block are such that tests made at one temperature may be absolutely valueless as a criterion of results in use at another temperature. Moreover, in use the paving blocks are subjected frequently to the action of excessive moisture, as during heavy rain storms or when snow lies upon them for a considerable length of time. It has been discovered that the action of moisture upon the blocks is such that tests made under wet and dry conditions of the paving blocks differ widely in result, and taken under either condition may be valueless for the

other. Certain kinds of asphalt blocks made from certain kinds of asphalt deteriorate in the presence of moisture, whether they are undergoing wear at the same time or not. Moreover different kinds of asphalt and different mixtures using the same kind of asphalt, show different degrees of resistance to water action.

It has been found by experience that asphalt blocks made from certain kinds of asphalt will deteriorate when subjected to moisture and that such deterioration does not take place throughout the whole block but only upon the exposed surfaces and that the block is affected to a depth of about one-quarter of an inch from the exposed surfaces even when the block has been immersed in water for several years. If this affected material of say, one-quarter of an inch in thickness is removed either by traffic or otherwise, the moisture will attack the fresh surface and this is really what happens when the pavement is subjected to continual moisture and continual traffic; the moisture attacks the surface of the pavement, deteriorates a thin layer of the cement, the traffic removes the injured portion, the water again attacks another thin layer and so on until the whole block is destroyed. This water action does not take place with all asphalts and certain asphalts are more affected than others.

The rattler to which I have referred, while effective for a paving block so long as it is subjected to a uniform and moderate temperature, has failed to take into account the wide ranges of temperature to which paving blocks are subjected in use and the fact that the wear of these blocks differs under wet and dry conditions.

I have devised a rattler wherein paving blocks may be subjected to wearing tests under either extreme of temperature and also permitting the ready moistening of the blocks and tests thereof when moistened.

In order that the principles of my invention may be fully apparent I have disclosed one type thereof in the accompanying drawings, wherein—

Figure 1 is a vertical section of a rattler embodying my invention, the operating means therefor and the rattler body conveying means being shown in elevation; Fig. 2 represents in longitudinal section and in elevation a detail of means for securing the

paving blocks in the rattler; Fig. 3 represents in plan and in horizontal section the rattler chamber and rattler operating means, the rattler body having been removed; Fig. 4 is a front elevation partially in section of a portion of the apparatus shown in Fig. 1; and Fig. 5 is a detail representing the manner of securing the blocks in position.

Referring to that single type or embodiment of the invention herein illustrated, the chamber of the rattler, which is preferably composed of insulating material, is indicated at 1 and is provided with doors as 2, preferably located at the front. The rattler body is indicated at 3 as mounted upon a horizontally disposed shaft 4 mounted in bearings 5 and 6 and driven by gearing 7 in any suitable manner, fast and loose pulleys 8 and 9 preferably being employed.

The rattler body in its general construction may be that known in the art as the Jones-Talbot rattler, in which paving blocks are clamped in annular form to rotate upon a shaft, the inner exposed surface of the blocks being subjected during such rotation to the action of contained metallic or other cubes or blocks simulating in effect the wear to which blocks are subjected in use. Such rattler body herein comprises a disk 10 having thereon a central sleeved portion 11 adapted to fit upon a correspondingly shaped portion of the shaft 4. In the present instance, said cooperating parts are indicated as tapered in part so that a close fit may be secured. Any other suitable type of rattler may be employed.

I have discovered that it is important in obtaining valuable tests under all conditions that the blocks be subjected to tests when thoroughly wetted. This can most readily be done by securing the rattler body removably to its shaft, so that after the blocks have been individually secured in position upon the body, the latter with its attached blocks may be immersed in water and then quickly replaced upon its shaft. Were the blocks individually immersed in water and thereafter clamped in position one by one in or upon the disk body, much of the moisture would pass from the blocks during the operating and moreover the blocks would be more difficult to handle. In accordance with my invention therefor, I removably secure the rattler body upon its shaft in any suitable manner such as that described. The end of the shaft 4 adjacent the end of the sleeve 11 may be screw threaded and provided with suitable locking and holding nuts indicated at 12 whereby the rattler body may be secured in position in a manner permitting its ready removal and replacement. In order conveniently to remove the rattler body from its chamber to the point where it is to be submerged, any suitable means may be provided. Herein

for the purpose I have indicated a lever 13 or other support mounted by means of fall chains 14 upon a trolley 15 guided upon a track 16, the rattler body being suitably supported upon the lever 13 and guided to the desired point. It is apparent that any suitable means may be substituted for that shown to transport the rattler body. In this manner, the rattler body having the blocks clamped or secured therein may be readily moistened and then quickly and conveniently mounted in position for the testing operation.

Asphalt paving blocks are used throughout many countries of the world, not only in the temperate zone, in portions of which they may be subjected to extremely low temperature, but they are used in many tropical or nearly tropical countries, as in the South American republics, wherein not only is the heat excessive but heavy rain storms are of frequent occurrence. Paving blocks subjected to the dry and glaring heat of the sun under a high temperature become, as previously stated, quite soft and the wearing qualities thereof are greatly affected. In the northern countries and during winter months in many countries of the temperate zone, the temperature is frequently so low that the blocks become quite brittle, the stony portions thereof being liable to be knocked from the blocks under heavy impact. The highest technical knowledge and skill have been for some time past and are now being utilized for the purpose of obtaining paving blocks that are suited to the different conditions referred to, it being found that a paving block adapted to a country wherein the temperature changes are not extreme is or may be totally unsuited to a tropical country or country wherein extremely low temperatures are prevalent during the winter months. Furthermore, a paving block entirely suited to the street of a South American city is unsuited for the streets of a city situated at a high latitude.

It has become extremely necessary severely to test paving blocks as manufactured, inasmuch as slight changes in the constituency of the blocks produce very different results in the wearing qualities, but, as previously stated, these tests have been heretofore of little value in so far as they apply to blocks intended for use in tropical or nearly tropical countries or in countries situated in a high latitude, and even for blocks intended for use in different parts of the United States. In accordance with my invention I have therefore devised means to subject blocks to a controlled temperature which may be either a refrigerating or a high temperature and desired intermediate variations. This result may be accomplished in any suitable manner, but herein, for the purpose, I have indicated (Fig. 1) an ammonia or other re-

frigerating machine at 17 with pipes 18 which are coiled about or otherwise in proximity to the rattler body within the chamber 1 therefor. In this manner the blocks may have imparted thereto any desired low temperature and when in such condition rotated with the rattler body and so subjected to tests that will truly ascertain the wearing qualities of the blocks at such temperature. Heating coils may be located within the chamber 1 of the rattler as indicated at 19 and connected with any convenient or suitable source of supply not shown. If desired a partition 20 may be placed between such coils and the rattler body. In this manner any desired high temperature may be imparted to the blocks approximating that to which they may be subjected to use in certain countries or localities and thereby a true wearing test may be obtained, a result heretofore impossible and never yet accomplished so far as I am aware.

The paving blocks indicated at 21 may be secured to the rattler body in any desired manner, but in the present instance I preferably employ a metallic or other member 22 for each block, one end of said member being bolted or otherwise secured as represented at 23 to the disk 10 and if desired secured to a ring or annulus 24 mounted adjacent to or secured to the disk 10. As here shown, the opposite end of the metallic member 22 is downturned and is provided with a screw clamp 25 having thereon a lock nut 26. In this manner, each block may readily be secured in position. It is apparent that if desired a plurality of blocks may be secured by means of a single member 22 of suitable size and shape. As indicated in Figs. 4 and 5, wedges 27, preferably of hard wood, are adapted to be forced between the blocks 21, thus aiding in steadying and securing them in position.

If desired (Fig. 3) a suitable tachometer 28 may be employed to register the velocity of the apparatus and a rotation registering apparatus 29. Any suitable means may be provided to retain within the rattler the metallic cubes 30 which in the rotation of the rattler strike rapid blows upon the blocks 21. In the present instance (Fig. 1) a screen 31 is provided for the purpose and secured in position in any suitable manner. 32 and 32' indicate thermometers to ascertain the temperature within the chamber 1 of the rattler.

When the same asphalt is used blocks will vary in their resisting powers to water action, due to the other ingredients or to the particular method of manufacture, such as proportions of the various ingredients, temperature, amount of pressure, etc. All of these things make it very important to employ some method of testing the water action

on different kinds of blocks, this being done in the present embodiment of the invention as follows: The rattler will be charged with the blocks, the cubes inserted and the machine run for say, five hundred revolutions or until the coating of asphalt on the exterior of the blocks is completely removed and the true material of the block is fully exposed. The rattler body with its contents of blocks will then be removed from the shaft and the whole submerged in fresh water for a period of say, fifteen days. It will then be replaced upon the shaft, the cubes again inserted and the rattler rotated for say, a thousand revolutions or until all of the affected material has been entirely removed. The rattler body and its contents will again be immersed in water for a further period and the process repeated as many times as may be necessary.

By having several disks and sets of clamps to fit the same shaft it will be possible to have several sets of blocks undergoing tests at the same time, as one set will be placed in the rattler while other sets are being immersed in the water.

Preferably the asphalt blocks are weighed before they are put into the rattler and after they are taken out, thus giving the number of pounds of material worn away by the metallic cubes. If the total area exposed to the action of the cubes is measured the results may be conveniently expressed in pounds lost per square yard of pavement.

Having thus described my invention, I desire it to be understood that although specific terms are employed they are used in a generic and descriptive sense and not for purposes of limitation and that the scope of the invention is set forth in the following claims.

Claims.

1. A rattler for testing paving blocks and the like having one or more block impacting members and also having provisions for controlling the temperature of such blocks while subjected to the testing operation.

2. A rattler for testing paving blocks and the like comprising a rotatable member having provisions for securing paving blocks thereto and having one or more block impacting members, an inclosed casing for said rattler and provisions for regulating the temperature of the blocks upon the rattler while subjected to the testing operation.

3. A rattler for testing paving blocks and the like comprising a rotatable member having provisions for securing paving blocks thereto, one or more block impacting bodies within said rotatable member, an inclosed casing for said rattler and provisions external to said rotatable member for regulating the temperature of the blocks upon the rattler while subjected to the testing operation.

4. A rattler for testing paving blocks and

- the like comprising a rotatable member having provisions for securing paving blocks therein, one or more block impacting members coacting with said rotatable member, a casing wherein said member may be rotated and means for subjecting said blocks while upon the rattler to either extreme of temperature.
5. A rattler for testing paving blocks and the like comprising a rotatable member having provisions for securing paving blocks therein, a casing wherein said member is mounted and rotated, and means for subjecting said blocks while upon the rotatable member to a heating action and separate means for subjecting said blocks while upon the rotatable member to a cooling action.
6. A rattler for testing paving blocks or the like comprising a rotatable member having provisions for securing paving blocks therein, a casing wherein said member is mounted and rotated, and means for subjecting said blocks while upon said rotatable member to one extreme of temperature and separate means for subjecting said blocks while upon said rotatable member to the opposite extreme of temperature.
7. A rattler for testing paving blocks or the like comprising a rotatable member having provisions for securing paving blocks therein, a casing wherein said member is mounted and rotated, and means external to said rotatable member but within said casing for subjecting said blocks interchangeably while carried by the rotatable member, to either a heating or to a refrigerating temperature.
8. A rattler for testing paving blocks and the like comprising a rotatable body having provisions for securing paving blocks thereto, a casing wherein said rattler body is located, and refrigerating apparatus having pipes communicating therewith and within said casing whereby the blocks may be subjected to a refrigerating temperature during the testing operation.
9. A rattler for testing paving blocks and the like comprising a rotatable body having provisions for securing paving blocks thereto, a casing wherein said rattler body is located, and refrigerating apparatus having pipes communicating therewith whereby the blocks may be subjected to a refrigerating temperature during the testing operation.
10. A rattler for testing paving blocks and the like comprising a rotatable body having provisions for securing paving blocks thereto, a casing wherein said rattler body is located, a refrigerating apparatus having pipes communicating therewith and within said casing, and heating coils located adjacent said rattler body whereby the blocks carried thereby may be subjected to either extreme of temperature.
11. A rattler for testing paving blocks and the like comprising a shaft, means for rotating the same, a rattler body mounted upon said shaft and having one or more block impacting members therein and provisions for securing said rattler body thereon but permitting ready removal thereof.
12. A rattler for testing paving blocks and the like comprising a shaft, means for rotating the same, a rattler body having provisions for tightly securing the same upon the shaft but permitting ready removal thereof from said shaft and one or more block impacting bodies within said rattler body.
13. A rattler comprising a rotatable disk and block holding means secured thereto to secure blocks in the form of an annulus about said disk and having clamping means adapted to engage the blocks to clamp the same in said position with relation to said disk, said rattler having one or more block impacting members.
14. A rattler for testing paving blocks or the like comprising a shaft, means for rotating the same, a rattler body mounted upon the shaft, one or more block impacting members contained within said rattler body, means to secure said rattler body to the shaft, said means permitting ready removal of the said rattler body from said shaft, whereby a portion of said shaft is exposed for the substitution of another rattler body.
15. A rattler for testing paving blocks and the like comprising a disk having provisions for mounting the same upon a shaft, a ring or annulus adjacent said disk, and block holding means secured to said disk and provided with block engaging clamping screws whereby blocks may be clamped in position with relation to said disk and ring.
16. A rattler for testing paving blocks and the like comprising a disk and means for securing paving blocks thereto in the form of a ring or annulus, and wedges adapted to be inserted between said blocks to secure the latter in position.
17. A rattler for testing paving blocks and the like comprising a rattler body, a shaft whereon the same is mounted, means permitting ready removal of said body from said shaft, one or more block impacting members within said rattler body, and provisions for subjecting blocks while positioned upon said rattler body to either extreme of temperature.
18. A rattler for testing paving blocks or the like comprising a casing having provisions for receiving a rotatable shaft, a shaft mounted in said casing, means to rotate said shaft, a rotatable member carried by said shaft within said casing and having provisions for securing paving blocks thereto, means for subjecting said blocks while carried by said rotatable member and within said casing to a heating action, and separate means for subjecting said blocks to a cooling

action while carried by said rotatable member.

19. A rattler for testing paving blocks or the like comprising a casing having provisions for receiving a rotatable shaft, a shaft mounted in said casing, means to rotate said shaft, a rotatable member carried by said shaft within said casing, and having provisions for securing paving blocks thereto, one or more block impacting members within said rattler body, and means for subjecting said blocks interchangeably while carried by said rotatable member and within said casing to either a heating or a refrigerating temperature.

20. A rattler for testing paving blocks or the like comprising a casing having provisions for receiving a rotatable shaft, a shaft mounted in said casing, means to rotate said shaft, a rotatable member carried by said shaft within said casing and having provisions for securing paving blocks thereto, means for subjecting said blocks while carried by said rotatable member and within said casing to a heating temperature, and separate means for subjecting said blocks to a refrigerating temperature while carried by said rotatable member.

21. A rattler comprising a rotatable disk

and block holding means secured thereto to secure blocks in the form of an annulus about said disk, the rattler body having a partially open face opposite said disk and means to subject the blocks while secured to the disk to temperature variations to test the efficiency thereof.

22. A rattler comprising a rotatable disk and adjustable means mounted upon said disk to clamp a series of blocks against said disk in annular form to be tested, in combination with block impacting members within said series of blocks.

23. A rattler for testing paving blocks and the like comprising a rotatable disk, block holding means carried by said disk and having adjustable provisions for clamping the blocks as a series in annular form against said disk, and one or more block impacting members adapted to impact upon the inner faces of said blocks when the disk is rotated.

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

GEORGE P. HEMSTREET.

Witnesses:

HARRY STUKERT,
FRED GORLICH.