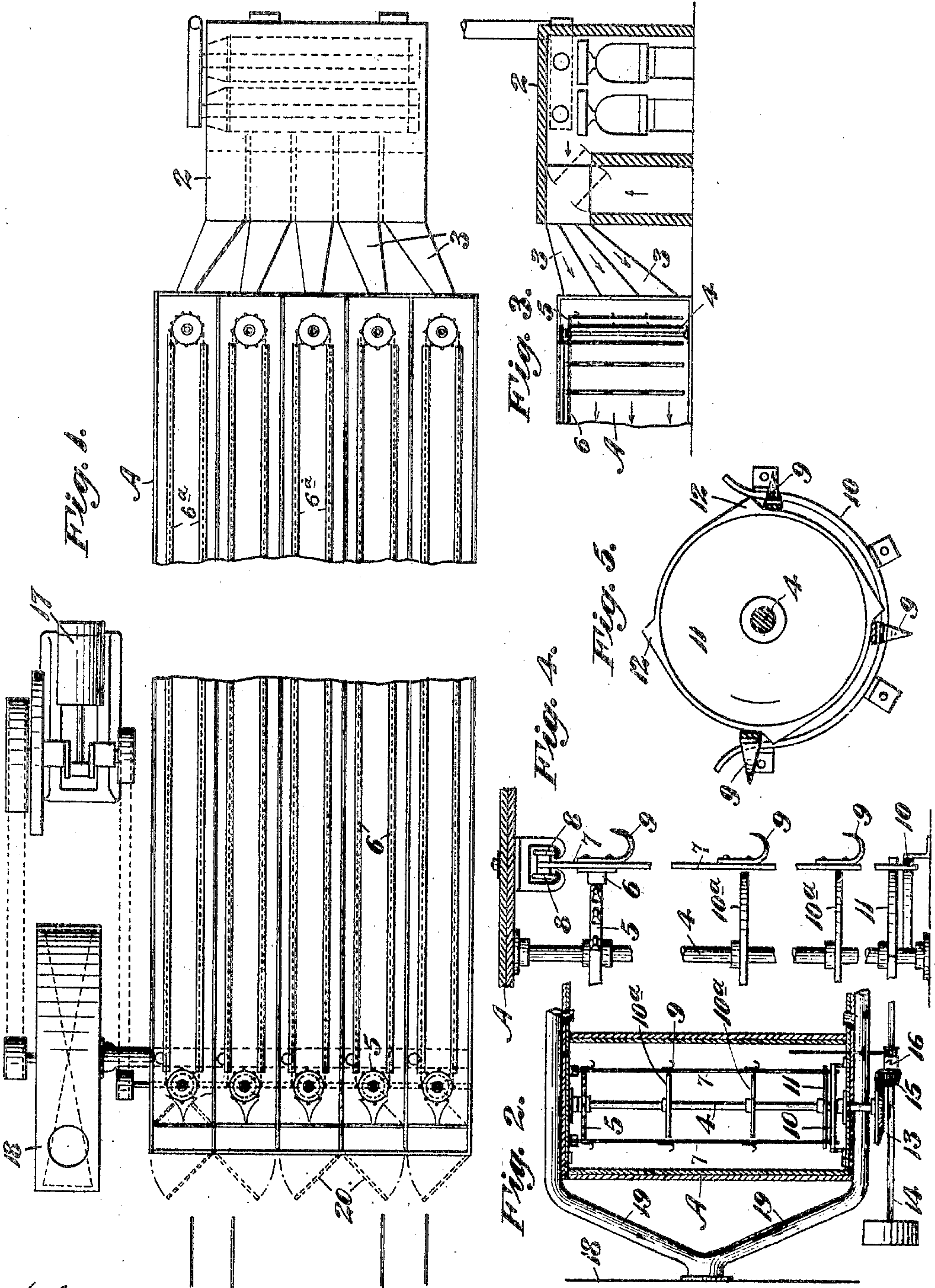


G. BOSCHKE.  
DRIER.

APPLICATION FILED APR. 18, 1905.



Witnesses,  
Chas. E. Chapin.  
J. A. Morse

Inventor,  
Guy Boschke  
By Geo. H. Strong. atty.



# UNITED STATES PATENT OFFICE.

GUY BOSCHKE, OF SAN FRANCISCO, CALIFORNIA.

## DRIER.

No. 804,518.

Specification of Letters Patent.

Patented Nov. 14, 1905.

Application filed April 18, 1905. Serial No. 256,222.

*To all whom it may concern:*

Be it known that I, GUY BOSCHKE, a citizen of the United States, residing in the city and in the county of San Francisco and State of California, have invented new and useful Improvements in Driers, of which the following is a specification.

My invention relates to a drying apparatus.

It consists in a combination of mechanism and in details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a plan view of my drier with roof removed. Fig. 2 is a vertical transverse section of one compartment. Fig. 3 is a partial longitudinal section showing heater connections. Fig. 4 is a view of the hanger, support, and sprocket-shaft. Fig. 5 is a plan view of guide-sprocket.

The particular object of my apparatus is to provide a means for drying fish, skins, leather, or any flexible substance which may be hung upon hooks or supports and which is caused to travel through alley-ways by means of endless chains from which the hooks depend. During this travel the articles to be dried are subjected to a current of heated air passing through the alley-ways from one end to the other.

The apparatus is preferably placed in a building which should have air-tight walls, ceiling, and floor made of tongued and grooved or other suitable lumber, preferably of two thicknesses, laid to break joints and coated with some hermetically-sealing material. A building of this description may comprise one or more alleys of dimensions required for the particular use for which they are designed. At one end of the alley or alleys is a heater and at the opposite end of the alley is an exhaust-fan, so that a current of air may be continuously or intermittently passed through the alley. By means of endless chains carrying hangers the material to be dried may be transmitted through the alleys as long as necessary, after which the dried product is removed.

A represents a building constructed as here described. At one end I have shown a heating-furnace 2, which may be of any usual or well-known description, such as may be purchased in the market. This heater has pipes 3 leading from it into the contiguous end of the drying-chamber. The building used for this purpose may be of any shape or size, but preferably long and narrow, and it may be made

with one or more alleys. As each alley or room is a complete unit in itself, a description of one will answer for all. The alley-ways may be properly proportioned for the work. A very suitable proportion will be three feet wide, eight feet high and eighty feet long, and the sides of the alleys are lined with smooth lumber, so as to present an even surface to air-drafts on all sides. The heating-pipes 3 are led into the alleys, one at the top, one near the center, and one near the bottom, the object being to distribute and deflect the air so as to about equally fill the end of the alley from top to bottom.

In the center of the alley and a short distance from each end are vertical steel shafts 4, revolving in shaft-boxes passing through supports above the ceiling and below the floor of the alley. On each of these shafts is keyed a sprocket-wheel 5, about eighteen inches in diameter, more or less, and these wheels are secured about four inches from the ceiling. An endless link belt or chain 6 passes around these sprockets, and this chain is supported in a substantially level position by hangers 7, which have the lower ends fastened to the chain and the upper ends are carried by wheels running upon a track. The chains may run in appropriate guides 6<sup>a</sup>, whereby they are maintained essentially horizontal between the sprocket-wheels. As shown in the present case, the upper ends of the hangers are supported by a frame having wheels 8, which run in an inclosed casing curved at the bottom to form a support for the wheels and having a central space through which the hanger may pass. To these hangers are fixed hooks 9, upon which the product to be dried may be hung. These hooks and hangers are a sufficient distance apart to carry the load for which they are designed. The hangers are of such length as to extend to near the bottom of the alley or passage which forms the drier, and they may have a series of hooks 9 fixed to them between the top and bottom, as shown. The lower ends of the hangers are substantially unsupported, and when they reach the ends of the alley where the chains pass around the sprocket-wheels they pass within a curved guide 10 and outside the guide-wheels 10<sup>a</sup> and 11. Upon the vertical shafts are fixed the wheels 11, having projecting points or sprockets 12, which are separated from each other a distance equal to the distance between the hangers. Thus when each hanger reaches the sprocket 11 one of the arms 12 will engage it



and carry it around within the semicircular guide 10, from which it emerges when it reaches the other side and commences its return journey.

5 Power is transmitted to move the apparatus by means of a bevel-gear, as at 13, fixed upon the vertical shaft at the end opposite to the heater and preferably below the floor. A horizontal shaft 14 has a pinion 15, which engages  
10 the gear 13, and by means of a clutch, as shown at 16, the mechanism of any alley may be disengaged and the travel of the belts stopped, and they may be started at any time by again engaging the clutch. Power to drive this  
15 mechanism is transmitted from a suitable motor, as at 17, through belt-pulley and shafts, as shown.

The speed of the carrying-chain may be regulated to suit the character of the material  
20 to be dried. I have found for drying fish, such as codfish, that a speed of thirty feet per minute is very satisfactory; but it will be manifest that this may be varied to suit conditions, and as each alley is independent of  
25 all of the others the movement of the material to be dried can be properly and independently controlled in each.

18 is a fan or blower of any suitable description. I have here shown a fan of this description  
30 placed at the end of the apparatus which is opposite to the heater, and connection is made with the inlet of the fan by means of passages, as at 19, which passages extend across the top and bottom of the alleys, as shown, converging and connecting with the suction portion  
35 of the fan, thus exhausting the air in the alleys. Each of these passages may be controlled by a suitable gate or valve, so that the rate at which the air is drawn through any  
40 passage can be properly controlled.

The end of the building farthest from the heater is fitted with air-tight doors, as at 20, and these may be closed when drying is being done and opened to allow articles to be taken  
45 into or out of the drier. These doors are placed at any convenient distance from the end of the alley, so that space may be had to store the article before and after drying. A track or other suitable convenience may be  
50 brought into close connection with this end of the apparatus. By making double doors at this point it will be seen that the outer doors may first be opened, then closed to form an air-lock, then the inner doors, and the operator can pass into the space contiguous to  
55 the ends of the alleys where the traveling chains are exposed, and as the article to be dried passes around this end of the carrier by the movement of the hangers the condition may be examined and those articles which  
60 are sufficiently dried may be removed. Those which are not sufficiently dried can remain to again pass around the circuit. It will be seen that by this arrangement where fish is to be  
65 dried they can be easily placed upon the hooks

which are slowly passing and as easily removed when dried.

It will be seen that in this apparatus fish or other articles being hung upon the hooks at the end most distant from the heater are  
70 caused to travel toward the heat, being subjected to an increased temperature as they approach the heater. Then passing around the sprockets at the heater end they again move away from the heater and they are subjected  
75 to air, gradually decreasing in temperature and increasing in moisture, thus alternating, and this alternation of heating and cooling prevents the formation of an exterior hard crust which prevents the satisfactory drying  
80 of the article. The vertical position assumed by the fish when thus hung exposes both sides to the fullest action of the surrounding medium, and by reason of the flat surfaces of  
85 considerable area, and because they may be hung at different angles with the line of travel, the current of passing air will be constantly agitated and deflected from the time of its admission to its exit.

As the rods or hangers 7 are loosely suspended from the upper end, it is desirable  
90 that they have some temporary backing or stiffening device at the points where the fish are placed upon or removed from the hooks to prevent their yielding and swinging back  
95 under the pressure applied in attaching or removing the fish. Such a device is provided by the wheels or disks 10<sup>a</sup> and 11, exterior to which the hangers pass at the loading and discharging end of the apparatus, as previously  
100 described, and they provide a sufficiently stiff and solid backing to resist the pressure necessary to affix the fish or substances to be dried to the hooks, while the curved guides 10,  
105 within which the hangers pass, steady and prevent their swinging outward when the fish are removed.

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

1. In a drier, a channel or alley, a heater, conducting-pipes connecting it with one end of the alley, means for inducing the travel of the heated air to the opposite end, an endless traveling chain, supports therefor in the upper  
115 part of the alley, hangers suspended from the chain having a series of hooks thereon adapted to receive the substances to be dried and to transmit them in a vertically-suspended position.  
120

2. A drier having a relatively narrow horizontally-extending alley, a heater and means connecting it with one end of the alley, means for circulating the heated air through the alley, a horizontally-traveling conveyer located in the upper part of the alley, hangers depending from the conveyer and hooks on the hangers adapted to suspend the substances to be dried in a vertical position.

3. In a drier, a channel or alley, a heater  
130



and pipes connecting with one end of the alley, means for inducing the flow of the heated air to the opposite end, an endless traveling chain and sprockets around which it is movable in the upper part of the alley, rods depending from said chain having hooks at intervals between the top and bottom and adapted to carry the substances to be dried suspended therefrom, means for guiding the lower ends of the rods in a curve coincident with the diameter of the sprockets, said means comprising sprockets, the teeth of which are separated a distance equal to that between the rods, which rods they engage, and a segmental guide within which the lower ends of the rods are carried in passing around the sprocket.

4. In a drier, a horizontal channel or alley, a heater a series of superposed pipes connecting with the heater and leading respectively into the middle and lower portion of the alley end, means by which the heated air is caused to travel to the opposite end of the alley, vertically-journaled shafts at each end having sprocket-wheels fixed at the top, an endless traveling chain passing around said sprockets, rods connected with the chain extending to near the bottom of the alley and having hooks upon them at points between the top and bottom, guides by which the lower ends of the rods are carried around a curvature equal to the diameter of the sprockets, to be returned upon the opposite side, and means for supporting the chain between the sprockets.

5. In a drier, a horizontal channel or alley, a horizontal track arranged therein, heater-pipes connecting said heater at intervals vertically with one end of the alley, means for inducing the flow of the heated air to the opposite end, vertical shafts journaled contiguous to the ends of the alley, sprocket-wheels upon the upper ends of the shafts an endless traveling chain passing around said sprockets and having depending rods at intervals, with hooks for suspending the substances to be dried, and means supporting the chain between the sprocket-wheels, said means comprising wheels, and a wheel-frame journaled upon the track and having hangers depending therefrom and fixed to the chain.

6. In a drier, a horizontal channel or alley, a horizontal track arranged therein, a heater, pipes connecting it with the alley at intervals between the top and bottom, vertically-journaled shafts located contiguous to the ends of the alley and having sprockets fixed near the top, an endless chain passing around the sprockets, means consisting of wheels traveling upon said tracks and having connections with the chain whereby the latter is supported in its horizontal position between the sprockets, hanging rods fixed to the chain at intervals and having hooks located between the top and the bottom upon which the substances to be dried are suspended to hang vertically, means by which the lower ends of said rods

are guided in passing around the ends of their travel and a suction-fan whereby a current of heated air is constantly drawn through the apparatus.

7. In a drier, parallel horizontal alleys, a heater, pipe connections between said heater and each of the alleys, horizontal traveling endless chains, sprocket-pulleys near the tops of the alleys around which the chains pass, devices for supporting the chains between the sprocket-pulleys, rods hanging from the chains with hooks to receive the substances to be dried, a suction-fan and connections between the top and bottom of the alleys at the end opposite to the heater, and gate-controlled inlets to the passages from each of the alleys.

8. In a drier, a plurality of parallel horizontal alleys having horizontal revoluble sprockets near the top, endless chains passing around said sprockets, supports by which said chains are maintained substantially horizontal in their travel, rods suspended from the chains having hooks at intervals between the top and bottom for the suspension of substances to be dried, a heater located at one end having pipes or passages connecting it with the alleys, a suction-fan with passages connecting it with each of the alleys, chambers located beyond the suction-passages and sprockets at this end of the alleys, said chambers having doors for access, and to prevent the ingress of air.

9. In a drier, a chamber, a heater connected with one end, an air-exhausting apparatus connected with the opposite end, an endless traveling chain movable alternately to and from the source of heat, and hangers carried by the chain to suspend the substances to be dried so as to be surrounded by the drying medium and to deflect the air-currents from side to side.

10. In a drier, a chamber, a heater connected with one end, an air-exhausting apparatus connected with the opposite end, an endless traveling chain movable alternately to and from the source of heat, hangers carried by the chain from which to suspend the substances to be dried, and doors forming an air-lock at the receiving and discharge end of the chamber.

11. In a drier, a chamber, a heater connected with one end, an air-exhausting apparatus connected with the opposite end, an endless traveling chain movable alternately to and from the source of heat, hangers carried by the chain to suspend the substances to be dried, and supports against which the hangers are in contact while passing the point where the substances are to be attached to and removed from the hangers.

12. In a drier, a drying-chamber, an endless horizontally-traveling chain with hangers and hooks for suspending the substances to be dried, guides at one end around which the hangers pass, said guides acting to resist pressure when the substances are attached or removed.



13. In a drier, a drying-chamber, an endless horizontally-traveling chain, end sprockets therefor, dependent hangers loosely suspended from the chain, having hooks for the attachment of substances to be dried, means for guiding the hangers as the chain passes around the end sprockets, and wheels or disks against which the hangers are supported while substances are attached or removed.

10 14. In a drier, a drying-chamber, an endless horizontally-traveling chain movable therein, loosely-dependent hangers suspended from

the chain and having hooks for the attachment of substances to be dried, and resistant backing devices in contact with which the hangers move while the substances are attached or removed.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GUY BOSCHKE.

Witnesses:

S. H. NOURSE,

HENRY P. TRICOU.