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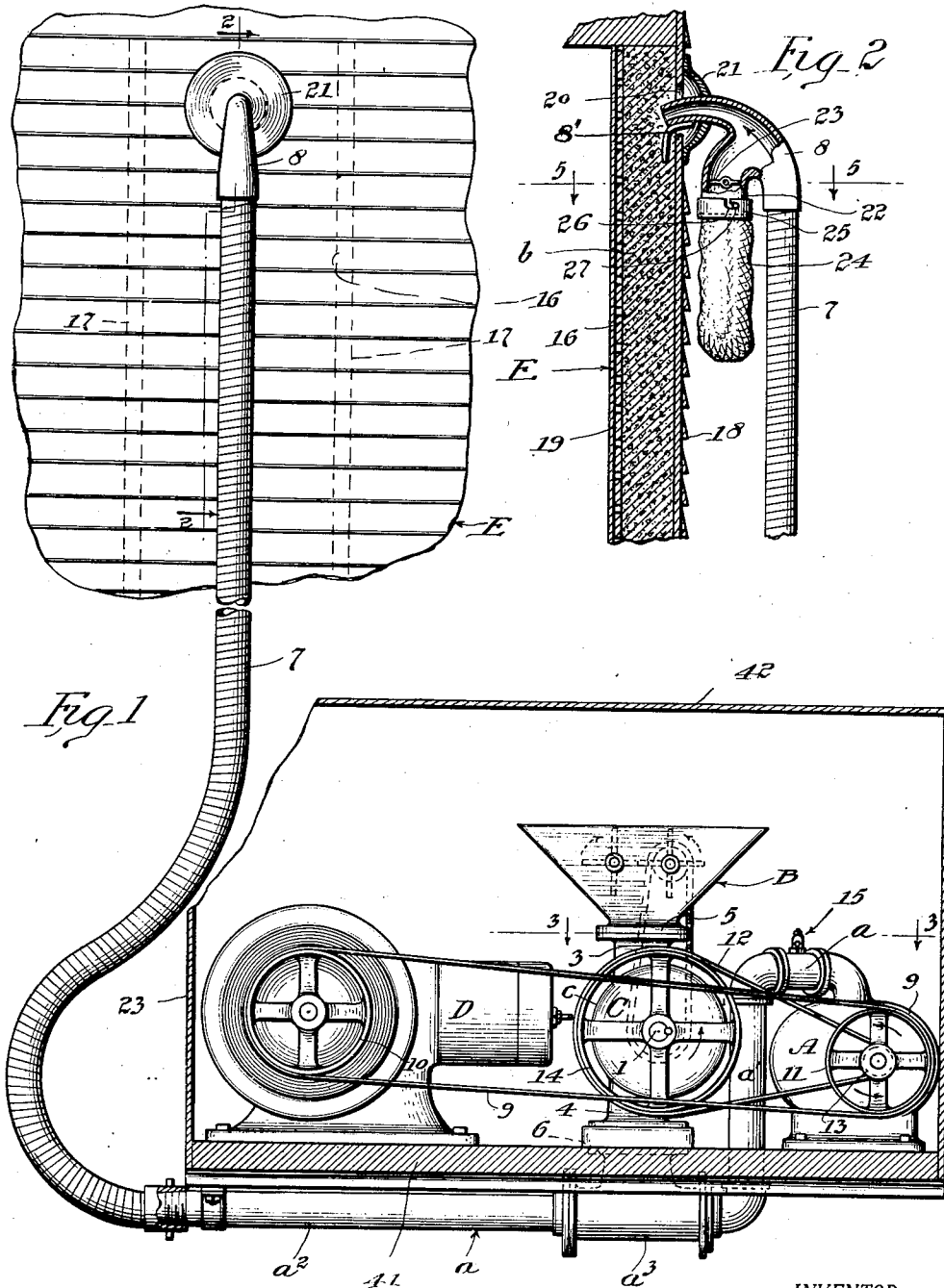
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APPARATUS FOR HANDLING COMMINUTED MATERIAL

Filed Oct. 15, 1928

3 Sheets-Sheet 1



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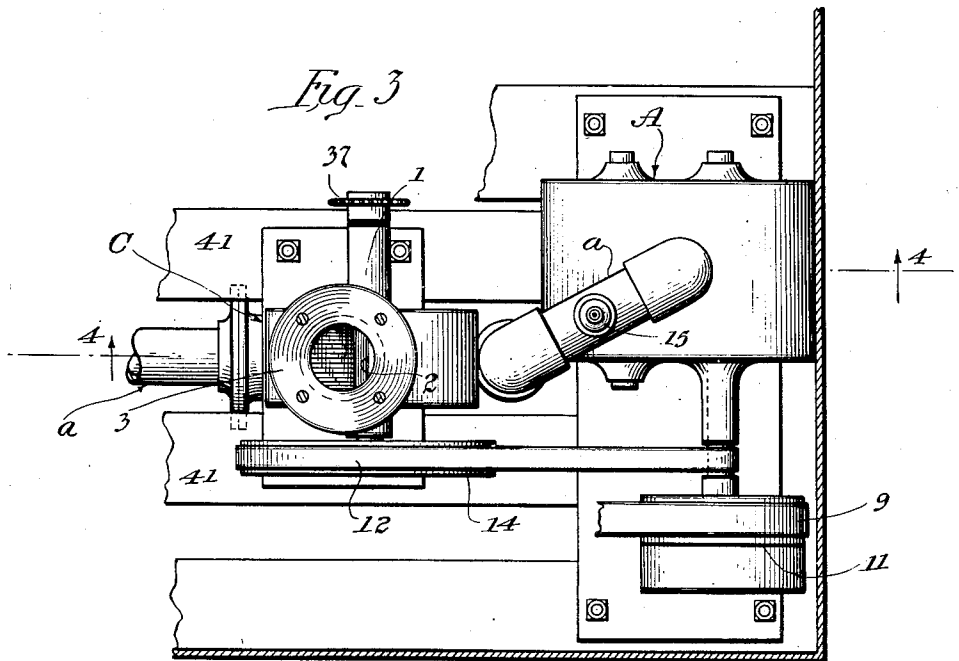
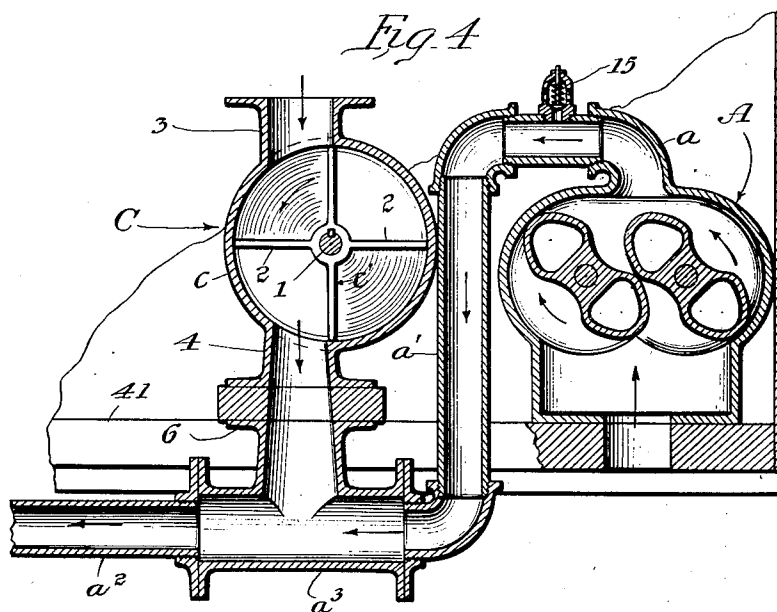
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APPARATUS FOR HANDLING COMMINUTED MATERIAL

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APPARATUS FOR HANDLING COMMINUTED MATERIAL

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3 Sheets-Sheet 3

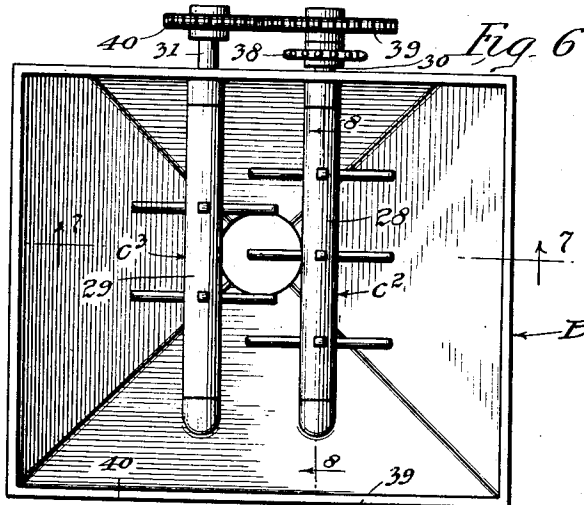
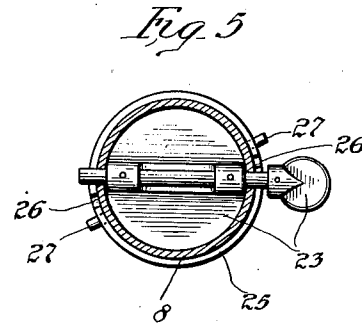
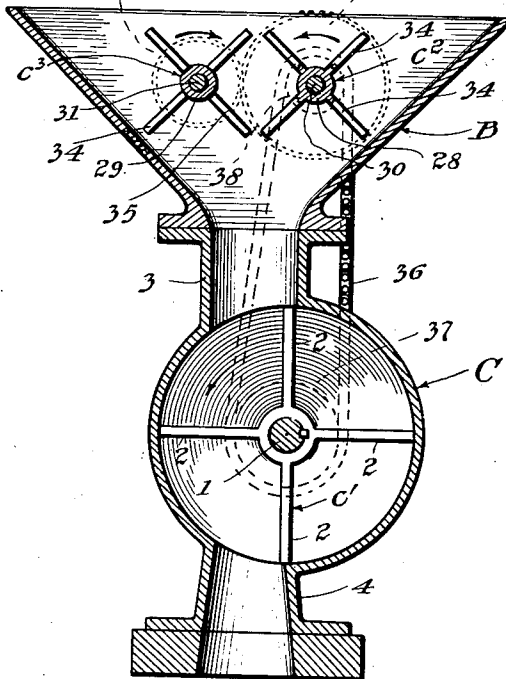
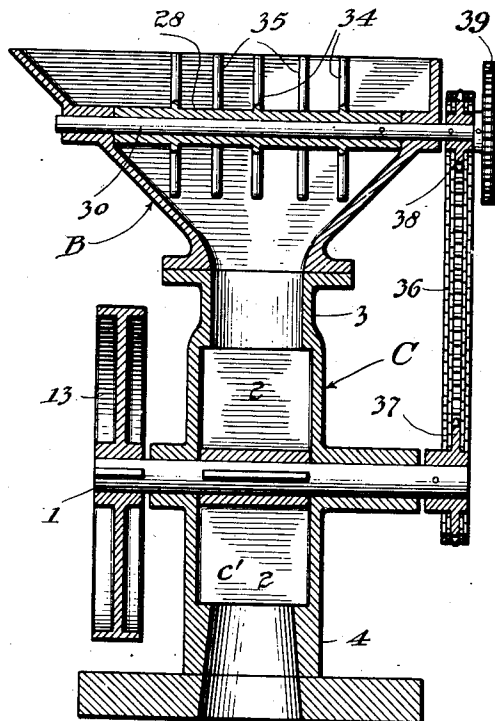


Fig. 7.

Fig. 8

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UNITED STATES PATENT OFFICE

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APPARATUS FOR HANDLING COMMINUTED MATERIAL

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This invention relates to apparatus for handling comminuted material and relates particularly to apparatus designed and adapted for filling the hollow wall spaces of buildings with insulating material in comminuted form.

At the present time, it is becoming increasingly prevalent to fill the wall spaces of buildings—and particularly the wall spaces between the studding of frame buildings closed by the outer sheathing of the building and the plastering applied to opposite sides of such studding—with insulating material in comminuted form. A preferable insulating material for the purpose consists of a filamentary product known commercially as mineral wool, which is cut into short lengths—say one inch (1") long. In practice it is found that when the wall spaces of buildings are thus filled with an effective insulating material, they can be heated much more effectively and economically than where the wall spaces contain only air, and will also render houses thus treated much cooler in summer.

The present invention has particular reference to the provision of apparatus for filling the wall spaces of buildings already erected.

The object of the invention is to provide apparatus for the purpose specified, which is simple in construction, strong and durable; which is efficient for its designed purpose; and which is relatively inexpensive to construct.

To effect the objects of the invention, my improved apparatus comprises the various features, combinations of features, and details of construction hereinafter described and claimed.

In the accompanying drawings, in which my invention is fully illustrated,

Fig. 1 is a side view of an apparatus embodying my invention and improvements, shown as applied in use for filling hollow spaces in the walls of a building already constructed with insulating material;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary top plan view of

my improved apparatus, on an enlarged scale, the hopper forming part thereof being removed;

Fig. 4 is a sectional view on the line 4—4 of Fig. 3;

Fig. 5 is a sectional plan view of manually controlled venting means substantially on the line 5—5 of Fig. 2;

Fig. 6 is an enlarged top plan view of the hopper forming part of the apparatus;

Fig. 7 is a sectional side view of the hopper and associated feeding and sealing means on the line 7—7 of Fig. 6; and

Fig. 8 is a sectional view of said hopper and said feeding and sealing means on the line 8—8 of Fig. 6.

Describing the invention with particular reference to the drawings, my improved apparatus comprises a blower, designated as a whole A, preferably a positive blower of the general type known as a Root blower, connected to the discharge opening of which is an air discharge pipe *a*, which, for reasons presently explained, comprises a drop section *a'*.

The insulating material for filling the wall spaces, designated *b*—and consisting preferably of a filamentary non-metallic substance, as mineral wool cut into short pieces, say about one inch (1") in length, is adapted to be contained in a hopper, designated as a whole B, and which may be of any suitable or approved construction, from which it is delivered to the section *a'* of the blower discharge pipe which communicates with the lower end of the drop section *a'* thereof, by a combination feeding and sealing device designated as a whole C, which, as shown, is of a familiar type, comprising a cylindrical casing *c* and a runner *c'* rotatably mounted therein, said runner consisting of a hub, keyed or otherwise secured to a shaft 1 rotatably mounted in bearings in the side walls of the casing *c*, and radial vanes 2, the outer and lateral edges of which are fitted to the inner cylindrical surfaces and the side walls of said casing, with slight clearance.

The casing *c* is made in the form of a union fitting, being provided with flanged tubular connections 3 and 4 adapted to be connected,

respectively, to a flange 5 surrounding the discharge opening of the hopper B and a flange 6 on a T-fitting a^3 connected into the section a^2 of the blower discharge pipe.

5 To prevent clogging of the connection between the casing of the feeding and sealing device C and the T-fitting a^3 , said connection is preferably flared, the diameter thereof preferably increasing from the casing c to the fitting proper a^3 .

As shown, the tubular connections 3 and 4 of the casing c are arranged eccentrically thereof, but this relation may be varied if desired.

15 Detachably connected to the outer end of the blower discharge pipe a is a flexible hose 7 of desired length, preferably usual commercial wire-wound hose, and secured to the outer end of said hose is a nozzle 8, preferably made of suitable sheet metal, and which tapers outwardly from its attached end, as clearly shown in Figs. 1 and 2.

The blower A is driven by a suitable motor, designated as a whole D, which, as shown, is an internal combustion engine but which exemplifies any suitable form of motor.

As shown, the blower A is driven by means of a belt 9 adjusted to pulleys 10 and 11 secured to the crank shaft of the engine D and to the shaft of said blower.

In the preferable construction, shown also, the runner c' of the feeding and sealing mechanism C is driven by suitable connection with the shaft of the blower A, consisting of a belt 12 adjusted to pulleys 13 and 14, secured to the blower shaft and to the shaft 1 of the runner c' , respectively, the relation being such that said runner c' will be driven relatively very much slower than the shaft of the blower.

For reasons presently explained, a pressure relief valve 15, of any usual or approved construction, is connected into the blower discharge pipe a , preferably adjacent to the upper end of the drop section a' of said pipe.

For purposes of clear and definite illustration, I have, in Figs. 1 and 2 of the drawings, shown my improved apparatus as applied in use for filling the spaces 16 in the walls of a building already constructed, designated as a whole E, between the studding 17 of said walls, and which are closed on opposite sides by the outer sheathing 18 and the plaster 19 or other covering, and which I will now describe, particular reference being had to Figs. 1 and 2 of the drawings.

Preparatory to filling the spaces 16, holes 20 are formed in the outer sheathing 18 adjacent to the tops of the walls, of sufficient size to permit the end of the nozzle 8 to be inserted therethrough into the wall spaces 16, the escape of air from the wall spaces 16 through the holes 20 being prevented by suitable sealing means consisting, as shown, of a rubber disk 21 provided with a central

hole or opening adapted to receive the end of the nozzle 8 and the outer edges of which are adapted to bear against the outer surface of the sheathing 18 surrounding said holes 20. In the preferable construction shown, the disk 21 is cupped, and the opening therein is so proportioned that it will engage the tapered nozzle 18 snugly at a point a short distance from the discharge end. Thus, by exerting pressure on the nozzle 8, a substantially airtight joint will be formed between the hole in the disk 21 and the nozzle 8 and also between the edges of the cupped rubber disk 21 and the outer surface of the sheathing 18.

In most cases, it is found that there is sufficient leakage from the different wall spaces 16 to prevent excessive air pressures therein, which would otherwise prevent designed operation of the apparatus; but to provide for relieving the air pressure in said wall spaces, means are preferably provided for venting said air space. In the preferable construction shown, said venting means are associated with the air discharge nozzle 8 and consist of a hollow connection 22 formed on said nozzle, preferably at its under side, said connection being controlled by a suitable valve, indicated at 23, which we may assume is a usual form of butterfly valve and is adapted for manual operation by the operator.

Also, to prevent loss of filling material when the valve 23 is opened, a bag 24, made of suitable filter fabric, is adapted to be detachably attached to the discharge end of the connection 22. To provide for conveniently attaching and removing the filter bag 24, a metal ring 25 is secured in the open end thereof, adapted to be secured to the connection 22 by any suitable means, simple means for the purpose, consisting of a usual form of bayonet joint, consisting of angular grooves 26 formed in the ring 25 adapted for engagement by lugs or projections 27 on the connection 22, said grooves and lugs preferably being in duplicate on opposite sides of said ring and connection.

In the preferable construction, shown also, the nozzle 8 is adapted to be secured in engagement with the holes 20 in the sheathing 18 by means of a hook 8' thereon, adapted to be hung over the lower edges of said holes.

During the filling of an enclosed space, such as the wall space in a building, there is a tendency for the filling material to be forced into and clog any openings which permit the escape of the air necessarily introduced with the filling material. Obviously, should the circumstances be such that the amount of air escaping from the space being filled is less than the amount of air necessarily introduced with the filling material, there will be an undesirable accumulation of pressure within the space, and such accumulation of pressure may be sufficient to, for instance, force the plastering from the wall, or cause other in-

jury. The inclusion of the pressure relief valve in the discharge conduit will prevent such accumulation of pressure in the space being filled, beyond the safety point, and thus prevent stripping of the plastering from the wall or other injury to the building structure.

When a wall space 16, on which the apparatus is operating at a given time is filled with insulating material *b*, insulating material will collect in the section *a*² of the blower discharge pipe, the hose 7 and nozzle 8, causing back pressure in the blower discharge pipe *a* which will ultimately be relieved by opening of the pressure relief valve 15, said relief valve being preferably so adjusted that it will open and thus relieve the air pressure in the blower discharge pipe *a*, before the insulating material contained therein becomes sufficiently compacted in the hose 7 and the nozzle 8 to clog the same and prevent designed operation of the apparatus. By locating the pressure relief valve between the blower and the point of delivery of the insulating material, all danger of clogging or stuffing of the relief valve by the back flow of the filling material is prevented, a result which is further augmented by locating said relief valve adjacent the top of the drop in the conduit, so that gravity will also aid in preventing such clogging of the relief valve.

The relief valve 15 will also serve as a signal to the operator that the wall space on which the apparatus is working at a given time is filled, thus obviating loss of efficiency in the apparatus by continuing to discharge air into a wall space after it is filled.

In buildings of usual size and standard construction, a wall space 16 defined by the studding of the wall can be filled in about two minutes, using air pressure of approximately two pounds.

In what I now consider the preferable embodiment of the invention, my improved apparatus comprises means adapted for subjecting the filling material *b* delivered into the hopper B to the action of what may be designated combing devices, which will loosen up any filling material which may be matted or compacted so that it will be light and fluffy.

Simple means for this purpose consists of what may be called combing rolls, designated as a whole *c*², *c*³, rotatably mounted in the hopper B, comprising cores 28 and 29 secured to shafts 30 and 31, rotatably mounted in bearings formed in bosses 32 on the walls of the hopper B, the relation being such that said shafts will extend parallel with the shaft 1 of the feeding and sealing mechanism C. Secured in said cores, respectively, are pins 34 and 35, said pins preferably overlapping, and the pins of different combing rolls being arranged out of line with or staggered relative to each other.

Rotation is adapted to be imparted to the

combing rolls *c*², *c*³, by suitable driving connection with the shaft 1, the relation being such that the upper sides of said rolls will move towards each other and preferably such also that one of said rolls will rotate faster than the other. As shown, the roll *c*² is driven by means of a chain belt 36 adjusted to sprocket wheels 37 and 38 secured to the shafts 1 and 30 of the feeding and sealing runner *c*¹ and of the rolls *c*², respectively; and the roll *c*³ is driven from the roll *c*² by means of gears 39 and 40 secured to the shafts of said rolls, respectively, said gears being of such size that the roll *c*² will be rotated faster than the roll *c*³. As shown, said gears are so proportioned that the roll *c*² will rotate about twice as fast as the roll *c*³.

This construction will insure that filling material *b* delivered into the hopper B will be discharged into the feeding and sealing mechanism C while rotating the rolls *c*², *c*³, at different rates of speed will subject the filling material to a combing or shredding action, which will operate, in an obvious manner, to loosen up any matted or compacted filling material which may be delivered to the hopper B, all in the manner desired.

In order to render the apparatus conveniently portable, the blower A, the hopper B, the feeding and sealing mechanism C, and the motor D, together with the piping and other parts associated therewith, are preferably mounted upon a truck comprising a body portion made in the form of a platform 41; and to protect the apparatus from the weather, the truck on which the apparatus is mounted preferably comprises a housing 42 which encloses the apparatus.

I claim:

1. Apparatus for filling a substantially enclosed space of a building comprising a blower; a discharge conduit leading from said blower; means for delivering insulating material to said conduit; a pressure relief valve located in said conduit between said blower and the point of delivery of the insulating material; and a discharge section for said conduit arranged to deliver the material into spaces of buildings or the like.

2. Apparatus as specified in claim 1, in which there is a drop provided in said conduit between the blower and the point of material delivery and said pressure relief valve is located adjacent the top of said drop.

3. Apparatus for filling a substantially enclosed space of a building, comprising a blower; a discharge conduit leading from said blower; means for delivering insulating material to said conduit; a pressure relief valve located in said conduit between said blower and the point of delivery of the insulating material; and a discharge section for said conduit arranged to deliver the material into spaces of buildings or the like.

4. The combination as specified in claim 3 in which there is a drop provided in said conduit between the blower and the point of material delivery and said pressure relief valve is located adjacent the top of said drop.

In witness that I claim the foregoing as my invention, I affix my signature this 6th day of October, A. D., 1928.

HENRY J. BURT, JR.

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