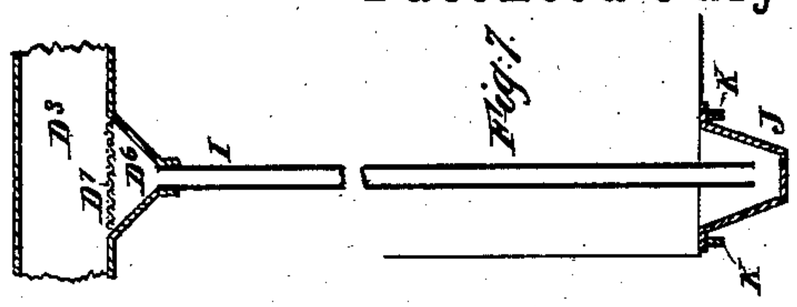
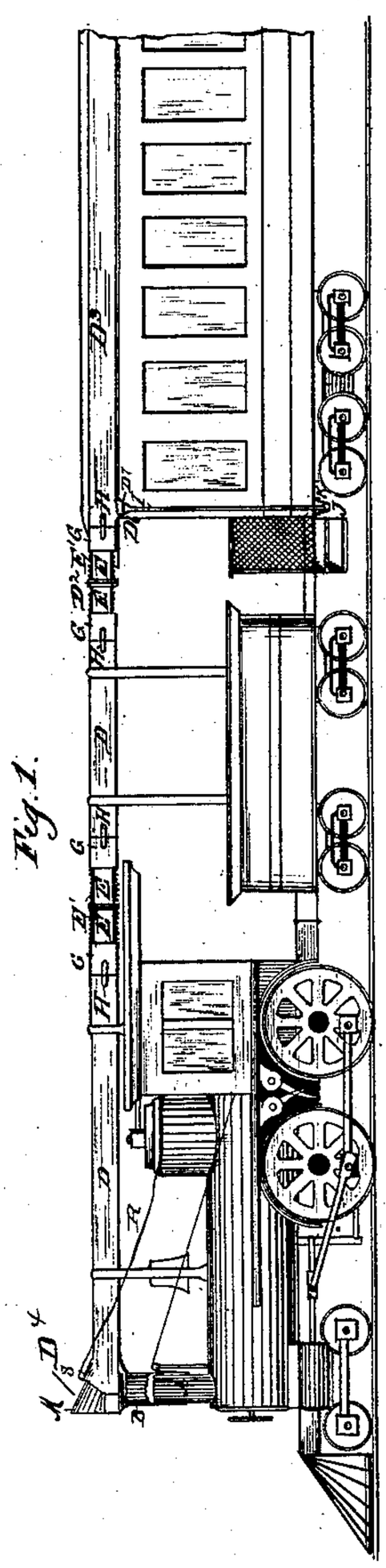
(No Model.)

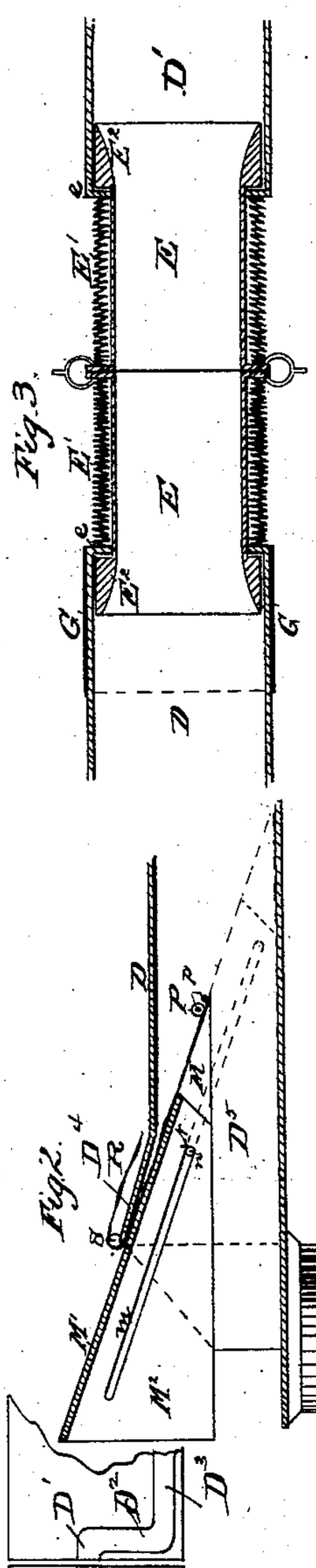
# O. S. TAVSHANJIAN.

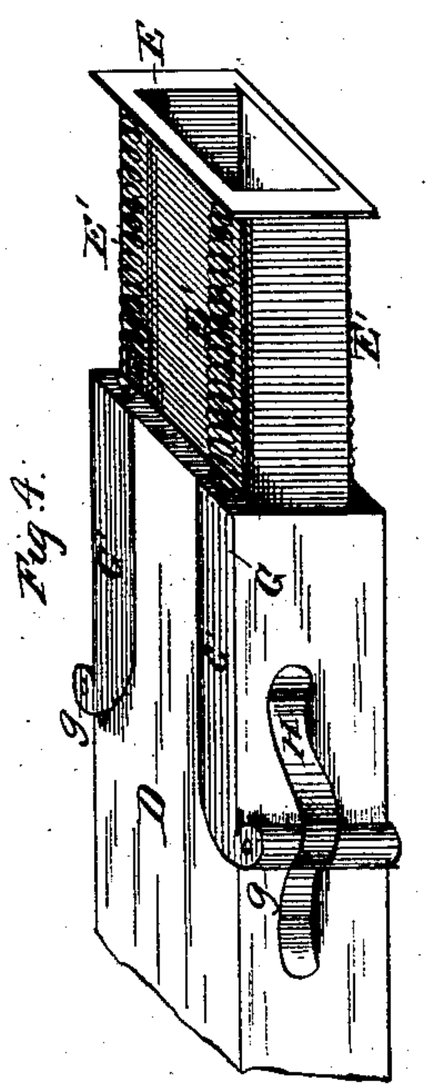
## SMOKE AND SPARK CONVEYER.

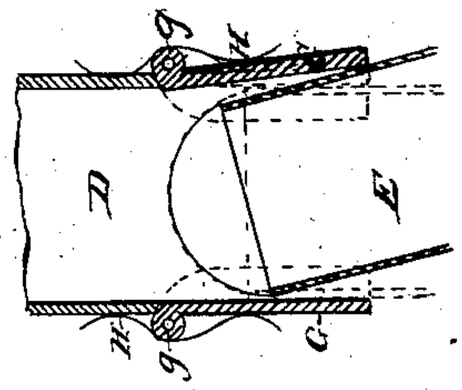
No. 281,581. Patented July 17, 1883.

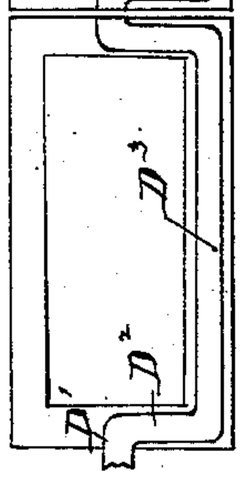



Witnesses.
B. E. D. Stafford
M. F. Boyle

Inventor.
O. S. Tavshanjian,
by his attorney
Thomas D. Stetson

# UNITED STATES PATENT OFFICE.

OHANNES S. TAVSHANJIAN, OF CONSTANTINOPLE, TURKEY.

## SMOKE AND SPARK CONVEYER.

SPECIFICATION forming part of Letters Patent No. 281,581, dated July 17, 1883.

Application filed April 6, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, OHANNES S. TAVSHANJIAN, of Constantinople, in the Empire of Turkey, temporarily residing at New York city, in the county and State of New York, have invented certain new and useful Improvements in Smoke and Spark Conveyers for Railway-Trains, of which the following is a specification.

It has long been proposed to provide the tops of the several cars each with a large longitudinal pipe open at each end, and to couple the several pipes together and to the smoke-stack of the locomotive, with provisions for yielding to conform to the several motions, and to convey the smoke and sparks from the locomotive through such series of pipes and discharge them harmlessly at the rear of the trains.

The object of my invention is to overcome certain practical difficulties and insure the success of such system. I provide more effective and convenient means than heretofore for opening the system immediately over the smoke-stack to allow the smoke to be discharged directly upward from the smoke-stack while the train is standing still at stations or other points. I provide yielding sides to the pipes or the connections therefrom at the junctions, so as to allow better than ordinarily for oblique positions of the cars relatively to each other in turning curves and in switching. I also provide, by a peculiar arrangement of the pipes, for allowing an ample passage for the smoke and sparks without carrying any part of the apparatus above the present top of the cars, thus avoiding difficulty in passing through tunnels and covered bridges, and under signal-frames, telegraph-wires, &c. I also provide convenient means for discharging the water accumulating from the steam, which forms an important element in the current moving through the pipes.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 a general side elevation. Fig. 2 is a central longitudinal section of the upper portion of the smoke-stack and of the parts immediately adjacent. Fig. 3 is a horizontal section, and Fig. 4 a perspective view, of the provisions for connecting the pipe of one car with the pipe of another, with peculiar provisions for allowing great side motions of one car relatively to the others, and also great obliquity or skewing of the position of one relatively to another, as is required in traversing curves of small radius. Fig. 5 is a horizontal section through a portion. Fig. 6 is a plan view of the top of one of the cars. Fig. 7 is a vertical section of a portion on an enlarged scale.

Similar letters of reference indicate corresponding parts in all the figures.

A is the base, and B the upper portion, of a smoke-stack of a locomotive. The part B is of a little larger diameter than the part A, and is adapted to slide telescopically up and down. When the locomotive is to be used with cars not provided with pipes, the upper portion, B, of the smoke-pipe is raised, and the smoke is discharged above the apparatus in the ordinary way; but when properly-equipped cars are attached, the upper portion, B, of the smoke-pipe is lowered, and the smoke is received into the pipes at a low point. This and the other provision to be presently described allow the apparatus to be used on trains without increasing the height above that of the cars and locomotives not equipped with this invention.

D D are horizontal pipes of galvanized sheet-iron or other suitable material, made as smooth as practicable on the inside, and of sufficient area to easily convey all the smoke and steam discharged from the smoke-pipe A B, and also a quantity of fresh air received through the front. Certain portions of the system of pipes will be designated when necessary by additional marks, as D′ D², &c.

The cars are made, as is common, with a portion of the roof near each end and at each side considerably lower than a portion in the middle. The pipe D for each car is made somewhat wider than its height, or, in other words, flattened, and is bent in gentle curves, so that the current of smoke, air, steam, and sparks which is moving rearward through the system of pipes is transferred from the pipe of one car to the pipe of the next through suitable yielding connections, and in passing the length of each car is first deflected to one side, so as to avoid the raised portion of the car-roof, then extended the length of the car over a low portion of the

roof, near the side, then is deflected inward again to the center, so that while the passage from each car to the next is at the center, so as to be subject to the least longitudinal extension and contraction in working, the current is passed freely along the length of each car without going over the high portion in the center. The ends which are in the center line of the car are marked D′. The curves which lead the gases from the center to the sides and back again are marked D². The stretch of pipe which extends longitudinally the greater portion of the length of the car is marked D³. The connection between the pipe of one car and the adjacent end of the pipe of the next car is effected by short coupling-lengths E E, which are flanged to abut firmly together, and equipped with longitudinal springs E′, which hold them extended under ordinary conditions, but allow them to telescope in the main pipe when the cars are coupled together. These springs hold the flanges gently together, so as to make a sufficiently tight joint, and by yielding more or less at different periods allow for all the changes in distance of the cars apart which ever occur in practice. Each pipe D is formed with a flare, *e*, and with a locking-shoulder, E². (See Fig. 3.) Each side of each pipe is open at and near its end. In other words, the main pipe is formed with the top and bottom of each end extending farther than the stationary sides. The aperture thus left in each side is closed by doors G G, turning on hinges *g* and subject to the action of springs H H, which tend to keep them always closed. When the cars make a great sidewise movement relatively to each other, and also when the cars assume an oblique position relatively to each other, the coupling-lengths E E are allowed to assume a considerable angle, being deflected to the right or to the left. This is accommodated by the yielding of the doors G G, as indicated in dotted lines in Fig. 5. The upper and lower edges of each door G are formed with inwardly-extending wings or flanges G′. The wings G′ cover the joint between the door and the stationary horizontal portions of D, which are adjacent thereto.

The pipe, corresponding to D on the locomotive, which receives the smoke, &c., at its front end and discharges it at the rear may be deflected to the right or left to avoid any central high parts of the locomotive. In case there is no necessity for such deflection, it may extend straight from the front to the rear in the center line of the locomotive. I will represent it in the latter condition. Its front end is fitted upon the top of the stack, as shown. It may be supported and steadied by the stack. Other means may be provided for supporting and steadying the pipe, as may be found expedient. The forward end of the pipe D on the locomotive is peculiarly equipped. The front end of the stationary top is inclined, as indicated by D⁴. Under and in front of this is fitted a movable piece which performs important functions. This entire piece is marked M, certain portions being indicated, when necessary, by additional marks, as M′ M². M′ is the inclined top. M² M² are broad wings extending downward from each side of M′. Fig. 2, which shows one of the wings, indicates how these wings or sides are continued beyond the inclined top M′, and their upper edges correspondingly inclined. A long slot, *m*, in each of the sides, inclined so as to extend parallel to the top M′, receives a roller, N, carried on a pin, *n*, fixed in the inside of D⁵, by which latter mark I will designate the front end of the pipe D, which is made of rectangular section, to accommodate the movable piece M.

P is another roller, mounted on a pin, *p*.

R is a chain attached to the movable piece M at the point represented, and running over the pulley S, mounted in fixed bearings on the extreme upper and forward edge of D⁴. It extends to the foot-board of the locomotive, (not represented,) from whence it may be operated by the engineer. When the train is moving, and it is desired to take the smoke, with its sparks and steam, through the series of pipes and connections along the whole length of the train and to discharge it at the rear, the engineer pulls on the chain R and moves the sliding piece M forward and upward into the position shown in strong lines in Fig. 2. When the locomotive is approaching a station or the end of the route and about to stop, the engineer slacks the chain R, and the device M, yielding to the influence of gravity, aided by the incidental shaking motion of the locomotive, runs quietly downward and backward until it assumes the position shown by the dotted lines in Fig. 2. This leaves the space over the opening in the stack A B entirely free for the smoke and steam to rise gently, or to be projected by the force of the blast, with any degree of velocity, upward into the atmosphere. This position of the parts is maintained during the stop, and for a brief period in the act of starting, while the blasts of steam are allowed to act with their full force. So soon as the train is well under way and the point of cut-off is shortened, so as to make the exhaust gentle, the engineer pulls the chain R, and the piece M is drawn upward into the position shown in strong lines. In this position the smoke and accompanying matter are moved backward, being aided by a strong blast of air taken in at the open front of the device, due to the rapid motion of the train through the air. The upper surface, M′, is preferably curved or arched, and the upper portion of D is correspondingly curved, so as to make an approximately close fit thereto; but I prefer to leave the fit sufficiently loose to allow the chains or wires R to play freely. I prefer to employ two of the chains R and pulleys *s*, the two being united into one after the passing of the pulleys *s*, so that the engineer need pull but a single cord or chain to move the slide M upward and forward, and to slacken but one to allow it to move forward.

When, in the motion of the train over irregu-

lar and imperfect track, the adjacent ends of two cars are moved laterally relatively to each other, or when the cars are thrown into a considerably oblique position, due to traversing a curve or switch, the junction-lengths E are deflected greatly to one side, and the doors G operate under the influence of the springs H to accommodate the motion. The strong lines in Fig. 3 show the parts flexed in one direction, and the dotted lines in the same figure show the parts flexed to a degree in the opposite direction. When the two cars crowd closer together than ordinarily, the springs H allow this by being compressed. Care should be taken to provide springs of just sufficient force.

The pipe D on each car has two or more depressions in its lower face, (indicated by $D^6$,) from each of which a pipe, I, leads down below the floor of the car. Each depression $D^6$ is provided with a netting or grating, $D^7$, of wire or other suitable material, to arrest the sparks, but allow the free passage of any water due to the condensation of steam in the pipes.

The steam which is used to operate the locomotive is usually discharged with the smoke. Much of such steam will condense in the pipes D in cold weather. Sometimes, from causes more or less understood, a locomotive will throw out with the steam considerable water. The water from both sources, being carried along in the pipes, sinks readily through the netting $D^7$, and, flowing down through the pipe I, is allowed to fall freely to the ground. The lower end of the pipe I is trapped by a vessel, J. This vessel is supported in brackets K, which allow it to be easily removed to avoid difficulties from ice in cold weather. In very cold weather these vessels should be removed and the lower end of the pipe left entirely open. In all other times the vessels may be used, and will prevent the passage of any smoke down through the pipe I. This construction is important in view of the liability of soot and sparks mingling with the water and clogging any valves or machinery. The depression $D^6$, by collecting the water, and the grating $D^7$, by stopping the solid matter and allowing the water to pass, and the vessel J, serving as a trap, with its flaring form serving to avoid injury from filling with ice, constitute useful features.

The flanges are formed with recesses on their back faces, in two or more of which are fitted slight clips F. These clips are applied by the hands of an attendant, or otherwise, after the cars are properly brought together, and serve to insure the two junction-lengths being kept exactly in line each with the other. It is important that the clips F be slight, so that in case of the disengagement of the cars through accident or design, without removing the clips the latter will yield by breaking or bending, and allow the two junction-lengths E E to separate without inducing any mischief to other parts of the apparatus.

Modifications may be made in the forms and proportions of the details. Parts of the invention may be used without the whole. The flanges E′ may be faced with rubber, to tighten the joint when they are brought together. The clips shown in Fig. 3 as aiding to hold these flanges together may be dispensed with. I propose in some cases to extend the pipes straight from one end to the other of the car at a sufficient height to pass over the highest portion of the roof. I propose in some cases to employ a locomotive with a smoke-pipe which is not telescopic, but terminates permanently at a height about level with the lowest part of the pipe D. The pipes D D may be of various shapes—round, square, &c. I propose in some cases to extend two pipes along the main portion of the length of the car. Instead of simply curving the pipe to one side and extending it along on one side of the roof, I branch it and extend it along both sides of the roof.

I claim as my invention—

1. In a system of pipes for conveying smoke and sparks on railway-trains, the combination, with cars having the central portions of their roofs higher than the ends and sides, of the pipes D, having a central position at each end of the car, and curved, as indicated at $D^2$, with the extension $D^3$ along the side of the top, substantially as and for the purposes herein specified.

2. In a system of pipes for conveying smoke and sparks on railway-trains, the side doors, G, and springs H on the pipes D, in combination with the junction-lengths E, arranged to allow the side obliquity of the connections, substantially as herein specified.

3. In combination with a pipe, D, forming part of a system of pipes for conveying smoke and sparks along a railway-train, the gravity-slide M, arranged to move in an inclined path, the pulleys *s*, and the flexible chains R, for allowing it to be moved by the engineer from the foot-board, substantially as herein specified.

4. The drain-pipe I, flaring vessel J, and supporting-brackets K, in combination with the pipe $D^3$, having a depression, $D^6$, and grating $D^7$, and with provisions for discharging the products of combustion and steam from the locomotive through the portion $D^3$ of the pipe D, all substantially as herein specified.

In testimony whereof I have hereunto set my hand, at New York city, N. Y., this 4th day of April, 1883, in the presence of two subscribing witnesses.

OHANNES S. TAVSHANJIAN.

Witnesses:

B. E. D. STAFFORD,

M. F. BOYLE.