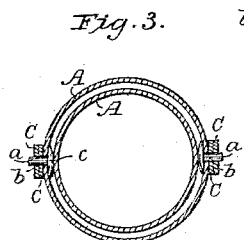
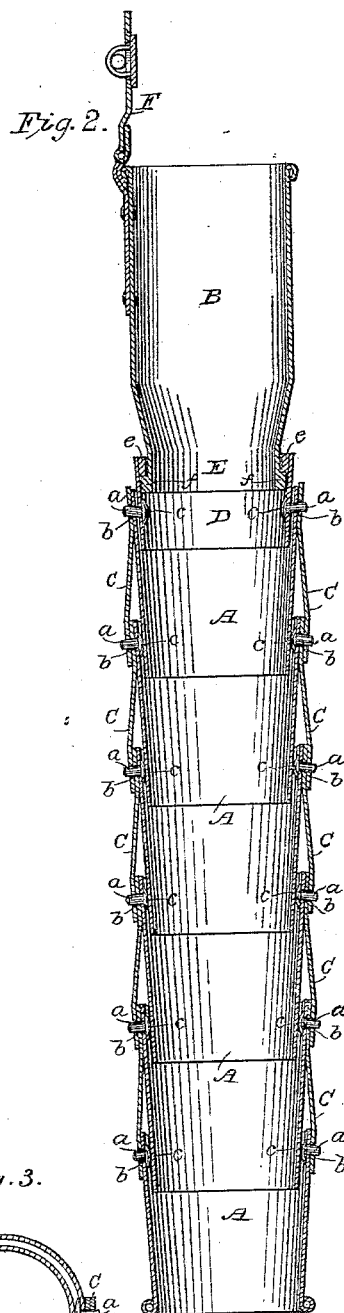
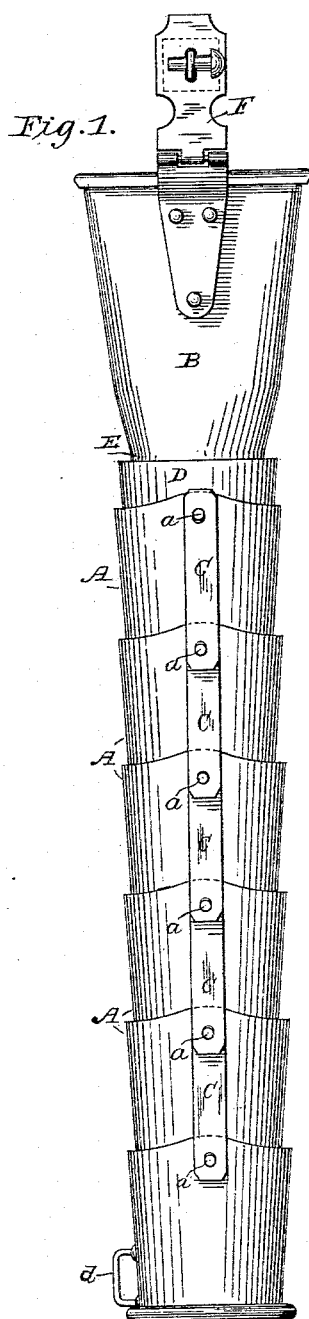


(No Model.)

T. W. EMERY.
FLEXIBLE GRAIN PIPE.

No. 384,352.

Patented June 12, 1888.



Witnesses:

John S. Palmer
Louis Fuser Jr.

Inventor.

Thomas W. Emery.

By his Attorneys

Louis Fuser & Co.

UNITED STATES PATENT OFFICE.

THOMAS WILLIAM EMERY, OF MINNEAPOLIS, MINNESOTA.

FLEXIBLE GRAIN-PIPE.

SPECIFICATION forming part of Letters Patent No. 384,352, dated June 12, 1888.

Application filed October 4, 1887. Serial No. 251,483. (No model.)

To all whom it may concern:

Be it known that I, THOMAS WILLIAM EMERY, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new and Improved Flexible Grain-Pipe, of which the following is a specification.

This pipe, which is primarily designed for a spout for the discharge or transmission of grain, is composed of a series of overlapping tubular sections, which are connected together by removable straps pivotally connected to adjacent sections, which hold the sections in proper relation to each other, but permit a limited swinging movement to each section independently of the other sections, whereby the combined movements of the several sections give flexibility to the pipe and permit it to be moved as necessity or convenience may require. The pipe is provided with a flared mouth or hopper at one end, which is adapted to be connected to the receptacle from which the grain is to be discharged, and the section of the flexible pipe adjacent to the hopper is so connected therewith that it may be rotated to any extent within the hopper, so that this capability of rotation, combined with the pivotal or swivel joints between the several sections, permits an extended or "universal" adjustment of the free end of the pipe. The straps connecting the several sections of the pipe are exteriorly located thereon and can be readily removed therefrom, so that any section or number of sections can be removed from the pipe, either to shorten the same or to permit the addition of other sections to increase the length or for repairs. The connecting-straps being on the exterior of the pipe, and the bolts to which they are pivoted being also on the exterior of the pipe, there are no projections on the interior of the pipe, so that its inner surface is smooth and unobstructed, a free passage being thus furnished for the discharge of grain or other materials.

The improved pipe is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the pipe. Fig. 2 is a central longitudinal section thereof. Fig. 3 is a cross-section of the pipe at the joint between two sections.

A A are the tubular sections of the pipe,

and B is the receiving-hopper thereof. Each section is slightly conical in shape, with its wide end toward the hopper and its narrow end entering a short distance within the wider end of the adjacent lower section. Adjacent sections overlap each other far enough so that no lateral opening is left between them at any position thereof. Sufficient peripheral space is left between the exterior surface of one section and the interior surface of the section overlapping it to permit the free and easy movement of the sections as they swing on their joints. The spaces between the several sections also determine the extent of their movement. Since the upper section (that is, the one toward the hopper from which the grain is received) is in each case overlapped by the lower section, no grain can escape through the spaces between adjacent sections, and this arrangement also prevents any object passing through the pipe, which might be injured by so doing, coming in contact with the edges of the sections.

C C are the straps which connect the several sections of the pipe. Each section is connected to the adjacent section by two straps on diametrically-opposite sides from each other, and the several straps connecting all the sections on each side are in line with each other. The connections between the straps and the sections are pivotal ones, and consist of bolts *a a* on the exterior of the sections, which enter eyes or apertures *b b* in the ends of the straps, so that the straps may swing thereon.

Each bolt has a head, *c*, and it is located near the upper edge of a section, extending through the same with its head located between the upper portion of the section to which it is attached and the outer surface of the inner overlapped section. Thus the heads of the bolts are concealed and offer no obstruction on the interior surface of the pipe with which material passing therethrough can come in contact. Adjacent sections are thus connected together by straps extending from the upper end of one to the upper end of the next, so that a minimum number of bolts and straps need be employed. The outer ends of the several bolts are not headed, so that the straps may be readily slipped off therefrom

to permit the ready detachment of any section or sections. To prevent the accidental detachment of the straps, each bolt inclines downwardly, (that is, away from the hopper,) so that
 5 when in use the weight of the pipe will prevent the slipping off of the straps. With the same object in view the lower end of each upper strap overlaps the upper end of each lower strap at the point where the two embrace the same bolt. The bolts, however, on the upper-
 10 most section are inclined in the opposite direction, since but one set of straps is attached thereto.

The lowermost section is provided with a manipulating strap or handle, *d*, and has a beaded lower edge, so that in foreshortening or lengthening the pipe intermediate sections will usually be separated to effect the same.

Since the several pivotal points of all the
 20 sections are in the same plane, the pipe can be moved back and forth in one plane only. To further extend the movement of the pipe, a special joint is provided between the uppermost section, B, and the hopper A. Riveted
 25 or otherwise attached (preferably by the upper bolts, *b b*) within the uppermost section is a tube, D, which has on its upper edge an inwardly-projecting bead, rim, flange, or ring, *e*. The hopper itself, which is, as usual, flared,
 30 has a tubular lower portion, E, which enters within and is embraced by the tube D. The lower edge of this part E has an outwardly-projecting bead, rim, flange, or ring, *f*, which is located beneath the ring *e*, the two rings
 35 preventing the separation of the hopper from the tube D. This construction permits the rotation of the tube D, and with it the flexible pipe within the hopper, to any extent, and this rotation, together with the flexibility of
 40 the pipe, gives a universal movement of the lower or discharge end of the pipe.

The upper end of the hopper is provided with a hinged flap, F, for connection with any receptacle.

While reference has been made to the use 45 of this pipe in the discharge of grain, it is not limited thereto, since it may be employed for the discharge or transmission of potatoes, coal, and other articles. It could also be used as a fire escape, its smooth inner surface, the regu- 50 lation of its speed of discharge by its capability of being bent, and its indestructibility by fire, it being made, preferably, entirely of metal, adapting it to this purpose.

I claim as my invention—

1. A flexible pipe consisting of separate 55 tubular sections pivotally connected by exterior fixed bolts or pivot-pins and straps connecting the bolts or pins of adjacent sections.

2. A flexible pipe consisting of separate 60 tubular sections having inclined exterior bolts, in combination with straps passing over said bolts and connecting said sections.

3. A flexible pipe consisting of separate 65 tubular overlapping sections and exteriorly extending bolts, said bolts being attached to the overlapping portion of each section, with its head located between said overlapping part and the overlapped portion of the adjacent section, in combination with the straps pivot- 70 ally connected with said bolts in adjacent sections.

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

THOMAS WILLIAM EMERY.

Witnesses:

LOUIS FEESER, Jr.,
 W. J. RODGERS.