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A. W. FORD.
METAL COLUMN.

APPLICATION FILED SEPT. 29, 1906.

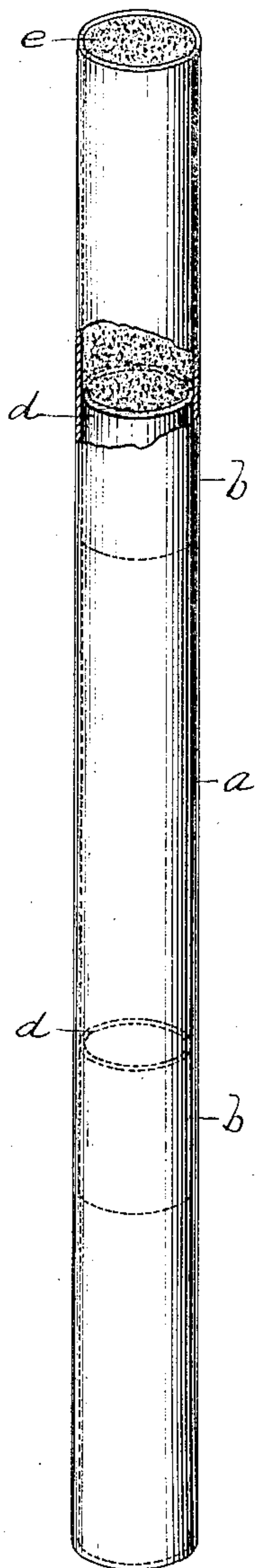


Fig. 1.

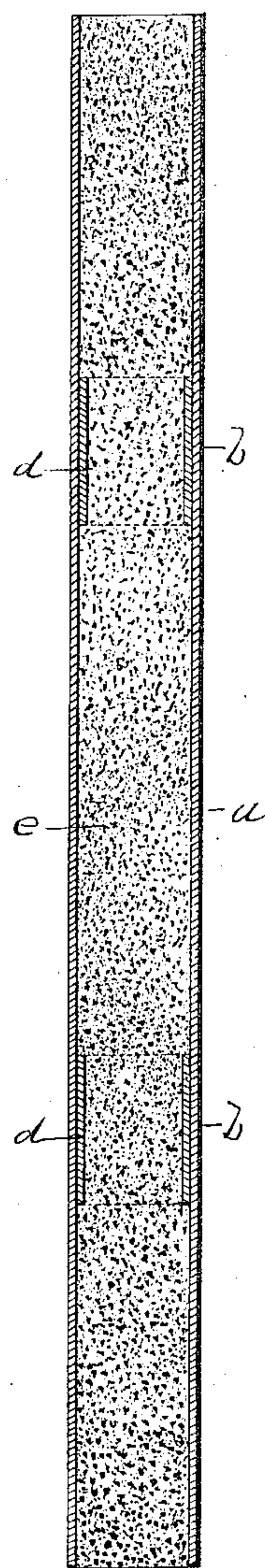


Fig. 2.

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METAL COLUMN.

No. 836,673.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ARTHUR W. FORD, a citizen of the United States, residing in Quincy, in the county of Norfolk and State of Massachusetts, have invented a new and useful Improvement in Metal Columns, of which the following is a specification.

This improvement relates to the construction of tubular or hollow columns made of steel, wrought-iron, cast-iron, or other metal and adapted for supporting loads, the invention relating more particularly to architectural columns or columns used in buildings for supporting a load—such as a roof, ceiling, or wall—in distinction from a merely ornamental column or shaft.

The invention has for its object to obtain and be able to utilize the maximum strength of a hollow metal column after the maximum load has been imposed thereon.

The shells of metal tubular columns of this character have been and are uniform in thickness for the full length of the column, and of course the chamber in the column has been of even diameter throughout. These columns, when loaded to the extreme limit, break, of course, at the weakest places, and in practice it has been found that the points of breakage are usually not in the middle of the column, but nearer its ends. I have found in my experience and by practical experiment that the breaking-points are almost uniformly at one-fourth to one-third of the length of the column from either its upper or lower end. Hence a column of given length which might require that its shell should be one-half inch in thickness at its weakest points—viz., one-fourth to one-third the distance from either end—would probably require a shell of about one-fourth of an inch thick at the intervening places. In my invention, therefore, I have reinforced these breaking-points by inserting inside of the columns at such points sections of tubing approximately a size smaller in diameter than the column, thereby increasing the strength of its weakest points to a degree which is equal to the strength of the strongest points and have retained such tubular reinforcements in position by means of a mixture, preferably concrete made of cement and sand, placed inside the column while in a plastic condition. It should be understood that these tubular reinforcements are necessarily non-integral with the column, as in the present state of the art it is impossible at any cost which is

not prohibitive to produce a tubular metallic column which will be found with an integral reinforcement at its weakest points.

In the accompanying drawings, in which similar letters of reference indicate corresponding parts, Figure 1 is a perspective view of a tubular metallic column embodying my invention, a portion being broken out. Fig. 2 is a longitudinal section of the same.

a represents the shell of a hollow or tubular column, made of steel or other metal and of even thickness and diameter throughout. At *b* I have inserted short tubes *d* of metal and preferably of one size smaller in diameter than the column, whereby said tubes practically fit in the column at the points which I regard to be the breaking or weakest points, such points being illustrated in the drawings as approximately one-fourth to one-third the distance of the length of the column from its opposite ends. These reinforcing-tubes are preferably made of material of the same thickness as the main body of the column, and they are held in the desired position by means of a filling *e*, preferably of concrete made of cement and sand and placed inside the column while in plastic condition. Thus the necessity for making rivet or bolt holes in the original column in order to retain the reinforcing members in position is obviated.

It is evident if it be admitted that my theory is correct that the supporting strength of the column throughout its length is practically its strength at its reinforced points, and hence a shell of less thickness can be employed in constructing the column if it is provided at its weakest points with the internal reinforcing-tubes described and illustrated.

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

1. In combination with a hollow metal column for the purpose described whose shell is of uniform thickness, comparatively short reinforcing-tubes placed inside the column at its weakest or breaking points, and a filling of a substance or compound of substantially the nature of concrete whereby said reinforcing-tubes are held in position at such points.

2. In combination with a hollow metal column for the purpose described whose shell is of uniform thickness, comparatively short reinforcing-tubes placed inside the column at its weakest or breaking points, and means

for holding or supporting said reinforcing-tubes at such points.

3. In combination with a hollow metal column for the purpose described whose shell is
5 of uniform thickness, comparatively short reinforcing-tubes placed inside the column at points which are at distances from the opposite ends which are approximately one-fourth to one-third of the length of the column, and
10 a filling of a substance or compound of substantially the nature of concrete whereby said reinforcing-tubes are held in position at such points.

4. In combination with a hollow metal column for the purpose described whose shell is

of uniform thickness, comparatively short reinforcing-tubes placed inside the column at points which are at distances from the opposite ends which are approximately one-fourth to one-third of the length of the column, and means for holding or supporting said reinforcing-tubes at such points. 20

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

ARTHUR W. FORD.

Witnesses:

HENRY W. WILLIAMS,
H. K. HOOD.