(No Model.)

S. F. ESTELL.

PUZZLE.

No. 589,822. Patented Sept. 14, 1897.

Fig 1

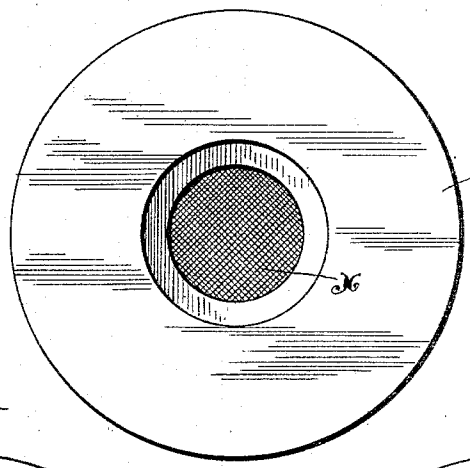


Fig 2

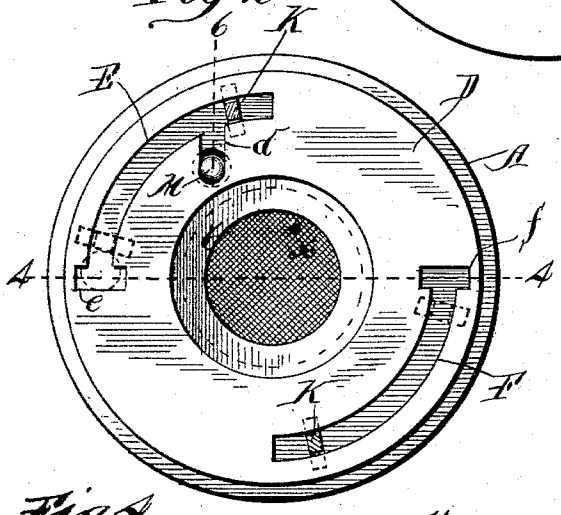


Fig 3

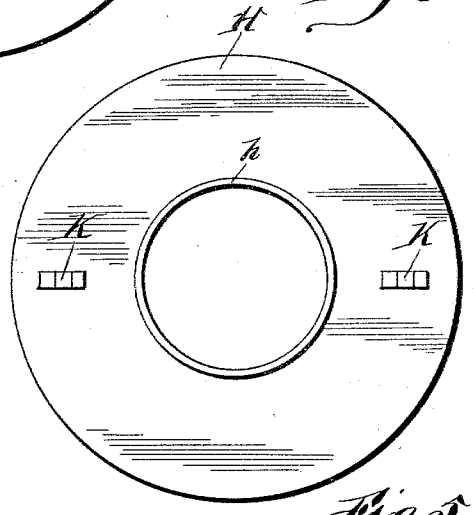


Fig 4

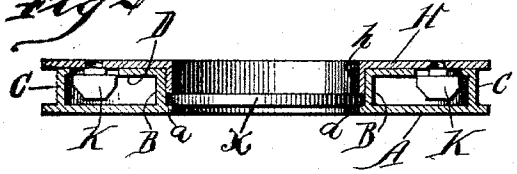


Fig 5

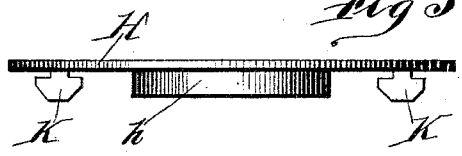
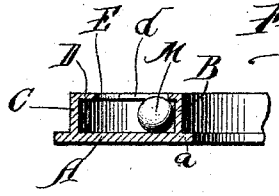


Fig 6



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UNITED STATES PATENT OFFICE.

SAMUEL F. ESTELL, OF CHICAGO, ILLINOIS.

PUZZLE.

SPECIFICATION forming part of Letters Patent No. 589,822, dated September 14, 1897.

Application filed April 26, 1897. Serial No. 633,914. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL F. ESTELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Puzzles; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The object of the invention is to provide a puzzle having the general appearance of a box with a removable cover, the two main members being locked together by the use of a ball running in a suitable way in such manner that by proper manipulation they can be separated.

In the accompanying drawings, Figure 1 is a plan view of the device. Fig. 2 is a plan view of the lower member thereof, the attaching-lugs, forming a part of the upper member being shown, however, in transverse section. Fig. 3 is a bottom plan view of the upper member. Fig. 4 is a transverse section of the device, taken on the line 4 4 of Fig. 2, both members being shown. Fig. 5 is an edge elevation of the upper member, and Fig. 6 is a detail sectional view on the line 6 6 of Fig. 2.

The lower member of the device consists of an annular plate A, having upstanding annular flanges B C located the one near its inner edge and the other near its outer edge, and an annular plate D, connecting the upper edges of the flanges B C. The plate D has two oppositely-disposed segmental slots E F.

The upper member of the device is in the form of an annular plate H, preferably of the same diameter as the plate A and having an annular flange *h* at its inner edge, the diameter of this annulus being such that it fits within the annulus B, its axial length, however, being somewhat less than that of the annulus B. The location of the annulus B near but slightly removed from the edge of the annulus plate A forms an annular shoulder *a*, so that a disk X, such as a coin or similar plate, may be secured between the edge of the flange *h* and the shoulder *a*.

The plate H is provided with a pair of oppositely-disposed headed studs K K, and each of the slots E F is widened at one of its ends, as shown at *e f*, to receive the studs K, and the bodies of the latter are sufficiently small, so that they will slide freely within the slots, the studs performing the function of T-bolts to hold the two members of the device together.

A ball M of slightly greater diameter than the distance between the plates A D is placed between these two plates, projecting partially through one of the slots, as E, which forms a way within which it is free to run, rolling upon the plate A. The plate D is cut away to form a recess or pocket *d*, extending inwardly from the slot E intermediate of its ends, preferably a short distance from the end opposite that at which the lateral extensions *e* are located. This pocket is approximately the same width as the slot and is preferably inclined with reference to the radius of the circle of which the slot is a segment, the inner end of the pocket being inclined toward the extensions *e*. This pocket is adapted to receive the ball M.

In putting the members of the puzzle together the disk X is first inserted into the well formed by the annulus B, the ball M is rolled into the pocket *d*, the lugs K K are inserted into the extensions *e f*, and the two main members are then turned in opposite directions until the lug K passes the pocket *d*. The device is now turned so that the ball M will be dislodged from the pocket and rolled to the opposite end of the slot when the members are turned backwardly, so that the stud K cuts off the access of the ball to the pocket *d*. It will be seen that the ball will now prevent the studs K K from passing to the lateral extensions *e f*, and consequently the two members cannot be separated until the studs have been moved to the farther ends of the slots and the ball rolled into the pocket *d*. In the absence of any external marks upon the device the location of the slots and of the pocket cannot be determined, and hence it is difficult to bring the parts into such position as to admit of the separation of the two members and a consequent removal of the disk X.

It will be seen that the disk X is not a material part of the device and may, if desired, be dispensed with, although its presence

serves as a stimulus to the solving of the puzzle.

While I have described and shown the preferred form of construction, it is obvious that the segmental slots may be changed somewhat in form and location and also the attaching-studs which coöperate with them without departing from the scope of the invention, the essence of which is that the two main members turning upon a common center are held together by a stud or studs entering an enlarged portion of a slot or slots, a ball being so disposed within the slot that it may be brought between the stud or studs and the aperture through which it enters.

I claim as my invention—

1. In a puzzle, the combination with a member having a segmental T-groove with a lateral enlargement at one end, of a member having a T-lug adapted to slide within the groove and to pass through its enlarged portion, a ball adapted to run within the groove and being of greater diameter than any portion of the throat thereof, such groove also having a lateral extension intermediate of its ends adapted to receive the ball but not to admit of the passage therethrough of the head of the lug.

2. In a puzzle, the combination with a member having a disk face and a segmental T-groove in such face, a member adapted to engage the first-mentioned member and having an angular movement over its disk face concentric with the T-groove, a headed stud projecting from the contacting face of the second member and adapted to slide in the T-groove, said groove being widened at one end to admit the head of the stud, a ball adapted to run within the groove but being of greater diameter than any portion of its throat, and a pocket for the ball opening laterally from the groove intermediate of its ends.

3. In a puzzle, the combination of two members adapted for mutual engagement so as to be capable of relative angular movement upon a common axis, one of such members having a segmental slot radially extended within the body of the member and having a transverse enlargement extending axially through the contacting surface of the member at one end of the slot, a stud projecting from the contacting face of the other member and having a radial projection at its outer end, such stud being adapted to enter the transverse enlargement of the groove and to slide within the groove, a ball adapted to run within the groove and being of greater diameter than the throat thereof.

4. In a puzzle, the combination with an annular plate, A, having two concentric annular flanges one near each of its edges, an annular plate, D, connecting the outer edges of such flanges and having segmental slots radially widened at one end, one of such slots having a lateral extension intermediate of its ends, an annular plate, H, having an axial flange at its inner edge adapted to fit within the inner flange of the plate, A, but being of less axial length than such flange, headed studs projecting from the face of the plate, H, and adapted to enter the widened portions at the ends of the slots and to move in said slots, and a ball of greater diameter than the distance between the plate, A, and the plate, D, and of less diameter than the segmental slots and being placed upon the plate, A, so as to project into one of the slots and run therein, substantially as described and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL F. ESTELL.

Witnesses:
LOUIS K. GILLSON,
WILLIAM F. BATES.