of which are conventional in design, while the former is made in accordance with the present invention. The external passageways each have an inlet end **28** and an outlet end **30**.

As particularly illustrated in FIG. **4**, together with FIGS. **1–3**, it will be noted that the novel passageways **24** commences at the inlet end **28** and has a width **29** for a marginal length thereof. The length of the passageway is the distance measured from numeral **28** to numeral **30**. The outlet end **30** of the passageway has a width indicated by the numeral **31**. Hence, the passageway **31** has been enlarged at shoulder **32** to a greater width **29**. The depth; that is, the distance measured from the innermost surface **33** to the outermost surface **20** of the main body preferably is constant along the entire length of the external passageway.

Upper and lower radial counterbores **34** and **36** are spaced apart from one another and from the longitudinal center of gravity **35** of the bit. Preferably there are two counterbores formed in diametrically opposed external passageways, as noted in FIG. **3**. The counterbore has a blind end **37** spaced from the internal axial passageway **44** of the bit. The counterbores are arranged perpendicular respective to the axial passageway **44**.

In FIG. **3**, the bit breaker **12** is seen to have an outer geometrical configuration in the form of a polygon which coincides with the configuration of the socket of the kelly drive **14**. The bit breaker includes an axial passageway **38** of a diameter to slidably receive the main body portion of the bit therewithin in a telescoping manner. Circumferentially spaced apart lugs **40** are affixed to the bit breaker and extend radially inwardly towards the axial passageway **44**. The lugs preferably are an integral part of the plate member, and are of a size to be received in close tolerance relationship within the enlarged marginal inlet portion of the external passageway. Stated differently, the lugs have a width which is slightly less than the width **29** of the external passageway **24**, and the lugs inwardly terminate in slightly spaced relationship respective to the inside wall **35** of the external passageway **24**.

This configuration of the bit breaker causes the lugs thereof to be seated against shoulder **32** of the external passageway **24** when the bit is seated within the bit breaker in the illustrated manner of FIGS. **1** and **3**.

As seen illustrated in FIGS. **5** and **6**, a bit handle **46** includes a reduced constant diameter marginal end **48** of a size to be telescopingly received in close tolerance relationship within the opposed counterbores **34** and **36**. The handle includes a large constant diameter outer marginal length **50**. Shoulder **52** is formed between the large and small diameter portions of the handle **50**. The outer marginal end **54** of the handle preferably is knurled to increase the friction with which the roughneck can hold the handle. As seen in FIG. **6**, two handles **46** have been placed within the bit **10**.

It should be noted in FIG. **3** that there are six equally spaced apart external passageways. Counterbore **36** has been formed into diametrical opposed external passageways, with one passageway being made in the manner indicated by numeral **24**, while the other passageway has been made in the manner illustrated by numeral **26**.

Handles **56** and **58** extend upwardly from attached relationship respective to the upper face of the bit breaker plate member to facilitate manipulation of the plate member.

In operation, a workman lifts the bit breaker **12** by handles **56** and **58**, and places the bit breaker within the kelly drive of a turntable. Next, two handles **46** are attached to a bit by inserting the reduced diameter marginal end portion **48** within the opposed counterbores **36** of the bit **10**. Two roughnecks lift the bit and discover that the bit rotates into the inverted position. The bit is sat down on the pen end so that the cutting face **22** and **23** can be inspected to make certain that the bit is in satisfactory operating condition.

Next the handles are removed from counterbores **36** and placed within the opposed counterbore **34**. The roughnecks lift the bit by the handles, and discover that the bit rotates into the illustrated position of FIG. **1**. The bit is next placed within the bit breaker by properly aligning lugs **40** with external passageways **24**. The aligned bit telescopingly descends through the bit breaker until shoulders **32** abuttingly engage the sides of the lugs **40**. The bit is now safely seated in captured relationship respective to the turntable, and cannot possibly fall downhole into the borehole.

The pin end of the bit is doped, a stand of drill tubing is lifted by the traveling block and the box end thereof set down on the pin end of the bit. A backup is applied to the tubing string and the rotary table is engaged to make up the threads between the bit and the drill tubing.

After the bit has been properly torqued to the specified value, the traveling block lifts drill tubing and bit from the bit breaker, the bit breaker is lifted from the turntable by utilizing handles **56** and **58**, and the drill bit and drill tubing is then run into the hole.

The bit is broke out from the drill tubing by reversing the above procedure.

In the illustrated embodiment set forth in the figures of the drawings, six external passageways have been selected for illustration, wherein alternant ones of the passageways have been modified for use in combination with the bit breaker of the present invention. Those skilled in the art, having read the above disclosure and studied the drawings thereof, will appreciate that the present invention can be practiced with a bit having any number of external passageways, and wherein any number of external passageways can be made in accordance with the present invention. It is contemplated that any drill bit can be modified in a manner to enable the present invention to be practiced therewith.

I claim:

1. In a drill bit for use in a rotary drilling rig, said bit having a main body which terminates in a formation engaging face at the lower end thereof and in a threaded fastener at the upper end thereof, said bit having a plurality of circumferentially spaced, external, outwardly opening passageways formed in said main body and communicating the lower end with the upper end of the bit, the combination with said bit of a bit breaker for making up and breaking out the threads of the bit with respect to the threads of a drill pipe;

said external passageways include spaced sidewalls which are joined to a bottom wall, said sidewalls of a marginal length of said passageway commencing at the lowermost end thereof are spaced from one another a greater distance respective to the sidewalls of the upper marginal terminal end of the external passageway thereby forming a shoulder at the sidewalls between the upper and lower marginal terminal ends;

said bit breaker has an outer perimeter in the form of a polygon which is of a complementary configuration respective to the geometrical configuration of the