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ABSTRACT

An actuator for a ram-type blowout preventer used either with a shear ram blowout preventer or a pipe ram blowout preventer. The actuator includes a pressure-responsive cylinder having an operating piston disposed therewithin. The piston includes a shaft for transmitting relative motion to the ram in the blowout preventer. A reversible annular member is disposed around the periphery of the piston to provide a variable pressure force in a shear ram blowout preventer and to limit the stroke of the piston in a pipe ram blowout preventer. The annular member includes a pair of annular flanges extending radially inward to form a channel therebetween. The channel receives the periphery of the piston which is moveable within the channel between the flanges. In a shear ram blowout preventer, the annular member increases the annular pressure area of the piston during the shearing stroke to increase the pressure force on the rams and their seals during the shearing of the pipe. After the pipe has been sheared, the annular member bottoms on the end of the cylinder allowing the piston to continue to travel in the channel such that the reduced annular pressure area of the piston reduces the pressure force on the rams and their seals during the sealing stroke to seal the bore after the pipe has been sheared. The reversible annular member is reversed on the piston in a pipe ram blowout preventer. In the reverse position, the annular member increases the annular pressure area during the sealing stroke until the annular member bottoms on the end of the cylinder. The piston is then allowed to continue to travel a short distance within the channel until the piston engages the other annular flange of the annular member thereby reducing the stroke of the piston. In the shear ram blowout preventer, the piston is allowed to engage the bottom of the cylinder for a full stroke equal to the axial length of the cylinder while the piston bottoms out

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on the annular flange of the annular member in a pipe ram blowout preventer to reduce the stroke of the operating piston within the cylinder.

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