



US006257338B1

(12) **United States Patent**  
**Kilgore**

(10) **Patent No.:** **US 6,257,338 B1**  
(45) **Date of Patent:** **Jul. 10, 2001**

(54) **METHOD AND APPARATUS FOR CONTROLLING FLUID FLOW WITHIN WELLBORE WITH SELECTIVELY SET AND UNSET PACKER ASSEMBLY**

(75) **Inventor:** **Marion D. Kilgore, Dallas, TX (US)**

(73) **Assignee:** **Halliburton Energy Services, Inc., Dallas, TX (US)**

(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

5,297,634	*	3/1994	Loughlin	166/387
5,301,755		4/1994	George et al.	
5,350,018	*	9/1994	Sorem et al.	166/187 X
5,472,049	*	12/1995	Chaffee et al.	166/250.1
5,474,131	*	12/1995	Jordan, Jr. et al.	166/313
5,490,563		2/1996	Wesson et al.	
5,547,029		8/1996	Rubbo et al.	
5,555,945	*	9/1996	Schultz et al.	166/250.07 X
5,577,560	*	11/1996	Coronado et al.	166/387
5,692,564	*	12/1997	Brooks	166/185 X
5,767,400	*	6/1998	Nakano et al.	166/254.1 X
5,803,186	*	9/1998	Berger et al.	166/264 X
5,941,307	*	8/1999	Tubel	166/313
6,056,059	*	5/2000	Ohmer	166/313

\* cited by examiner

*Primary Examiner*—David Bagnell

*Assistant Examiner*—Jong-Suk Lee

(74) *Attorney, Agent, or Firm*—William M. Imwalle; Marlin R. Smith

(21) **Appl. No.:** **09/184,770**

(22) **Filed:** **Nov. 2, 1998**

(51) **Int. Cl.<sup>7</sup>** ..... **E21B 33/12; E21B 43/12**

(52) **U.S. Cl.** ..... **166/387; 166/50; 166/65.1; 166/187; 166/313**

(58) **Field of Search** ..... **166/313, 50, 387, 166/65.1, 187, 106**

(57) **ABSTRACT**

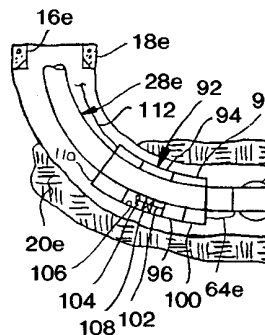
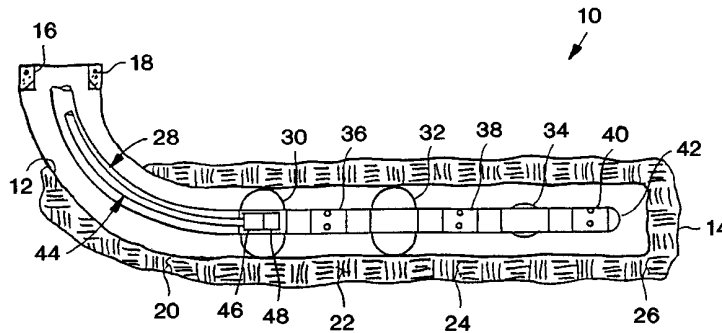
Apparatus and corresponding methods are disclosed for controlling fluid flow within a subterranean well. In a described embodiment, a longitudinally spaced apart series of selectively set and unset inflatable packers is utilized to substantially isolate desired portions of a formation intersected by a well. Setting and unsetting of the packers may be accomplished by a variety of devices, some of which may be remotely controllable. Additionally, a series of fluid control devices may be alternated with the packers as part of a tubular string positioned within the well.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

4,378,850	4/1983	Barrington .	
4,535,843	* 8/1985	Jageler	166/187 X
4,756,364	* 7/1988	Christensen et al.	166/187 X
4,942,926	* 7/1990	Lessi	166/50 X
5,062,485	11/1991	Wesson et al.	
5,070,941	12/1991	Kilgore .	
5,127,477	7/1992	Schultz .	

**31 Claims, 10 Drawing Sheets**



**BAKER HUGHES INCORPORATED AND  
BAKER HUGHES OILFIELD  
OPERATIONS, INC.**  
Exhibit 1010  
**BAKER HUGHES INCORPORATED AND  
BAKER HUGHES OILFIELD  
OPERATIONS, INC. v. PACKERS PLUS  
ENERGY SERVICES, INC.**  
IPR2016-00598



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(73) Assignee: **Halliburton Energy Services, Inc.**,  
Dallas, TX (US)

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(58) **Field of Search** ..... 166/313, 50, 387,  
166/65.1, 187, 106

(57) **ABSTRACT**

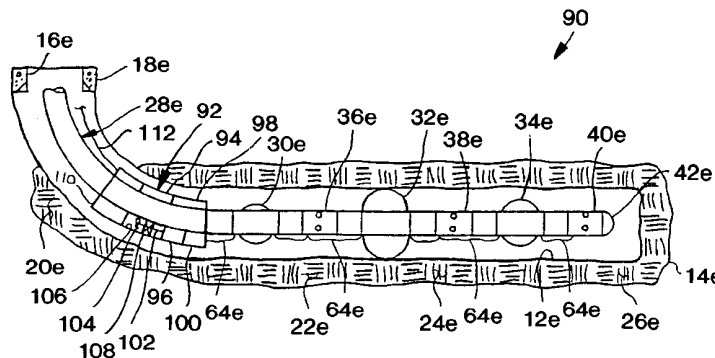
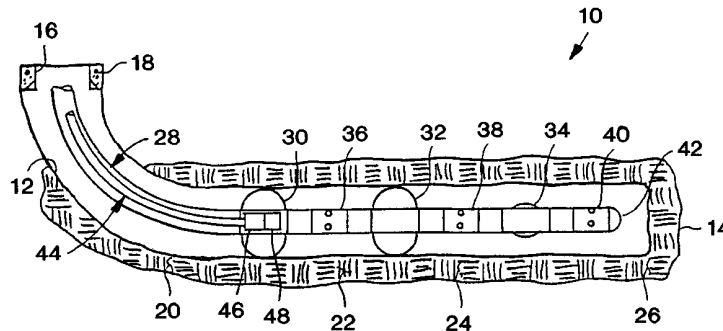
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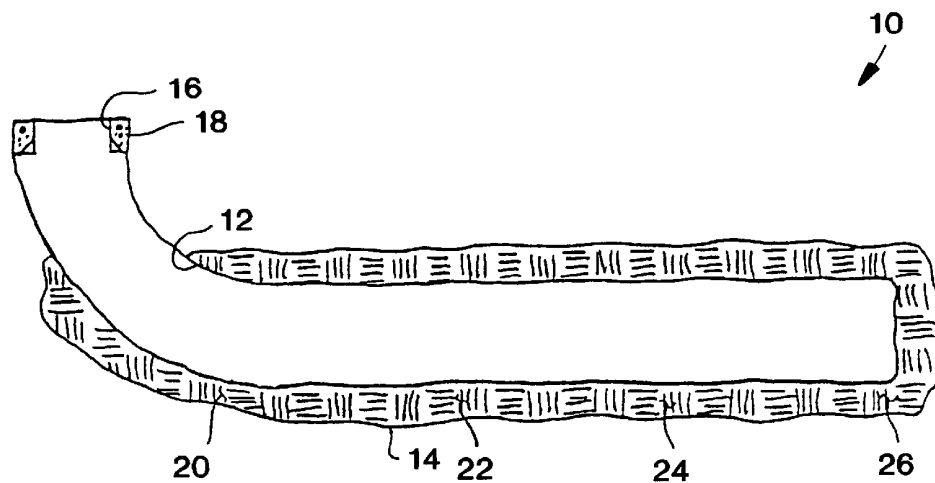


FIG. 1

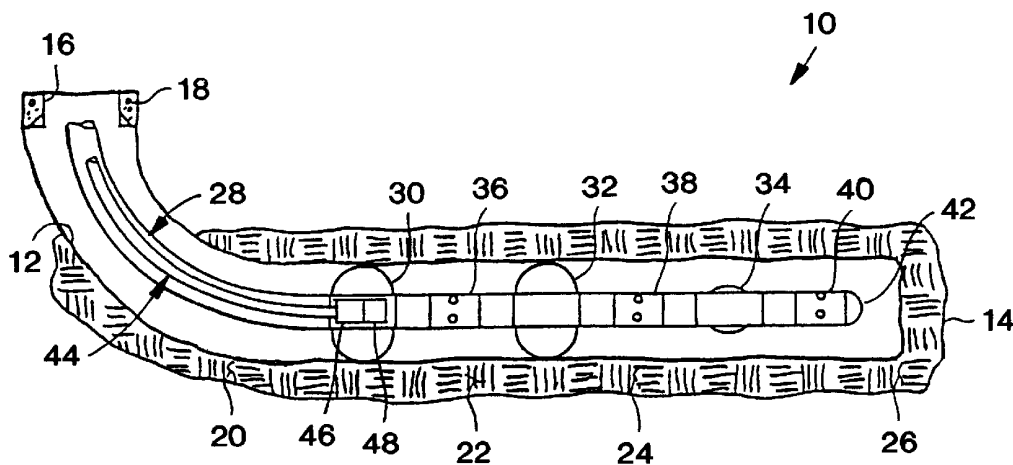


FIG. 2

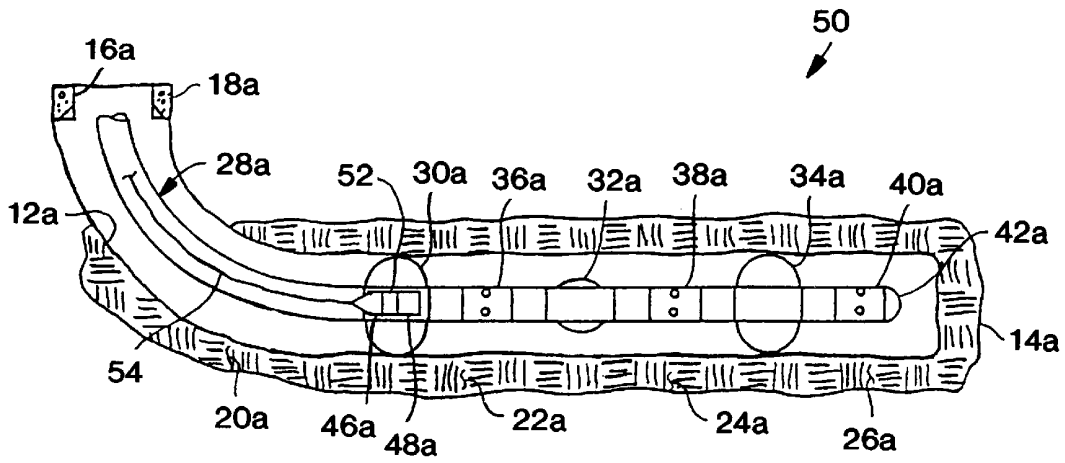


FIG. 3

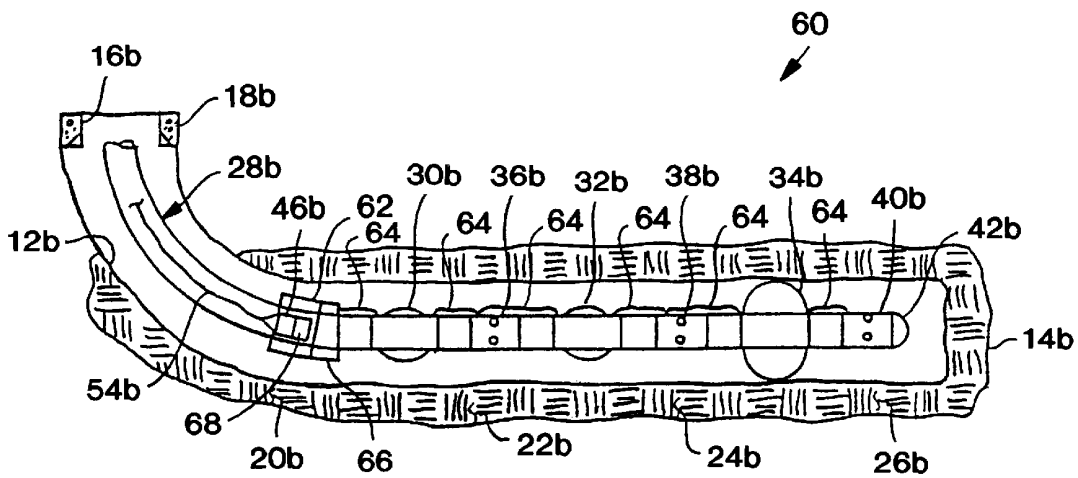


FIG. 4

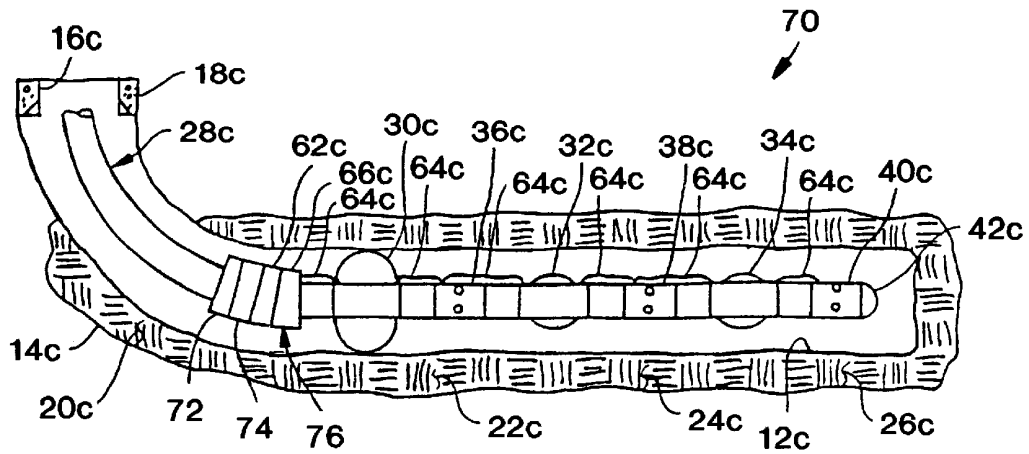


FIG. 5

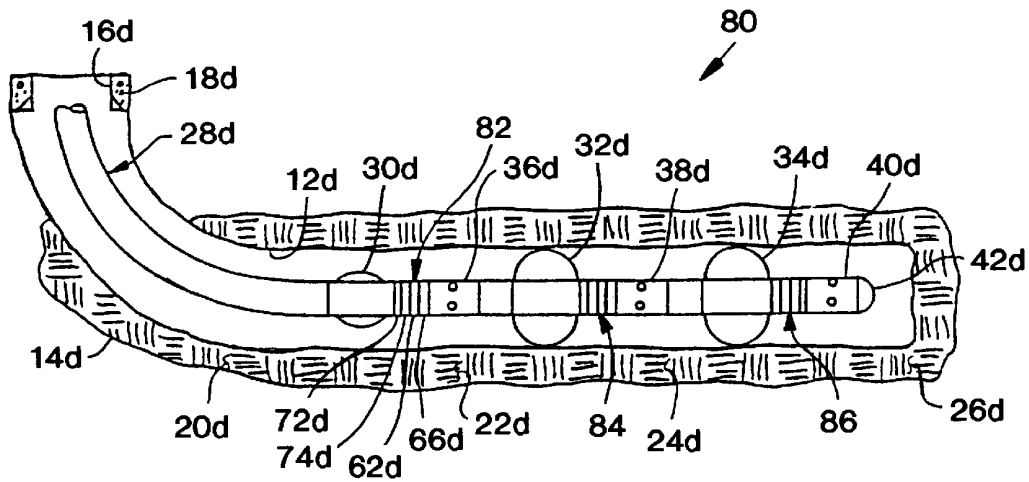


FIG. 6

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