THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 19

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte J. C. Birdwell

Appeal No. 93-1067
Application 07/567,145[1]

ON BRIEF

Before COHEN, MEISTER and STAAB, *Administrative Patent Judges*.

STAAB, *Administrative Patent Judge*.

DECISION ON APPEAL

J. C. Birdwell (appellant) appeals from the final rejection of claims 29-35, all the claims remaining in the application. We *affirm-in-part*.

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[1]Application for patent filed August 14, 1990. According to appellant, the application is a continuation of Application 07/220,607, filed July 18, 1988, now abandoned, which is a continuation-in-part of Application 06/309,979, filed October 8, 1981, now abandoned.

The appellant's invention pertains to a reciprocating piston type hydraulic pump, and in particular to a mud pump which may be utilized to intensify fluid pressure for use in drilling oil wells or in conditioning oil wells for fracturing with extremely high pressure or abrasive fluids. Claim 29 is illustrative of the subject matter at issue and a copy thereof, as it appears in the appendix to the appellant's brief, is appended to this opinion.

The references of record relied upon by the examiner in support of rejections under 35 U.S.C. § 103 are:

Krute	3,022,738	Feb. 27, 1962
Browne	3,080,821	Mar. 12, 1963
Sennet et al. (Sennet)	3,280,749	Oct. 25, 1966
Smith	3,295,451	Jan. 3, 1967

Claims 29-35 stand rejected under 35 U.S.C. § 112, first paragraph, as being based upon a specification that "fail[s] to provide an adequate written description of the invention" (answer, page 3).

Claims 29, 30, 33 and 35 stand further rejected under 35 U.S.C. § 103 as being unpatentable over Smith in view of Browne or Sennet. Claim 34 stands further rejected under

35 U.S.C. § 103 as being unpatentable over Smith in view of Browne or Sennet as applied in the rejection of claim 29 *et al.* and further in view of Krute.[2]

The rejections are explained in the examiner's answer (pages 3-6).

The opposing viewpoints of the appellant are set forth in the main brief (pages 4-11) and the reply brief.

The 35 U.S.C. § 112 Rejection

Based on the language used by the examiner in stating the rejection, it is not altogether clear whether the rejection is founded on the enablement requirement or the written description requirement of 35 U.S.C. § 112, first paragraph. Although the examiner's statement of the rejection indicates that appealed claims are rejected because they lack descriptive support in the specification, the examiner also appears to voice concerns for the ability of the disclosure to enable one skilled in the art to make and use that which is claimed. Irrespective of which provision of § 112, first paragraph, is meant, the examiner's position is not supportable. Accordingly, the rejection of claims 29-35 under 35 U.S.C. § 112, first paragraph, is reversed.

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[2]The § 103 rejections are new rejections made for the first time in the examiner's answer.

As stated in *In re Bowen*, 492 F.2d 859, 864, 181 USPQ 48, 52, (CCPA 1974), the description requirement of 35 U.S.C. § 112, first paragraph, "is that the invention claimed be described in the specification as filed." It is not necessary that the claimed subject matter be described identically, but the disclosure originally filed must convey to those skilled in the art that the applicant has invented the subject matter later claimed. *In re Wilder*, 736 F.2d 1516, 222 USPQ 369 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 1209 (1985).

As for the enablement requirement, it is by now well-established law that the test for compliance with the enablement requirement in the first paragraph of 35 U.S.C. § 112 is whether the disclosure, as filed, is sufficiently complete to enable one of ordinary skill in the art to make and use the *claimed* invention without undue experimentation. *In re Moore*, 439 F.2d 1232, 169 USPQ 236 (CCPA 1971). *See also In re Scarbrough*, 500 F.2d 560, 182 USPQ 298 (CCPA 1974). In rejecting a claim for lack of enablement, it is well settled that the examiner has the initial burden of producing reasons that substantiate the rejection. *See In re Strahilevitz*, 668 F.2d 1229, 212 USPQ 561 (CCPA 1982); *In re Marzocchi*, 439 F.2d 220, 169 USPQ 367 (CCPA 1971).

The examiner contends that the specification "fails to disclose" (answer, page 3) the "means to regulate" of claim 29, paragraph (k), the "means to vary the stroke . . ." of claim 34, paragraph (a), and the "means to vary the volume . . ." of claim 34, paragraphs (b).

We have carefully read the "Response to argument" section of the answer in order to gain a full appreciation of the examiner's rationale in support of the rejection. The examiner correctly surmises that the stroke of the drive pistons 87 may be varied by changing the output volume of the variable volume pump 125.[3] Although not expressly stated, it appears that the examiner regards paragraph (k) of claim 29 as calling for means for changing the volume of the expansionary fluid chamber (i.e., chambers 96 and common lines 146) to thereby either directly control the stroke of the drive pistons or indirectly control the stroke of the drive pistons by in some fashion controlling the output of the pump 125. In this regard, we note the following statement made by the examiner:

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[3]See page 9, lines 36-38 of the original specification ("The stroke length of cylinder rod 84 being [sic, is] determined by the amount of fluid passed through line 141, or by the rotational speed fo [sic, of] valve 132."). See also page 10, lines 41-43 of the original specification ("Further, since pump 125 is a variable volume pump, the flow going to cylinders 85 is gradually increased which correspondingly gradually increases the stroke length of piston 87.").

> . . . No where [sic] in the specification is it disclosed [that] the fluid in the expansionary fluid circuit [is] being supplied and discharge[d] to change the volume of fluid that is pumped by the pump. The volume of fluid pumped by the pump is governed by the setting of the variable volume pump 125 driving the pistons 87. . . . By controlling the amount of fluid discharged from the variable displacement pump 125 is the amount of fluid discharged by the pump controlled. It can be seen that the fluid in the expansionary fluid circuit does not need to be added to or deleted from in order to control the amount of fluid that is pumped as this is a function of the displacement of the variable displacement pump 125. The expansionary fluid circuit merely transfers the force on a driving stroke from one piston to the return stroke of another piston [answer, page 8; emphasis in original].

We do not agree with the examiner's apparent understanding of paragraph (k) of claim 29. From our perspective, paragraph (k) does *not* call for means to regulate, either directly or indirectly, the stroke of the drive pistons by increasing or decreasing the volume of the fluid within the expansionary chamber. Rather, we regard this paragraph as, in effect, calling for means to regulate the volume of fluid in the expansionary chamber that may be required *as a result* of piston displacement changes, wherein the said means is responsive to the pressure required to return the drive pistons. When read in this

manner, it is clear to us that the original specification (page 11, line 18 through page 13, line 32) provides both descriptive support and an enabling disclosure for the subject matter of paragraph (k) of claim 29. More particularly, the original specification states that:

> Since there is no practical way to always supply the correct amount of make up fluid to the closed reservoir of chamber 96 and line 146, and since this reservoir must remain at or above the required volume, then an excessive amount of fluid must be allowed to flow across the metering valve 135 and a suitable means provided to allow this excessive fluid to discharge from chamber 96 without causing excessive pressure surges . . . .
>
> . . . Thus relief valve 138 must be capable of sensing the loading requirement of chamber 96 and adjusting to allow fluid bypass therethrough at a pressure slightly higher that [sic, than] the load requirement, if this system is to function with a minimum of pressure surges [original specification, page 11, lines 18-36].

The specification than describes circuitry comprising metering valve 136, check valve 137, relief valve 138 and gas operated accumulator 139, which collectively function to dump excess fluid in a surge-free manner from the expansionary fluid chamber at a pressure just higher than the required pressure in chamber 96.

> If chambers 96 contain an excessive amount of fluid then [sic, than] as a one piston 87 of cylinder 85 reaches the end of its stroke in the rod end direction, then the pressure in chamber 96 will start to rise. The rise in pressure will cause fluid to flow from the vent port of relief valve 138 to chamber 178 of accumulator 139 and thus allow relief valve 138 to pass flow therethrough to low pressure line 142 thus allowing the excessive fluid to be dumped from chamber 96 at a pressure just higher than the required pressure in chamber 96. . . . Thus[,] due to the compressibility of the gas in chamber 177 [and the operation of check valve 137 and metering valve 138], the fluid pressure in chamber 178 will rise at a slower rate that [sic, than] the pressure in chamber 96, thus allowing valve 138 to dump excess fluid from chamber 96. This process is continually repeated, thus keeping the fluid volume and pressure requirement of chamber 96 as necessary to continually operate cylinder rod 84 in a powerly reciprocating manner [original specification, page 12, lines 24-40].

In view of the foregoing, we will not support the examiner's conclusion that the original disclosure fails to provide adequate support for the "means to regulate . . ." limitation of paragraph (k) of claim 29. As for the "means to vary the stroke . . ." limitation of paragraph (a) of claim 34 and the "means to vary the volume . . ." limitation of paragraph (b) of claim 34 also questioned by the examiner, we note page 9, lines 22-38 of the original specification which we regard as providing both descriptive support and an enabling disclosure for this subject matter.

The § 103 Rejections

In rejecting claims 29, 30, 33 and 35 as being unpatentable over Smith in view of Browne and Sennet, the examiner has found that Smith discloses a piston type hydraulic pump comprising three drive cylinders each provided with a first piston 43, three second cylinders 51 each provided with second piston 42, and connector means 40 extending between and connecting a respective one of the first and second pistons. The examiner considers that each of the first pistons divides the drive cylinders into a first chamber 49 and a second chamber 46, with conduit means 48 connecting each of the second chambers 46 such that each of the first pistons displaces pressurized fluid from its respective second chamber when said first piston is displaced in a downward drive direction. The examiner has also found that pump 23 of Smith corresponds to the source of pressurized fluid and that control valve means 19 of Smith comprises means for controlling the flow of pressurized fluid to and from the first chambers.

Regarding Browne and Sennet, the examiner has found that Browne (Figure 5) discloses a dual piston pump comprising, inter alia, second chambers 100, 100' connected together by connecting means 104, 104' to form an expansionary circuit, with the expansionary circuit including a pump driven by a motor that

supplies fluid to the circuit when the pressure sensor (PS) calls for additional fluid, a relief valve (V Rel) allowing fluid to be discharged from the circuit whenever the fluid pressure becomes too great, and an accumulator 106. The examiner has also found Sennet to disclose essentially the same expansionary circuit in Figure 1 and at column 3, line 62 through column 4, line 24. Based on these teachings, the examiner has concluded that it would have been obvious to one of ordinary skill in the art to have provided means to add and to discharge fluid from Smith's second chambers 46 and connecting conduit 48 for the purpose of maintaining a constant pressure acting on the drive pistons as taught by Browne or Sennet. Implicit in the rejection is the examiner's conclusion that the above modification of Smith would result in a pump that corresponds to the claimed pump in all respects.

We agree with the examiner that it would have been obvious to provide means to add and discharge fluid from Smith's second chambers and connecting conduit in view of Browne or Sennet. From our standpoint, the teachings of Browne and Sennet of providing a pressure responsive pump means and a pressure relief valve for replenishing and/or discharging fluid from the trapped fluid chamber as needed to ensure that the pressure therein remains substantially constant would have furnished ample

incentive for one of ordinary skill in the art to modify Smith in the manner suggested by the examiner. In this regard, we find Sennet's teachings at column 3, line 62 through column 4, line 24 to be particularly relevant. We consider the valve means of Smith, broadly speaking, to supply drive fluid to each first piston "independently . . . but in a timed and overlapping sequence," as called for in paragraph (i) of claim 29, in the sense that movement of Smith's distributor sleeve 19 is not in any way mechanically linked to the first pistons.

Regarding the "means to regulate . . ." of paragraph (k) of claim 29, it is our opinion that the modified Smith device would be capable of functioning to increase or decrease the volume of the fluid circuit in the manner set forth in paragraph (k) in that the trapped fluid chamber of the modified Smith device would include a gas accumulator such as element 124 of Sennet or element 106 of Browne that would function during operation to increase or decrease the volume of the fluid circuit in response to pressure fluctuations. Furthermore, it is our opinion that the modified Smith device would also be capable of functioning to regulate the quantity of fluid "responsive to pressure required to return the drive piston" as called for in paragraph (k) in that the trapped fluid chamber of the modified Smith device would include a pressure relief valve that would

operate, as least during those instances when the chamber is overpressurized, to discharge fluid from the chamber. Hence, we regard the trapped fluid chamber of the modified Smith pump to be fully capable of accomplishing the functions set forth in paragraph (k).

We are aware that means-plus-function language like that of paragraph (k) is limited to the corresponding structure disclosed in the specification for accomplishing the claimed function and equivalents thereof. *See In re Donaldson Company*, 16 F.3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1994). However, in the present instance, as was the case in *In re Mulder*, 716 F.2d 1542, 219 USPQ 189 (Fed. Cir. 1983), the appellant has neither asserted nor shown that the above-noted structure of the modified Smith device is not the equivalent of the structure disclosed in appellant's specification for accomplishing the claimed function of paragraph (k). Accordingly, we do not consider the "means to regulate . . ." of paragraph (k) of claim 29 to distinguish over the applied references. In light of the foregoing, we will sustain the standing § 103 rejection of claims 29, 30, 33 and 35.

We have considered all of the arguments presented by the appellant, however, they do not convince us that the examiner erred in rejecting claims 29, 30, 33 and 35 on the combined teachings of Smith and either Browne or Sennet. We note that

appellant does not challenge the examiner's position that it would have been obvious to modify Smith in the manner proposed by the examiner in view of Browne or Sennet. Rather, appellant argues (reply brief, pages 3-4) that Smith teaches a hydraulically *timed* piston and valve movement utilizing a *constant* volume trapped fluid chamber, whereas appellant teaches and discloses an *untimed* piston and valve movement utilizing a *variable volume* trapped fluid chamber. Appellant also argues that Smith teaches a constant piston stroke length, whereas appellant teaches and claims a piston and stroke length that varies in length. These arguments fail at the outset because they are predicated upon limitations that are not found in the claims. *See In re Self*, 671 F.2d 1344, 213 USPQ 1 (CCPA 1982). Appealed claims 29, 30, 33 and 35 simply do not require an *untimed* piston and valve arrangement utilizing a *variable volume* trapped fluid chamber, or varying the length of the piston stroke in direct proportion to a variance in volume of the drive fluid supplied to the drive piston, or continually adding fluid flow to the expansionary chamber as argued on page 3 of the reply brief; nor do they require the operational sequence discussed in the paragraph spanning pages 3 and 4 of the reply brief.

We will not sustain the rejection of claim 34 as being unpatentable over Smith in view of Browne or Sennet and further in view of Krute. While there are some similarities between the pumps of Smith and Krute, in Smith fluid is sequentially supplied to and discharged from only the first chambers 49 of the drive cylinders, while the second chambers 46 are in continuous fluid communication with each other via conduit 48 to define an essentially constant volume of trapped fluid. In contrast, in Krute fluid is sequentially supplied to and discharged from both the first (upper) and second (lower) chambers of the drive cylinders 21, 22 and there is essentially no constant volume of trapped fluid. Admittedly, Krute's by-pass valve 46 controls the volume of fluid flow to the drive cylinders to thereby vary the length of piston stroke. However, in view of the dissimilar operation of the pumps of Smith and Krute, one of ordinary skill in the art would not, in our opinion, be led to apply Krute's stroke varying concept in Smith absent the appellant's disclosure.

In summary:

(a) the examiner's decision to reject claims 29-35 under 35 U.S.C. § 112, first paragraph, is reversed;

(b) the examiner's decision to reject claims 29, 30, 33 and 35 as being unpatentable over Smith in view of Browne or Sennet is affirmed; and

(c) the examiner's decision to reject claim 34 as being unpatentable over Smith in view of Browne or Sennet and further in view of Krute is reversed.

The decision of the examiner is *affirmed-in-part*.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

IRWIN CHARLES COHEN)
Administrative Patent Judge)
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)
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JAMES M. MEISTER) BOARD OF PATENT
Administrative Patent Judge) APPEALS
) AND
) INTERFERENCES
)
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LAWRENCE J. STAAB)
Administrative Patent Judge)

Appeal No. 93-1067
Application 07/567,145

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APPENDIX

29. A reciprocating piston type hydraulic pump comprising:

(a) at least three drive cylinders, each of said drive cylinders being provided with a separate movable first piston disposed within it;

(b) a separate second movable piston disposed within a second cylinder, there being a second cylinder corresponding to said drive cylinder, wherein the number of second cylinders id equal to the number of drive cylinders;

(c) connector means extending between said first piston and said second piston within each of said pair of cylinders for integral movement of said first and second pistons;

(d) each of said first pistons dividing said drive cylinders to define a first chamber and a second chamber within each of said drive cylinders;

(e) means for connecting to each of said second chambers of said drive cylinders to form an expansionary fluid circuit containing pressurized fluid, said pressurized fluid flowing between said second chambers of said drive cylinders when said fluid is displaced from one or me of said second chambers by said first pistons;

(f) each of said first pistons displacing said pressurized fluid from its respective second chamber when said first piston is displaced in a drive direction;

(g) said pressurized fluid being periodically discharged from said expansionary fluid circuit;

(h) a source of pressurized drive fluid for connection to each of said first chambers of each of said drive cylinders;

(i) control valve means for connecting each of said first chambers to said source of pressurized drive fluid to displace each of said first pistons within its respective drive cylinder, said control valve means supplying drive fluid to each of said first pistons independently of piston position and movement within each of said drive cylinders, but in a timed and overlapping sequence;

(j) said control valve means also sequentially connecting said first chambers of said drive cylinders, which are not receiving said drive fluid from said control valve means, to exhaust lower pressure drive fluid and

(k) means to regulate the quantity of pressurized fluid within said expansionary fluid circuit to thereby timely increase or decrease the volume of fluid within said expansionary fluid circuit to enable operation during piston displacement changes wherein said means to regulate the quantity of pressurized fluid responsive to pressure required to return the drive pistons.