

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 30

UNITED STATES PATENT AND TRADEMARK OFFICE

MAILED

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

MAR 18 1996

Ex parte DOUGLAS K. STRUCK, RYLAND F. YOUNG
and

PATENT OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES

YUNG-FU CHANG

Appeal No. 95-0653
Application 07/429,273¹

HEARD: MARCH 4, 1996

Before WINTERS, WILLIAM F. SMITH and GRON, Administrative Patent Judges.

WILLIAM F. SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1 through 5, 7, 10 through 15, 19 and 20. Claims 2, 3, 5 and 19 were subsequently canceled, leaving claims 1, 4, 7, 10 through 15 and 20 for our consideration.

¹ Application for patent filed October 31, 1989.

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Claim 1 is illustrative of the subject matter on appeal and reads as follows:²

1. A purified isolated DNA sequence consisting essentially of a DNA sequence coding for an A. pleuropneumoniae hemolysin shown in FIG. 1 corresponding to nucleotide sequence 1 through 3386.

The references relied upon by the examiner are:

Nicaud, J. M. et al. (Nicaud), "Characterisation of HlyC and mechanism of activation and secretion of haemolysin from E. coli 2001," 187 Federation of European Biochemical Societies, no. 2, 339-344 (Aug. 1985).

Lo, Reggie Y. C. et al. (Lo 1985), "Cloning and Expression of the Leukotoxin Gene of Pasteurella haemolytica A1 in Escherichia coli K-12," 50 Infection and Immunity, no. 3, 667-671 (Dec. 1985).

Koronakis, Vassilis et al. (Koronakis), "The Secreted Hemolysins of Proteus mirabilis, Proteus vulgaris, and Morganella morganii Are Genetically Related to Each Other and to the Alpha-Hemolysin of Escherichia coli," 169 Journal of Bacteriology, no. 4, 1509-1515 (Apr. 1987).

Lo, Reggie Y. C. et al. (Lo 1987), "Nucleotide Sequence of the Leukotoxin Genes of Pasteurella haemolytica A1," 55 Infection and Immunity, no. 9, 1987-1996 (Sept. 1987).

Welch, Rodney A., "Identification of Two Different Hemolysin Determinants in Uropathogenic Proteus Isolates," 55 Infection and Immunity, no. 9, 2183-2190 (Sept. 1987).

Chang, Yung-Fu et al. (Chang), "Identification and Characterization of the Pasteurella haemolytica Leukotoxin," 55 Infection and Immunity, no. 10, 2348-2354 (Oct. 1987).

² For a complete understanding of the subject matter of this claim, a copy of Figure 1 of this application which is referred to in claim 1 is attached as an appendix.

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Frey, Joachim et al. (Frey), "Purification and partial characterization of a hemolysin produced by Actinobacillus pleuropneumoniae type strain 4074," FEMS Microbiology Letters 55, 41-46 (1988).

Highlander, Sarah K. et al. (Highlander), "DNA Sequence of the Pasteurella haemolytica Leukotoxin Gene Cluster," 8 DNA, no. 1, 15-28 (1989).

As set forth in the Supplemental Examiner's Answer (Paper No. 24, January 12, 1994), the sole ground of rejection remaining in this appeal is that of claims 1, 4, 7, 10 through 15 and 20 under 35 U.S.C. § 103 as unpatentable over Frey taken with any of Lo (1985), Koronakis, Chang, Welch, Nicaud, Lo (1987) or Highlander.

We reverse.

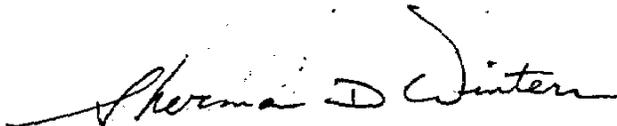
Viewing these references apart from appellants' disclosure of the present invention, as we must, we agree with appellants that the examiner's conclusion of obviousness can only be based upon impermissible hindsight. Keeping in mind that the rejection is premised upon Frey in view of each of the "secondary" references individually, the examiner has not explained with the requisite specificity how any of the proposed combinations of references teach or suggest the claimed invention. Of particular significance are the statements in Frey that the hemolysins of A. pleuropneumoniae were poorly known and had not yet been purified. The examiner has not established on this record how a

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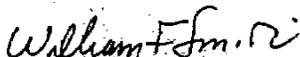
person having ordinary skill in the art would have without undue experimentation successfully identified and isolated a DNA sequence encoding a protein which was "poorly known" and in such an unpurified state. Conclusions of obviousness under 35 U.S.C. § 103 must be based upon facts of record, not unfounded generalities. In re Freed, 425 F.2d 785, 165 USPQ 570 (CCPA 1970), In re Warner, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967).

The decision of the examiner is reversed.

REVERSED



SHERMAN D. WINTERS)
Administrative Patent Judge)



WILLIAM F. SMITH)
Administrative Patent Judge)



TEDDY S. GRON)
Administrative Patent Judge)

BOARD OF PATENT)
APPEALS AND)
INTERFERENCES)

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Original Filed

07/429273

APPENDIX

FIG. 1A

260 -240 -220 -200 -180
GAGCGTGAAGAGCCATTACCCACACAAAAAGCAATGGCTTAACCATACAGAACGTTGGTACAAAAATTTTACAGGAAATGATGG
-160 -140 -120 -100
ATAGTCCTTAACAAAAATTAATGTTTTATTTCCTATAAAACATCCGATCAGTATTTTGGATTAAAAAAGAACAAACAGATCATGAC
-80 -60 -40 -20
AAACGTTGCCCTGTTTTCTTCCAAAAATATTATGGTTTTTTATTAGAAATAAATATCTATATTCATTTTTAGGGAAATGGGAGGAT
CATGCTAAAAAATTTAACGTATTGGGACAAATTCCTGGTTATGGGCAATTCCTCAATGCACCAAAATGGTCAGTTTCACTGTTAT
N L K M F N V L G Q I A W L V A N S P M R N W S V S L L M
100 120 140 160 180
GAAGAATGTTATTCTGCAATTCAAAAATGACCAATATTTGTTACTGTTGATGATGGTTTTCTATTGCATATTCAGTTCCTCCGGAAAT
K M V I P A I E N D P I F V T V D D G F P I A Y C S S R K L
200 220 240 260
AACTCTAGAGAGTCAAGGCTCGCTATGTAAAGGACACCAATTCATTAATAATAGATGATTGGAAATGCAGGAGATCGTATATGGATCATGCA
T L E C E A R Y V K D T N S L K I D D W H A G D R I W I I D
280 300 320 340 360
TTGGATTGCCCCATTGGGGATTCTCTCTATTGTATAAACATATGACACAAAGCTTTTTCATACGATATTGCAAGGGCAATTAGAATCTA
W I A P F G D S S L L Y K H R Q R F P Y D I G R A I R I Y
380 400 420 440
TCCTAGCAAAAAAGATACTGGAAAAATCATATTTAAAAGGAGGAAAAATAACAAAAAAGTAGCTGAAAAGACATTTCTTCAGTATGA
P S K X D T G K I I Y L K G G K I T K K V A E K T F L O Y E
460 480 500 520 540
GCAAGAGTTAATAACAGCTCTACAATAATATCTTTAAATGATCAATTATATAAAGGAGACTTTTTATGTCAAAAAATCACTTTGTCTCA
D E L I T A L Q N S K I T L S S
560 580 600 620
TTAAAATGCTCCTTACAACAAGGATTGAAAAATGGGAAAAACAAGTTAAATCAAGCAGGTACAACACTGAAGAATGGTTTAACTCAA
L K S S L G G G L K N G K N K L N O A G T T L K N G L T G T

APPENDIX

FIG. 1A

-260 -240 -220 -200 -180
GAACGTGAAGAGCCATTACCCAAACAACAAAAAGCAATGCCTTAACCAATTACAGAAGCTTGGTACAAAAATTTACAGGAAAATGATGG
-160 -140 -120 -100
ATAGTCTTAAACAAAAATTAATGTTTTATTCCTATAAAACATCCGATCAGTATTATTTTTGATTAAGAAAAAGAACAAACAGATCATGAC
-80 -60 -40 -20
AAACGTTGCCTTGTTCCTTCACAAAAATATTATGGTTTTTATTAGAATAAAATATCTATATTCAATTTTTAGGGAAATGGAGGGAT
M
20 40 60 80
GATGCTAAAAATTTTAAAGTATTGGGACAAATTCCTTGGTTATGGGCAATTCCTCAATGCACCGAAATGGTCAGTTTCACTGTTAAT
M L K N F H V L G O I A W L V A H S P M H R N W S V S L L M
100 120 140 160 180
GAAGAAATGTTTCTGCAATTGAAATGACCCAAATTTGTTACTGTTGATGATGGTTTTCTATTGCATATTGCAGTCCCGGAAAT
K H V I P A I E N O P I F V T V D D G F P I A Y C S S R K L
200 220 240 260
AACTCTAGACAGTGGGCTCGCYATGTAAGGACACCAATTCATTAAAAATAGATGATTGGAATGCAGGAGATCGTATATGGATCATTGA
T L E C E A R Y V K D T H S L K I D D W M A G D R I W I I D
280 300 320 340 360
TTGGATTGCCCATTCGGGGATTCACTCTATTGTATAACATATGACACAAGCTTTCCATACCATATTGGAAGGCAATTAGAAATCTA
W I A P F G D S S L L Y K H M R Q R F P Y D I G R A I R I Y
380 400 420 440
TCTAGCAAAAAAGATACTGGAAAAATCATATTTAAAGGAGGAAAAATAACAAAAAAGTAGCTGAAAGACATTTCTTCAGTATGA
P S K K D T G K I I Y L K G G K I T K K V A E K T F L Q Y E
460 480 500 520 540
GCAAGAGTAAATACACTCTACAATAATCTTTAAATGATCAATTATATAAGGAGACTCTTTTATGTCAAAAATCACTTTGTCATCA
Q E L I T A L Q * M S K I T L S S
560 580 600 620
TTAAAATCTCTTACAAACAGGATTGAAAAATGGGAAAAACAAGTTAAATCAAGCAGGTACAACTCAAGAAATGGTTAACTCAAAT
L K S S L Q Q G L K N G K M K L N Q A G T T L K M O L T Q T
640 660 680 700 720
GGTCATTCTCTACAGAAATGGGCTAAAAATTAATCTTATATTTCCCTCAAGGCTATGATTCGGGTCAAGGAAATGGAGTTCAAGATTA
G H S L O N G A K K L I L Y I P Q G Y D S Q Q G N G V Q D L
740 760 780 800
GTTAAAGCTGCTAATGATTTAGGTATTGAAGTATGGCGAGAAGCAGCAATTTGGCATTGCAAAAACTAGCTTTGATACAACCTCAG
V K A A N D L G I E V W R E E R S N L D I A K T S F D T T Q
820 840 860 880 900
AAAATCTAGGTTTTACTGATAGGAAATGCTATTATTTGCACCTCAGCTAGATAATTTATAAGCAAGAACTCTAAAATGGCAATACA
K I L G F T D R G I V L F A P Q L D N L L K K N P K I G N T
920 940 960 980
TTAGGAAGTCTCTAGCATCTCACAAAATATAGGTAAGCCAACTACTGTATTAGGTGGTATTCAATCTATTTAGGATCTGTTTATCT
L G S A S I S O N I G K A N T V L G G I Q S I L G S V L S
1000 1020 1040 1060 1080
GGAGTAAATCTGAATGAATTACTTCAAAAATAAGATCCTAATCAATTAGAAGCTTGCAAAAGCAGGGCTAGAACTGACTAATGAATTAGTT
G V N L M E L L O N K O P N Q L E L A K A G L E L T M E L V
1100 1120 1140 1160
GGTAAATTTGCTAGCTCGGTGCAAACTGTAGATCCATTTGCACAACAAATATCTAAACTAGGTTCAATTTACAGAAATGTGAAAGGATTA
G N I A S S V Q T V D A F A E Q I S K L G S N L O N V K G L
1180 1200 1220 1240 1260
GGAGGATTGAGTAAATTAACAAATCTACCAGATCTAGGAAAAGCAAGTTAGGTTTGGCATTATCTCTGGTTACTTTCTGGAGCA
G G L S N K L Q N L P O L G K A S L Q L D I I S G L L S G A
1280 1300 1320 1340
TCTGCATCTTATTTAGCAGATAAAGAGCCTTCAACAGAAAAAGAAAGCTGCCGAGGTGTAGAAATTTCTAACCAAAATATAGGTAAT
S A G L I L A D K E A S T E K K A A A Q Y E F A N G I I G N

FIG. 1B

1360 1380 1400 1420 1440
GTAACAAAAGCGGTCTCATCTTACATCTTGCCEAACGAGTCGCTTCAGGTTTGTCTTCAACTGGTCTGCGTGCAATTAATCGCATCT
VTKAVSSYILAQRYASGLSSTGPVAAIAS

1440 1480 1500 1520
ACAGTTGCACTAGCTGTAGCCCTCTTTCATTCTTAAATGTAGCTGATAAGTTTAAACAAGCTGATTTAATCAAATCATATCTGAACGC
TVALLAVSPLSFLNVADKFKQADLIKSYSER

1540 1560 1580 1600 1620
TTCAAAAATTAGGATATGATGGAGATCGTTTATTAGCTGATTTTCCCGTGACACAGGAATATTGATGCTTCTGTAACAACAATTAAC
FOKLG YDGDRL LAD FHR ETGT IDASVT TIN

1640 1660 1680 1700
ACTGCTTACGAGCTATCTCCGGTGGAGTTGCACTGCAAGCGCGGTTCTCTAGTCGGAGCTCCAGTTCGCTTACTCGTTCCTGGTGT
TALAALISGGVGAASAGSLVGPVALLVAGV

1720 1740 1760 1780 1800
ACGGGACTTATTACAACTATTCTAGAATATTCTAAACAAGCCATGTTGAACATGTTGCAATAAGGTTTCATGACAGAATAGTTGAATGC
TGLITTTILEYSKQAMFERVANKVMDRIVEW

1820 1840 1860 1880
GAGAAAAACATAATAAACTATTTTTCAGCAAGGTTATGATCTCGTCACTTTCAGCTGATTTACAGACAATATGAAGTTTCTTATCAAT
EKKHNKMYFEQGYDSRHLADLDQDNHKFLIN

1900 1920 1940 1960 1980
TTAAATAAAGAACTTCAGGCTGAACGGTAGTAGCTATTACCAACAAGATGGGATAACCAAAATTCAGACCTAGCGGCAATTAGCGCT
LNKELQAEFVVAITDQRWDHQIGDLAASR

2000 2020 2040 2060
AGAACGGATAAAATTTCCAGTGGAAAAGCTTATGTGGATGCTTTTTCAGGAGGGCAACACCAGTCTCAGTTCATCCGTCACAGTAGAT
RTDKISSGKAYVDAFEEGQHQSYDSSVQLD

2080 2100 2120 2140 2160
AACAAAAACGGTATTATTAATATTAGTAATACAAATAGAAAGACACAAAGTGTTTTATTTCAGAACTCATTACTAACTCCAGGTGAAGAG
NKNGITINISMTMRKTQS VLFRTPLLLTPGEE

2180 2200 2220 2240
AATCGGGAACGGTTCAGGAAGGTAATAATCTTATATTACAAAATTACATATACAAAGAGTTCAGACTGGACTGTAACAGATCGTGAT
NRERIQEGKNSYITKLNHQRVDSWTVTDGD

2260 2280 2300 2320 2340
GCTAGCTCAAGCGTAGATTTCACTAATGACAAACGAATCGCTGTAAATTTGATGATGCAAGTAACATTATCGAATCTAAAGATACT
ASSSVDFTNVQRIAVKFD DAGHIIESKDT

2360 2380 2400 2420
AAAATATCGCAATTTAGTGCTGGTAACTAATGTATTTGTTGGTCAAGTACTACCGTATTGATGGCGGGACGGACATGATCGA
KIIANLQAGNDVVFVYGSSTTVIDGGDGHDR

2440 2460 2480 2500 2520
GTTCACTACAGTAGAGGAGAATATGGCCATFAGTATTGATGCTACAGCCGAGACAGAAAAAGGCTCATATTTCAGTAAAAACGCTATGTC
VHYSRGEY GALVIDATAETEKGSYSVKRYV

2540 2560 2580 2600
GGAGACAGTAAGCATTACATGAAAATTTCCACCACCAAAACAAATGTTGGTAACTCGTGAAGAAAAAATTAATATCGTGGTGAAGAT
GDSKALNETIATHQTNVGNREEKIEYRRED

2620 2640 2660 2680 2700
GATCGTTTCATACTGGTTACTGTGACGGACTCACTCAATCAGITGAAGAGATCATTGGTTCACAATTTAATGATATTTTCAAAGGA
DRFN.TGYTVYD SLKSV EELIGSOFNDIFKG

2720 2740 2760 2780
AGCCAAATTCATGATGTGTTCCATCGTGGTAAATGGTGTACACTATTGATGGTAAACGATCGTGACGATCATTTATTTGGTGGCCAGGC
SOFDDVFHGGNGVDYIDGNDGD DNLFGGAG

2800 2820 2840 2860 2880
GATGATGTTTCATGAGGAAACGGTAACAATTTCTTGTTCAGCAACCGGTAATGATATTATCTCGGAGCTAAAGATAATCATATT
DDVSDGCGHGHMNHVWNGGTCGNDIISGKDDI

FIG. 1C

2900 2920 2940 2960
TATGTCCATAAAACAGGCGATGGAAATGATTCTATTACAGACTCTGGCCGACAAAGATAAACTGGCATTTCGGATGTAATCTTAAAGAC
Y V N K T G D G M D S I T D S G G Q D K L A F S D V N L K D

3000 3020 3040 3060
CTCACCTTAAAGAAAGTAGATTCTTCTCTCGAAATCATTAAATCAAAAAGGAGAAAAGTTGGTATTGGGAATTGGTTCTTAGAAGATGAT
L T F K K V D S S L E I I N Q K G E K V R I G N W F L E O D

3080 3100 3120 3140
TTGGCTAGCACAGTTGCTAACTATAAAGCTACCAATGACCGAAAAATTGAGGAAATATTGGTAAAGGAGCAGAACGATTACATCAGAA
L A S T V A N Y K A T M D R K I E E I I G K G G E R I T S E

3160 3180 3200 3220 3240
CAAGTTGATAAACTGATTAAGGAGGGTAACAATCAAATCTCTGCAGAAGCATTATCCAAAGTTGTGAATGATTACAATACCGAGTAAAGAT
Q V D K L I K E G N N O I S A E A L S K V V N D Y N T S K D

3260 3280 3300 3320
AGACAGAAGCTATCTAATAGCTTAGCAAAATTGATTTCTTCAGTCGGGAGCTTACGTTCTTCCTCAGACTTTAGGAATAATTTAGGAACA
R Q N V S M S L A K L I S S V G S F T S S S D F R N H L Q T

3340 3360 3380 3400 3420
TATGTTCTTCATCAATAGATGTCTCGAATAATATTCAATTAGCTAGAGCCGCTTAATATTCAAATCATAGCAATCCTATGGTGTAAATT
Y V P S S I D V S M H I O L A R A A *

3440 3460 3480 3500
ATAGGATTTGTTATTTTTTAAAGGAGAAGTTATGGAACCCAATAAAAAAAGGATCTTGGTTTAGCTGCCACTTAAATTTCTTGCTCAATA
M E P N K N K O L G L A A L K I L A Q Y

3520 3540 3560
TCATAATATTTCACTCAATCCCGAAGAATTAACATAAATTTGATCTAGA
H N I S V N P E E L E H K F D L