

this purpose, unless other existing committees, less burdened with work than the Referee Board, can more logically assume sponsorship of the various check samples. Of course, the Referee Board should follow the records of each Referee Chemist on the check samples. This has been done over a long period of years in the case of the check meal work.

The committee has examined critically its practice in paying for preparation of check samples of oil and seed and in charging collaborators for the service. We have paid little more than the out-of-pocket expense for the preparation and shipment of these samples and have collected from the collaborators barely enough to cover this amount. The committee particularly feels that we are too much indebted to Law and Company for time spent on the samples in excess of compensation received.

We are reluctant to increase the charge for the samples but feel that the financing of their preparation should be on a sounder basis. If the collaborative tests are believed to be of some value to the chemical profession and the Society as a whole, the general funds of the Society could logically be used to support the work in part. No complete solution of the problem has been proposed, and the only recommendation at the present time is that all dues paid by referee chemists in excess of regular membership dues be made available to the Referee Board, or through the Referee Board to the appropriate committee, for support of the collaborative tests.

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A Bibliography on the Solvent Extraction of Vegetable Oils From Raw Materials

With Special Attention to Soybeans

A. C. BECKEL

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To January, 1944

CLASSIFICATION OF CONTENTS

The references are arranged under names of authors or patent assignees in alphabetical order, without regard to classification and in chronological order under particular names.)

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1. Armstrong, R. T., and Kammermeyer, Karl
1942. Countercurrent Leaching. Graphical Determination of Required Number of Units.
Ind. Eng. Chem. 34: 1228-31 (1942).
C.A. 36: 6843 (1942).

2. Arnold, L. K.
1941. Community [Soybean-Oil] Plants.
Soybean Digest 1: No. 12, 4-5, 12 (1941).
C.A. 36: 1796 (1942).

3. Barstow, E. O., and Griswold, T., Jr.
1918. Method of and Apparatus for Extracting Oils and the Like.
U.S. Patent 1,238,084.
U.S. Patent 1,199,861.
U.S. Patent 1,125,920.
C.A. 12: 1589 (1918).

4. Bartusch, Edward
1939. Process and Apparatus for Continuous Extraction, Filtration, and Drying of Fat or Oil Containing or Other Extractable Material.
D.R.P. 671,230. Ausgegeben February 3, 1939.
C.A. 33: 3217 (1939).

5. Behrens, Johannes to I. G. Farbenindustrie, A. G.
1928. Process of Extracting Castor Oil.
British Patent 265,212. Accepted February 9, 1928.

6. Bighouse, Henry H.
1937. Apparatus (with vertical shells and spiral screw conveyors) for Extracting Oils from Materials Such as Crushed Seeds and Beans.
U.S. Patent 2,096,728. Received October 26, 1937.

7. Bilbe, C. W.
1941. Continuous Solvent Extraction of Vegetable Oils.
Mech. Eng. 63: 357-360.
Cotton Oil Press 42 (12): A-8 to A-12.
C.A. 35: 4234 (1941).

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8. Bohm, Egon
1933. Verfahren und Richtung zum Auslagen von festen Stoffen.
D.R.P. 578,704. Ausgegeben June 16, 1933.
French Patent 715,874. April 22, 1931.
C.A. 26: 2076 (1932).
9. Bollman, Hermann
1917. Extraction of Oil and Bitter Substances from Food Preparations.
British Patent 109,265. Accepted August 27, 1917.
C.A. 12: 73 (1918).
10. _____
1918. Removing Oily and Bitter Substances from Oil-Bearing Seed Press Cakes.
U.S. Patent 1,260,656. March 26, 1918.
C.A. 12: 1578 (1918).
11. _____
1919. Gegenstromverfahren zur abgestuften Auslosung von Fett und Ol aus Rohstoffen.
D.R.P. 303,846. Ausgegeben December 30, 1919.
12. _____
1920. Gegenstromverfahren zur abgestuften Auslosung von Fett und Ol aus Rohstoffen.
D.R.P. 322,446. Ausgegeben July 2, 1920.
13. _____
1920. Process for Production of Fats and Free Fatty Acids.
Swiss Patent 84,619. April 1, 1920.
14. _____
1921. Improvements in or Relating to the Extraction of Fat or Oil from Raw Materials.
British Patent 156,905. Accepted January 14, 1921.
15. _____
1922. Process for Producing Sugar Containing Foods from Soybeans.
D.R.P. 355,569. Ausgegeben June 29, 1922.
16. _____
1922. Extracting and Purifying Oils.
British Patent 197,429. Accepted February 17, 1922.
C.A. 17: 3800 (1923). Countercurrent Process.
17. _____
1923. Apparatus for Extraction of Fine Oil-Bearing Material.
D.R.P. 366,923. Ausgegeben January 13, 1923.
18. Bollman, Hermann, and Bruno, Rewald
1927. Vegetable Oils; Lecithin.
D.R.P. 505,354. December 22, 1927.
C.A. 24: P6048.
19. Bomer, A., and Grossfeld, J.
1939. Vorkommen, Gewinnung und Eigenschaften der Speisefette.
Handbuch der Lebensmittel-Chemie Band IV Fette und Ol, p. 401.
C.A. 33: 4339 (1939).
20. Bonotto, Michele
1937. Apparatus for Removing Solvent from Solvent Treated Material.
U.S. Patent 2,086,180. Granted July 6, 1937.
C.A. 31: 5908 (1937).
21. _____
1937. Apparatus for Treatment of Soybeans and Other Material.
U.S. Patent 2,086,181. Granted July 6, 1937.
C.A. 31: 5908⁸.
22. _____
1937. Solvent Extraction—Past and Future.
Oil and Soap 14: 310-11.
C.A. 32: 1126.
23. _____
1937. Safety in Solvent Extraction.
Oil and Soap 14: 30-33.
C.A. 31: 2312.
24. _____
1938. Process for Extracting Oils and Fats from Materials Containing the Same.
U.S. Patent 2,112,805. Granted March 29, 1938.
25. _____
1939. Process and Apparatus for Extraction of Oils, Fats and Other Soluble Constituents from Materials Containing the Same.
U.S. Patent 2,156,236. Granted April 25, 1939.
26. _____
1939. Method and Mechanism for Continuously Forming Liquid Impervious Plugs in Extraction Units.
U.S. Patent 2,184,248. Granted December 19, 1939.
C.A. 34: 2627⁹ (1940).
27. _____
1939. Process for Separating Solvent from Oil in Miscella and Like Mixtures.
U.S. Patent 2,163,303. Granted June 20, 1939.
C.A. 33: P7627.
28. _____
1940. Process in Continuous Extraction Systems of Continuous Removing from Solvent Treated Materials, Solvents of Lower Specific Gravity.
U.S. Patent 2,191,255. Granted February 20, 1940.
C.A. 34: 4601 (1940).
29. _____ (to Extractol Process, Ltd.)
1940. Filter Suitable for Use with "Miscella" Containing Oil, Solvent and Solid Particles.
U.S. Patent 2,188,673. January 30, 1940.
C.A. 34: 3545 (1940).
30. Boruff, C. S., and Miller, Dwight
1937. Solvent Extraction of Corn Oil from Distillers Grains.
Oil and Soap 14: 312-313. Illus.
C.A. 32: 1128 (1938).
31. Bottaro, Giacomo
1940. Process for Countercurrent Extraction.
U.S. Patent 2,213,080. Granted October 15, 1940.
C.A. 35: 936 (1941).
32. Boucher, Donald F., Brier, John C., and Osburn, James, O.
1942. Extraction of Oil from a Porous Solid.
Trans. Am. Inst. Chem. Engrs. 38: 967-93 (1942).
C.A. 37: 1 (1943).
33. Boykin, R. O. (to Russel Vail)
1929. Process of Extracting Oil from Cottonseed.
U.S. Patent 1,775,154. September 9, 1930.
C.A. 24: 5175, and
U.S. Patent 1,721,686. July 23, 1929.
C.A. 23: 4586 (1929).
34. Bradley, I. C.
1937. The Processing of Soybeans.
Proc. 16th Annual Meeting Am. Soybean Assoc. 1936, 37-39.
C.A. 31: 4148².
35. Bredemann, G., and Kummer, H.
1934. Ueber den Einfluss der Lagerung der Sojabohnene auf die Extra hierbarkeit und die Extra etionsgeschwindigkeit des Ols und der Phosphatide.
Fettehem. Umschau 41 (5): 81-85.
C.A. 28: 4926 (1935).
36. Chemische Fabrik Flora
1940. Extraction Process.
Swiss Patent 205,883. October 2, 1939.
C.A. 35: 2753 (1941).
37. Chemische-Fabrik von Heyden, A. G., To
1915. Process for Extraction of Fatty Materials of All Sorts, Hydrocarbons, Sulfur, and the Like.
D.R.P. 284,410. Ausgegeben May 21, 1915.
38. Cherdyntzeff, V. A.
1927. Ueber eine Methode der Extraktion von Sojabohnen mittelst Alkohols.
Manchuria Monitor 3, 1927.
Seifenseider Ztg. 54: 928-929.
39. Combe, Francesco A.
1930. Apparatus for Extracting Oleaginous Seeds with Volatile Solvents.
French Patent 705,306. November 10, 1930.
40. David, L. F., and Feligat, G.
Process for the Treatment of Oleaginous Materials for Separately Extracting All the Elements Therefrom.
U. S. Patent 1,794,105.
41. Davis, Arthur L., and Bartlett, Lewis H.
1940. Extracting Oil.
U.S. Patent 2,191,455. Granted February 27, 1940.
C.A. 34: 4602 (1940).
42. Dengler, F. P.
1932. Extraction of Oil from Vegetable Material.
U. S. Patent 1,850,095. March 22, 1932.
C.A. 26: 2883 (1932).
43. Dinley, Clarence F. (to Solvent Machine Co.)
1940. Extraction of Soybeans or Other Materials with Solvents.
U.S. Patent 2,200,983. Received May 14, 1940.
C.A. 34: 6470 (1940).

44. Downs, Charles, and Bellwood, Robert
1927. Improvements in or in Connection with Extraction of Oil from the Pericarp of Palm Fruit and Like Nuts.
British Patent 278,145. Accepted August 23, 1926.
C.A. 22: 2676.
British Patent 280,986. Accepted May 20, 1927.
C.A. 22: 3548.
45. Donald, M. B.
1937. Percolation Leaching in Theory and Practice.
Trans. Inst. Chem. Eng. 15: 77-109. Illus.
C.A. 31: 2475 (1937).
46. Dubly-Anskaya, N.
1932. The Effect of the Production Process on the Constants of Some Oils.
Masloboine-Zherovoe Delo 1932, No. 1, 65-8.
C.A. 26: 4491⁴.
47. Duchscher and Cie.
1937. Apparatus for Extracting Oil from Oleaginous Seeds by Steam and Hot Water.
French Patent 821,972. December 17, 1937.
C.A. 32: 3996⁴ (1938).
48. Edeleanu-Gesellschaft, m.b.H.
1938. Verfahren zur Gewinnung hellfarbiger Erzeugnisse bei der Zerlegung von Fette Olen durch flussiges Schwefeldioxyd.
D.R.P. 669,620. Ausgegeben December 30, 1938.
49. Eddy, Clarence F.
1927. Extraction of Fats and Oils.
U.S. Patent 1,487,449.
U.S. Patent 1,607,731. November 23, 1927.
C.A. 21: 335 (1927).
50. Edgerton, C.
1918. Apparatus for Extracting Grease and Oils.
U.S. Patent 991,491.
C.A. 12: 1491 (1918).
51. Eichengrun, Arthur
1927. Process of Dissolving or Extracting Fats, Oils, or Allied Bodies.
British Patent 243,030. Accepted April 17, 1927.
52. Elgin, J. C.
1936. Graphical Calculation of Leaching Operations.
Trans. Amer. Inst. Chem. Engin. 32: 451-471. Illus.
C.A. 31: 6060.
53. Engler, Peter J. W. (to Hansa-Mühle, A. G.)
1938. Apparatus for Continuous Extraction of Material Such as Oil-Bearing Seeds on the Pater Noster Principle.
U.S. Patent 2,117,113. Received May 10, 1938.
C.A. 32: 5243 (1938).
54. Engel, Werner, and Depmer, Wilhelm (to Hansa-Mühle, A. G.)
1939. Paternosterartige Vorrichtung zum kontinuierlichen Extrahieren.
D.R.P. 679,708. Ausgegeben August 12, 1939.
D.R.P. 700,798. Ausgegeben November 20, 1940.
C.A. 35: 7241 (1941).
55. Etablissement A. Olier. Soc. anon.
1934. Apparatus and Process for Extracting Solid Materials, e.g., Powdered Peanuts, Palm Nuts, Soybeans, Cottonseed, Copra.
British Patent 410,301. Accepted May 17, 1934.
C.A. 28: P6033⁴.
56. Er-Kang-Li, PeiSung King and Shih-Shun Lin
1935. Solvent Extraction of Soybean Oil.
Chinese Industry 1, No. 1, 115-28 (1935).
C.A. 29: 2767.
57. Extractol Process, Ltd.
1938. Improvements in Process and Apparatus for Extraction of Oils, Fats, and Other Soluble Constituents from Materials Containing the Same.
British Patent 484,187. Accepted May 2, 1938.
C.A. 32: 823, 3995, 7760 (1938).
58. Farbenindustrie, A. G., To I. G.
1929. Process for Refining or Separating Mixtures of Fats or Mineral Oils or Distillates or Hydrogenation Products from Coal.
D.R.P. 471,076. Ausgegeben February 6, 1929.
59. Farbenindustrie, A. G., To I. G.
1931. Continuous Extraction Process and Apparatus Therefore.
British Patent 341,581. Accepted January 22, 1931.
60. Fauth, Philipp, L.
1921. Improvements in or Relating to the Extraction of Oil from Oil-seeds and the Like.
British Patent 157,155. Accepted November 3, 1921.
C.A. 15: 2007 (1921).
61. _____
1929. Apparatus (with Drum and Internal Helical Device) for Use in Extracting Oils from Seeds, etc., with Solvents.
British Patent 357,172. June 14, 1929.
C.A. 26: 3130 (1932).
62. _____
1937. Apparatus for Continuous Distillation and Deodorization.
U.S. Patent 2,078,841. Granted April 27, 1937.
C.A. 31: 4520.
63. _____, G.m.b.H.
1931. Vorrichtung zum kontinuierlichen Extrahieren und Filtrieren von Saat gut.
D.R.P. 529,142. Ausgegeben July 9, 1931.
C.A. 25: 3190; 4447; 5054 (1931).
D.R.P. 537,530. Ausgegeben July 9, 1931.
C.A. 26: 1147.
64. Flummerfelt, Walter E.
1933. Extraction of Soybeans.
U. S. Patent 1,920,499. Granted August 1, 1933.
C.A. 27: 4721 (1933).
65. Firma Allgeme in Gesellschaft fur Chemische Industrie, m.b.H.
1924. Verfahren zur zerlegung der Naturlichen Fette und Ole.
D.R.P. 434,794. Application March 14, 1924.
66. Ford, Henry, and Boyer, Robert A.
1940. Soybean Crusher.
U.S. Patent 2,186,066. Granted January 9, 1940.
C.A. 34: 3120⁴ (1940).
67. Frank, Fritz.
1909. Process for Extracting Fatty Substances from Fresh (unbroken) Oil-Fruits.
U.S. Patent 915,169.
C.A. 3: 1475 (1909).
68. Frazier, Charles H. (to the Drackett Co.)
1941. Solid and Liquid Contact Apparatus, Suitable for Use of Solvents in Extracting Oil from Seeds, etc.
U.S. Patent 2,276,298. March 17, 1941.
C.A. 36: 4376 (1942).
69. Freeman, Stephen E.
1940. Processes of Extracting and Refining Glycerides and Products Resulting Therefrom.
U.S. Patent 2,200,390.
Solvent Extraction of Glyceride Oils.
U.S. Patent 2,200,391. Granted May 14, 1940.
70. Gesellschaft zur Verwertung Fauth 'scher Patent, m.b.H.
1938. Verfahren und Vorrichtung zum kontinuierlichen Extrahieren von Olsaaten und Olhaltigen Stoffen oder anderen extrahierbaren Material.
D.R.P. 659,575. Ausgegeben May 6, 1938.
C.A. 32: 6509 (1938).
71. Gesellschaft zur Verwertung Fauth 'scher Patent, m.b.H.
1939. Verfahren und Vorrichtung zum Zerkleinern und Extrahieren von Stoffen, insbesondere Olsaaten.
D.R.P. 671,851. Ausgegeben February 18, 1939.
C.A. 33, P1167.
72. Goss, W. H.
1941. Technological Problems in Processing Soybeans. I. The Continuous-Pressing Method.
Soybean Digest 1, No. 8, 2-3 (1941); cf. C.A. 35: 3840.
II. The Solvent Process.
Soybean Digest 1, No. 9, 2-3.
III. Solvents for Soybean Oil Extraction.
Soybean Digest No. 10, 4-5.
C.A. 36: 1796 (1942).
73. Goss, W. H.
1941. Modern Practice in Solvent Extraction.
Chem. and Met. 48 (4): 80-84. Illus.
C.A. 35: 3840 (1941).
74. Grillo, Wilhelm, und Schroeder, Max
1889. Verfahren zur Extraktion von Fette und Oelen. Mitelst Schwefliger Saure.
D.R.P. 50,360. Ausgegeben June 13, 1889.

75. Hanseatische Muehlenwerke, A. G., To
1933. Extraction Apparatus
D.R.P. 572,818. Ausgegeben March 23, 1933.
76. Hamilton, Alan G., and Perkins, Ezra Clinton
1939. Process and Apparatus for Extraction.
U.S. Patent 2,183,837. Granted December 19, 1939.
C.A. 34: 2628 (1940).
77. _____
1939. Improvements in Methods and Apparatus for the
Continuous Extraction of Solids by Liquids.
British Patent 507,465. Accepted June 15, 1939.
78. _____
1939. Vorrichtung zum Kontinuierlichen Extraktion.
D.R.P. 670,283. Ausgegeben January 16, 1939.
79. Hansa-Muehle, A-G.
1937. Apparatus for Continuously Extracting Oleaginous
Seeds. French Patent 810,462. March 22, 1937.
C.A. 31: 8972.
80. Hassel, Bruno
1929. Losungsmittel und Deren Eignung fur die Ol- und
Fettextraktin.
Seifenseider Ztg. 57: 577-579.
C.A. 24: 982 (1930).
81. Harburger Oelwerke Brinkmann and Mergell, To
1914. Process for Producing Oil from Oil Seeds.
D.R.P. 269,195. Ausgegeben June 12, 1914.
82. Hayward, J. W., Steenbock, Harry, and Bohsted, G.
1936. Effect of Heat as Used in the Extraction of Soy-
bean Oil upon the Nutritive Value of the Protein
of the Soybean Oil Meal.
J. Nutrition 11, 219-34 (1936).
C.A. 30: 6042.
83. _____
1938. The Proteins of Soybeans and Soybean Oil Meal.
(From "The Composition and Nutritive Properties
of Soybeans and Soybean Oil Meal, a Literature
Review," pp. 12-21. Soybean Nutritional Research
Council, 3818 Board of Trade Building, Chicago.)
84. _____
1940. Soybean Oil Meal Processing.
Flour and Feed 41 (4): 24.
85. Heublum, von R., and Japhe, H.
1935-36. Moderne Oelgewinnung und ihre Grundlagen.
Allg. Oel u. Fette Ztg. 32: 401-405, 447-452, 497-
502, 1935. 33: 13-17, illus.; 49-55; 96-103, illus.;
141-151, illus.; 199-203; 254-261, illus.; 1936.
86. Heymann, Adolph v.
1940. Extraction Installation for Fats and Oils.
German Patent 696,499. Ausgegeben August 22,
1940.
C.A. 37: P3291 (1943).
87. Hildebrandt, Karl
1931. Verfahren und Vorrichtung zur Kontinuierlichen
Extraktion von Olen und Fetten aus solche en-
thaltendem Gut.
D.R.P. 528,287. Ausgegeben June 27, 1931.
C.A. 25: 4728 (1931).
British Patent 267,563. February 19, 1931.
C.A. 27: 2056.
88. _____
1932. Vorrichtung zur kontinuierlichen Extraktion.
D.R.P. 547,040. Ausgegeben March 23, 1932.
C.A. 26: 2076 (1932).
89. _____
1934. Apparatus for Continuous Extraction of Fats and
Oils.
U.S. Patent 1,961,420. Granted June 5, 1934.
Fette u. Seifen 46: 350-352.
C.A. 28: 4928 (1934).
90. _____
1939. Die Kontinuierliche Extraktion von Saaten und
deren apparative Durchfuehrung.
Fette u. Seifen 46: 350-2 (1939).
C.A. 34: 653 (1940).
91. Hippolyte Marcel Lamy-Torillon
1939. Process and Apparatus for the Continuous Treat-
ment of Solid Materials by Means of Solvents.
British Patent 512,660. Accepted September 12,
1939.
C.A. 35: 667 (1941).
92. Igarashi, Syoji, and Ishida, Yoshitoyo
1937. The Influence of Addition Agents in the Extraction
of Soybean Oil with Alcohol.
Jour. Soc. Chem. Ind. Japan 40 (Supp. Bind.):
271-2 (1937).
C.A. 31: 7684 (1937).
93. Inuma, Toru, and Mashino, Minoru.
1933. Properties of Soybean Protein I. The Influence
of Preceding Treatments on the Solubility of the
Protein.
Jour. Soc. Chem. Ind. Japan. (Supp. Bind.): 310-
311 (1933).
C.A. 27: 4550.
94. Iwasa, Yosaburo
1938. Byproducts in Soybean Oil Extraction. IV. The
Preparation of Caramel from Stachyose of Soy-
beans.
J. Agr. Chem. Soc. Japan 14: 1512-16 (1938).
C.A. 33: 5220 (1939).
95. Iwasa, Yosaburo
1937. Utilization of the Byproducts in the Preparation
of Soybean Oil by the Alcohol Extraction Method.
I. Sugars.
J. Agr. Chem. Soc. Japan 13: 225-230.
C.A. 31: 5607 (1937).
96. _____
1937. Utilization of the Byproducts in the Preparation
of Soybean Oil by the Alcohol Extraction Method.
II. Saponins.
J. Agr. Chem. Soc. Japan 13: 231-232.
C.A. 31: 5607 (1937).
97. _____
1937. Utilization of the Byproducts in the Preparation of
the Soybean Oil by the Alcohol Extraction Method.
III. Fermentation of the Sirup.
J. Agr. Chem. Soc. Japan 13: 233-235.
C.A. 31: 5607 (1937).
98. John, Alfred
1934. Extraction Method and Apparatus.
British Patent 413,041. July 12, 1934.
C.A. 29: 630 (1935).
99. Joyce, H.
1935. The Method of Soybean Oil Extraction as Devel-
oped by the Edison Institute of Technology.
Oil and Soap 12: 68-70 (1935).
C.A. 29: 3541.
100. Junker, M.
1933. Notizen uber die Sojabohnen Extraktion.
All. Oel u. Fette Ztg. 30: 492-495.
C.A. 28: 4258 (1934).
101. Karetten, Alfred
1928. Continuous Oil Extraction Plant, Simon Type.
Chem. App. 15: 195-7 (1928).
C.A. 22: 4849 (Abt.).
102. Kennedy, Angus Beresford
1937. Leaching Method and Apparatus.
U.S. Patent 1,628,787. Granted May 17, 1927.
C.A. 21: 2080.
103. Kimmel and Company, To C.
1928. Continuously Operated Closed Extraction Appara-
tus for the Extraction of Oil and Fat Containing
Material.
D.R.P. 528,121. Ausgegeben August 25, 1928.
C.A. 25: 4728.
104. Fried, Krupp Grusonwerke, A. G., To
1936. Apparatus for Continuous Extraction of Material.
D.R.P. 633,917.
105. _____
1928. Apparatus for the Separation of Oil from Oil-
bearing Material.
D.R.P. 467,801. Ausgegeben November 1, 1928.
106. _____
1928. Process and Apparatus for Separation of Oil from
Oil-containing Material.
D.R.P. 454,822. Ausgegeben January 18, 1928.
107. Lawrence, E., Jr.
1930. Apparatus and Method of Extracting Oil from
Oleaginous Material.
U.S. Patent 1,743,356. February 25, 1930.
C.A. 24: 2001 (1930).

108. Lawrence, Edwin
1938. Apparatus for Extracting Oils from Materials Such as Soybeans or Cottonseed by Use of Solvents. U.S. Patent 2,154,339. Received April 11, 1938. C.A. 33: 5692.
109. Leahy, John F.
1941. Processing Oil Seeds and Nuts. III. Oil Extraction by Solvent Extraction Process. Southern Power and Ind. 59, No. 8: 62-7 (1941). Cf. C.A. 35: 3113. C.A. 35: 6821 (1941).
110. Lemmel, Hans
1931. Apparatus for Continuous Extraction of Oils and Fats. D.R.P. 525,724. Ausgegeben May 28, 1931. C.A. 25: 4728.
111. Levine, Arthur H., Sweeney, Orland R., Kircher, Charles E., and McCracken, William L. (to E. I. du Pont).
1941. Apparatus for Continuous Countercurrent Extraction, as in Extracting Oil from Soybeans with Trichlorethylene or the Like. U.S. Patent 2,264,390. December 2, 1941. C.A. 36: 1531 (1942).
112. Levine, Arthur H., and Dent, Roy J. (to E. I. du Pont)
1943. Countercurrent Extraction Apparatus Suitable for Extractions Such as that of Oleaginous Matter from Flaked or Comminuted Soybeans with Trichlorethylene or the Like. U.S. Patent 2,321,923. Granted June 15, 1943. C.A. 37: 6502 (1943).
113. Lob, Albert
1923. Process for Producing Bone Grease and Glue from Bones. D.R.P. 373,218. Ausgegeben April 3, 1923.
114. Lill, William
1937. Rotary Apparatus for Extracting Oils from Seeds. D.R.P. 636,093. Ausgegeben October 3, 1936. C.A. 31: 898 (1937).
115. McKee, R. H.
1921. Process of Extracting Oils, Fats, and Fatty Acids. U.S. Patent 1,376,211. C.A. 15: 2683 (1921).
116. McMahon, J.
Process of Extracting Oils, Grease, etc., from Seeds, Wool, etc. U.S. Patent 793,464.
117. Marks, Edward
1923. Apparatus for Extracting Oil, Fat, and Waxes, and for Conditioning Maize and Other Grains. British Patent 215,113. Accepted December 6, 1923. C.A. 18: 2927.
118. Markley, K. S., and Lynch, D. F. J.
1940. Technology of the Cottonseed Crushing Industry. Bureau of Agr. Chem. and Eng. U.S.D.A. New Orleans, Louisiana. ACE 63: 23 pp.
119. Martin, J.
1921. Method of Extracting Soybeans by Means of a Solvent. Mat. grasses 13: 5879-80 (1921). C.A. 15: 3563.
120. Mashino, Minoru
1929. (Untersuchung über Verbesserungen bei der Extraktion von Sojabohneol.) J. Agr. Chem. Soc. Japan 32 (Supp. Bind.): 256 —German Title from Chem. Umschau Fette 36: 347, 1929. C.A. 24: 2319 (1930).
121. ———, and Nishimura, S.
1931. (Untersuchung ueber die Verbesserung der Sojaol-extraktion. II. Beziehung zwischen Siedepunkt des Gasolins und dem optimalen Verhältniss Gasolin: Methanol.) J. Agr. Chem. Soc. Japan 34 (Supp. Bind.): 402-405. (German Title from Chem. Umschau Fette 39: 88, 1932). C.A. 26: 864 and C.A. 24: 2319.
122. Measmer, Schubert G.
1942. Extraction of Oil from Soybeans Using a Mixture of Trichlorethylene and Ethyl Alcohol as a Solvent. Iowa State College J. Sci. 17: 100-2 (1942). C.A. 37: 3288 (1943).
123. Meyerweissflog, W. E.
1937. The Solvent Extraction of Soybeans. Oil and Soap 14: 10-14. Illus. C.A. 31: 1645 (1937).
124. Naszextraktion, G.m.b.H., To
1906. Process for Extracting Fat and Waxes from Moist Materials. D.R.P. 179,449. Ausgegeben November 24, 1906.
125. O'Brien, Wm. J., and Brett, Roy C.
1937. Apparatus for Extraction with Solvents, as in Extracting Oils from Oil-bearing Seeds. U. S. Patent 2,074,988. Granted March 23, 1937. C.A. 31: 3316.
126. Okano, Koji, and Ninomiya, Mamoru
1929. Ueber die Denaturierung der Eiweisstoffe von Sojabohnen bei der Oel-extraktion Mittels Alkohol. I. Rept. Centr. Lab. South Manchuria Ry. Co., 14: 7-9. C.A. 25: 1694.
127. Oktomo, Sajiro
1929. On the Proteins and Vitamins in the Embryo of the Soybean. Rept. Centr. Lab. South Manchuria Ry. Co., 14: 15-17 (cf.). Bean Industry in Manchuria, Contemporary Manchuria 1 (1): 15-42, 1937, Studies on the Alcoholic Extraction of Soybean Oil. Contemporary Manchuria 1 (3): 83-101, (1937).
128. Olier, Andre
1939. Extraction Column. U.S. Patent 2,150,608. Granted March 14, 1939, and U.S. Patent 2,056,735. Granted October 6, 1936. C.A. 30: 8676 (1936).
129. ———
1935. Paternosterartige vorrichtungen zum kontinuierlichen extrahieren. D.R.P. 634,152. Ausgegeben March 5, 1935.
130. Pattee, Ellis C. (to National Distillers Products Corp.)
1940. Continuous Solvent Extraction Apparatus. U.S. Patent 2,187,890. Granted January 23, 1940. C.A. 34: 3547 (1940).
131. Podbielniak, Walter J. (to Benj. B. Schneider)
1940. Centrifugal Fluid Treating Apparatus. U.S. Patent 2,209,577. Granted July 30, 1940. C.A. 35: 6 (1940).
132. Perin, Louis
1924. Improved Process for Extracting Oil from Oleaginous Grains and Other Bodies of Solvents. British Patent 207,542. Accepted May 15, 1942.
133. Price, David J.
1936. A Rural Soybean Plant Explosion. Nat'l Fire Prot. Assoc. Quart. January 1936, pp. 9-12.
134. Price, David J., and Brown, Hylton R.
1936. Glidden Soybean Plant Explosion. Nat'l Fire Prot. Assoc. Quart. January 1936, pp. 1-9.
135. ———
1936. Explosions in Soybean Plants. Safety Engineer 71: 79-82 (1936).
136. Proscio Oils Corp.
1928. Apparatus and Countercurrent Solvent System for Extraction of Oils and Fats. D.R.P. 532,187. August 12, 1928. C.A. 26: 328 (1932). British Patent 324,681. C.A. 24: 3917 (1930). C.A. 23: 5343 (1929).
137. Rapoport, A.
1939. The Use of Dichlorethane in Extraction Processes. I. Sbornik Dikhloretau 1939, 52-91. Khim. Referat. Zhur. 1940, No. 3, 88-9. C.A. 36: 4225 (1942).
138. Ravenscroft, Edward A.
1936. Extraction of Solids with Liquids. Ind. Eng. Chem. 28: 851-855. Illus. C.A. 30: 5463.
139. Rewald, Bruno
1933. Extracting Oil from Seeds. (C₆H₆+1-10% Me or Et Alc.) U.S. Patent 1,917,734. Granted July 11, 1933. C.A. 27: 3354; 4706.

140. Reid, E. E. (to Columbia Engineering and Management Corp.)
1931. Extraction of Oils.
U.S. Patent 1,802,533. April 28, 1931.
C.A. 25: 3862 (1931).
141. Riedel, J. D., and DeHaen, E.
1923. Soybean Oil.
D.R.P. 474,543 and 464,554. Ausgegeben August 29, 1923.
C.A. 23: P5054.
142. Riddle, R. N.
1914. Method of Extracting Oils and Fats from Oil Seeds and Other Vegetable Raw Materials Containing Oils and Fats.
U.S. Patent 1,076,997.
C.A. 8: 436 (1914).
143. Robinson, Harry S. (to French Oil Mill Machinery Co.)
1940. Apparatus (of the paternoster type) Suitable for Extraction of Oils and Fats from Vegetable Seeds, etc., by Use of Solvents.
U.S. Patent 2,225,799. December 24, 1940.
C.A. 35: 2352 (1941).
144. Rosenthal, H., and Trevithick, H. P.
1934. Low Boiling Hydrocarbons as Oil Extraction Media. Oil and Soap 11: 133-134.
C.A. 28: 5267 (1934).
145. ———
1932. Extraction of Oils (with C₄H₁₀) Under Pressure.
U.S. Patent 1,849,886. Granted March 15, 1932.
C.A. 26: 2802 (1932).
146. ———
1939. Oil Treatment Process. U.S. Patent 2,152,664.
Oil Extraction. U.S. Patent 2,152,665.
Separation of Oils. U.S. Patent 2,152,666.
Method for Extraction of Animal Oils. U.S. Patent 2,152,667. Granted April 4, 1939.
C.A. p. 5217 (1939).
147. ———, and Trevithick, H. P.
1940. Extraction of Cottonseed Oils with Liquid Carbon Dioxide. Oil and Soap 17: 264. Illus.
148. Rosenthal, Otto
1923. Process for Extraction of Materials Containing Oil and Fat.
D.R.P. Ausgegeben July 19, 1923.
149. Ruthruff, Robert F., and Wilcock, Donald F.
1941. Solvent Extraction of Vegetable Drying Oils.
Trans. Am. Inst. Chem. Eng. 37: 649-67 (1941).
C.A. 35: 7734 (1941).
150. Sato, Masanori, Sakai, Hiroshi, Yokochi, Mitsuo, and Sato, Iwawo
1928-29. Extraction of Soyabean Oil with Alcohol. II. Rept. Centr. Lab. South Manchuria Ry. Co. 13: 46 (1928); 14: 1, 3, and 5 (1929).
C.A. 25: 1694 (1931), and C.A. 25: 1695 (1931).
151. ———, and Ito, Chiyomatsu
1930. Method of Extracting Fatty Oils.
British Patent 336,273. Accepted October 10, 1930.
C.A. 25: 2016 (1931).
152. ———, and Ishida, Yoshitoyo
1930. Method of Extracting Fatty Oils.
British Patent 336,274. Accepted October 10, 1930.
C.A. 25: 2016 (1931).
153. ———, and Ito, Chiyomatsu
1932. Method of Extracting Fatty Oils (Alc. as solv. under press).
U.S. Patent 1,892,366. Granted December 27, 1932.
C.A. 27: 2056.
154. Sato, Sadakichi
1919. Proteins and Oil of Soybeans and Their Industrial Applications.
J. Chem. Ind. Tokyo 22: 851-77 (1919); 953-968; 1945-58.
C.A. 14: 2682.
155. ———
1921. Oil and Protein Extraction from the Soybean. Techn. Repts. Tohoku. Imp. Univ. 2: 1-124 (1921).
C.A. 16: 1491.
156. Satow, Teikichi
1931. Apparatus for Removing Oil from Soybeans and for Semi-baking the Beans.
U.S. Patent 1,799,256. Received April 7, 1931.
C.A. 25: 3190 (1931).
157. Savage, Joseph
1932. Process for Removing Fat from Raw Material Containing Water.
D.R.P. 542,942. Ausgegeben January 30, 1932.
C.A. 26: 3130, and
British Patent 278,891. October 22, 1926.
C.A. 22: 2851.
158. Schlotterhose, Conrad, and Brandt, Herman, To
1930. Improvements in or Relating to Extraction of Oils and Fats by Solvents.
British Patent 316,881. Accepted October 23, 1930.
159. Schlotterhose, Conrad
1932. Process of Extraction from Substances Containing Oil, Fat, etc.
U.S. Patent 1,862,945. Granted June 14, 1932.
C.A. 26: 4194.
160. Schmid, Alfred
1939. The Extraction Apparatus "System Hansa-Mühle," Its Construction and Mode of Operation.
Fette und Seifen 46: 464-5 (1939).
C.A. 34: 7661 (1940).
161. Scholler, Heinrich
1937. Apparatus for Extracting Vegetable Materials Under Pressure.
D.R.P. 639,775. Ausgegeben December 17, 1936.
C.A. 31: 3750.
162. Schwalbe, Carl
1918. Process for Producing Fat, Wax, Resins, etc., from Vegetable Cellulose Containing Materials.
D.R.P. 309,555. Ausgegeben November 25, 1918.
163. Schwartz, A. K.
1927. Solvent Extraction of the Soybean.
Oil and Fat Ind. 4: 284-8 (1927).
C.A. 21: 3756.
164. Shinozaki, Yuichi, and Sato, Masanori
1934. Alcohol Extracted Soybean Oil. I. Changes Due to Heat Treatment. II. Changes of Properties and Compositions by Ultra Violet Light. III. Effect of Ultra Violet Light in Oxygen, Hydrogen, and Nitrogen Atmospheres.
J. Soc. Chem. Ind. Japan 37 (Suppl. Bind.): 372 (1934).
C.A. 28: 7046.
165. Sievers, A. F., and McIntyre, T. D.
1921. The Relative Effectiveness of Several Organic Solvents for the Extraction of Vegetable Oils.
Cotton Oil Press 4, No. 10: 44-5 (1921).
C.A. 15: 1228.
166. Silvano, Emilio, and Lombardi, Cerri
1931. Process for Defatting, Extracting, or Washing Solid Material.
D.R.P. 519,830. Ausgegeben March 4, 1931.
167. Simon, Louis J., and Hinchley, J. W.
1921. Apparatus for Extracting Oils, Fats, Grease, Rubber, Sulfur, or Other Materials with Solvents.
U.S. Patent 1,381,758. June 14, 1921.
168. Simon Brothers, Ltd., To
1927. Machine for Extraction of Oils, Fats, Waxes, and Other Odoriferous Materials.
D.R.P. 453,253. Ausgegeben December 5, 1927, and
British Patent 278,815. July 19, 1926.
C.A. 22: 2851 (1928).
169. Simon, Louis and Simon Extracting Machine Syndicate, To
1930. Apparatus for Extracting Oil and the Like from Material Containing It.
D.R.P. 495,809. Ausgegeben April 12, 1930.
170. Singer, M.
1937. Das Extraktionsverfahren—die Allgemeine Olegewinnungsweise der Zukunft.
Seifenseider Ztg. 64: 863-865, 881-882.
C.A. 32: 1126.
171. Slashehev, A.
1932. Richness of Material and Number of Extractors in a Battery.
Masloboino Zhirovoe Delo 1932, No. 11, 35-46.
Chimie et Industrie 29: 1406.
C.A. 28: 4925.
172. Smith, Julian C.
1942. Ternary Systems for Extraction Calculations.
Ind. Eng. Chem. 34: 234-7 (1942).
C.A. 36: 1541 (1942).

173. Sohler, Karl
1934. Continuous Apparatus for Extracting Oil from Seeds, etc.
D.R.P. 602,272. September 4, 1934.
C.A. 29: 630 (1935).
174. Solvent Extraction Refrigeration Co., To the
1924. Process for Extraction of Fats, Oils, Essential Oils, etc., from Materials in Which They Are Contained.
D.R.P. 405,395. Ausgegeben October 31, 1924.
175. Stahlgren, K. A., and Shannon, T. L.
1920. Apparatus for Extracting Grease from Organic Matter.
U.S. Patent 1,341,523.
C.A. 14: 2273 (1920).
1926. Apparatus for Extraction of Water, Oil, and Fatty Matter from Solid Material.
U.S. Patent 1,694,361. December 4, 1929.
C.A. 23: 1005 (1929).
British Patent 286,752. November 8, 1926.
C.A. 23: 536 (1926).
176. Sterling, J. R.
177. Stockhausen, Julius
1912. Process of Removing Fat and Impurities from Vegetable and Animal Materials.
U.S. Patent 1,035,815.
C.A. 6: 3334 (1912).
178. Süß, Heinrich (to Maschinenund, etc., m.b.H.)
1941. Apparatus for Continuous Extraction of Oil from Seeds, etc., by Use of Solvents.
U.S. 2,223,747. December 3, 1940.
C.A. 35: 2024 (1941).
179. ——— (to Rheinmetall-Borsig, A.-G.)
1942. Arrangements for Extracting Solid, e.g., Oily Substance from Seeds.
German Patent 723,222. June 18, 1942.
C.A. 37: 5266 (1943).
180. Swallen, Lloyd C., and Reinties, Harold (to Corn Prods. Ref. Co.)
1941. Apparatus Suitable for Use in Extracting Zein from Gluten Meal with an Alcoholic Solvent, etc.
U.S. Patent 2,227,605. January 7, 1941, also
U.S. Patent 2,133,591.
C.A. 35: 2645 (1941).
181. Sweeney, O. R., Arnold, L. K., and Arnold, J. H.
1929. Processing the Soybean.
Iowa State College Official Publication 28, No. 7: 3-46 (1929).
C.A. 24: 1238.
182. Taylor, Robert L.
1936. How Soybeans Help Build Fords.
Chem. and Met. 43: 173-176. Illus.
183. Torwald, Waldemar
1924. Gesichtspunkt für die Auswahl des Extraktions-systems.
Chem. Ztg. 48: 853-855.
C.A. 19: 751 (1925).
184. Tsao, Utah
1937. Graphical Methods as Applied to Continuous Counter-current Extraction of Solids by Liquids.
J. Chem. Eng. China 4: 164-8 (1937).
C.A. 32: 3672 (1938).
186. Tismstra, Sijbren
1939. Extraction Process.
U.S. Patent 2,149,643. Granted March 7, 1939.
C.A. 33: 4269 (1939).
187. Turner, Charles, and Flood, H. J.
Oil Extracting Device.
U.S. Patent 1,024,230.
188. Turner, Charles
1914. Process for Extracting Oils from Solids.
U.S. Patent 1,104,456.
C.A. 8: 3130 (1914).
189. Turner, F. M.
1927. Modern Methods of Extraction by Means of Solvents.
Oil and Fat Industry 4: 5-10 (1927).
C.A. 21: 1196 (1927).
190. Van Wirt, Alfred E. (to Imperial Paper and Color Corp.)
1940. Rotary Extractor.
U.S. Patent 2,199,928. Granted May 7, 1940.
C.A. 34: 5705 (1940).
191. Volkov, E. N., and DVinyaninova, I. L.
1940. Denaturation of Soybean Proteins by Organic Solvents and by Heat.
J. Applied Chem. (USSR) (13: 267-73) (in German 273-4).
C.A. 34: 7943 (1940).
192. von Girsewald, Conway F.
1912. Process for Extraction of Bones, Leather Scraps, and Similar Material with Volatile Solvent in Vacuum.
D.R.P. 243,243. Ausgegeben February 9, 1912.
193. Wacker, Gesellschaft, To Alexander
1929. Preparation of a Residue from Extraction of Fat Containing Plant or Animal Material Applicable to Feeding.
D.R.P. 485,625. Ausgegeben November 6, 1929.
194. Wells, R.
Method of Extracting Oils and the Like.
U.S. Patent 1,267,611.
U.S. Patent 1,357,365.
C.A. 12: 1842 (1918).
195. Whitehead, Matthew, and Scott, Ernest
1923. Process and Apparatus for Extraction of Materials Containing Oil.
D.R.P. 377,216. Ausgegeben June 14, 1923.
U.S. Patent 1,446,606. February 27, 1923.
C.A. 17: 1557 (1923).
196. Whiton, Louis, and Bredlik, Vladimir
1920. Improvements in Extraction of Fatty Matter from Garbage and Other Fat Containing Material.
British Patent 143,196. Accepted March 1, 1920.
C.A. 14: 2867 (1920).
197. Whiton, L. C.
1926. Design and Operation of a Solvent Extraction Plant.
J. Oil and Fat Ind. 3: 268-76 (1926).
C.A. 21: 1196 (1927).
198. Wijnberg, Simon
1910. Improvement in or Relating to Extracting and Purifying Waxes, Fats, and Oils.
British Patent 16,148. Accepted March 17, 1910.
199. Wilhelm, Karl
1932. Process for Producing Light Low Acid Oils and Fats from Fish, Flesh, and Their Byproducts and for Preparation of Light Fish and Flesh Meals.
D.R.P. 551,101. Ausgegeben May 26, 1932.
D.R.P. 552,284. Ausgegeben June 10, 1932.
C.A. 26: 4494 (1932).
200. Wilhelm, Karl
1932. Process for Extraction of Vegetable Materials.
D.R.P. 551,102. Ausgegeben June 18, 1932.
C.A. 26: 4494 (1932).
201. Winters, Alexander
1918. Improvements in Apparatus for Extracting Oil from Seeds, Beans, Nuts, Offal, etc.
British Patent 120,156. Accepted October 31, 1918.
C.A. 13: 520.
202. Yoshida, Kichi
1929. Oil Extraction.
French Patent 682,987. October 9, 1929.
C.A. 24: P4650.
203. ———
1929. Extracting Oils Such as Soybean Oil by Pressure.
British Patent 341,079. Accepted October 29, 1929.
C.A. 25: P4143.
204. Yushkevitch, S., Brilling, S., and Antonemko, F.
1932. The Extraction of Oil from Soybeans.
Masloboino Zhirovoe Delo 1932, No. 4-5, 52-3.
C.A. 27: 2583.
Schriften Zentral biochem. Forschungsinst. Nahr. Genuss mittelind (Moscow) 2: 380-99 (1933).
C.A. 27: 5563.
205. Zipser, Siegfried
1923. Process and Apparatus for Extraction with Volatile Solvents.
D.R.P. 386,036. Ausgegeben December 1, 1923.
British Patent 183,825. July 21, 1922.
British Patent 186,040. July 27, 1922.
C.A. 17: 221, 1160 (1922).