

Beverage Cans Crusher Machine Patents: A Review (Part II)

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Abstract - The study provides a review summary for patents of can crusher/press machines. Such review work is incredibly helpful for any designer(s) to provide them up to date overview information of the patents for robust can crusher machines. The review here lined the patents within limited time period, from 2000 to 2007. The study gives an outline for about thirty eight patents; however, careful descriptions for such patents are to be given at separate studies. The present study provides a title of each patent, patent range, name of the designer, patent issued date as well as a patent design summary. This review work is thinking to be helpful for inventors worked on patents for press/crusher machines.

Keywords: Can Crusher Machines, Patents, Review Study, Period 2000–2007

I. A BRIEF SUMMARY OF CAN CRUSHERS PATENTS

In our early studies we presented some discussions about patents for can crusher machines, you may see, e.g., [1–4]. The study here is dedicated for an overview of early patents, as summarized below; however, details of patents could be shown in separate studies.

1. *Compressing Device for Plastic Bottles, Patent Number: 7290486*

A compacting gadget for plastic jug utilizes a couple of plates which are lashed on each side of a container. The ties are fixed as the suppress' substance is utilized. The plates are molded in such a path to lessen pleating on the container. Discretionary adornments, for example, a seat to hold the plates in favor of the container while introducing; a remain to hold the jug upright; and a handle to encourage pouring are accessible [5].

2. *Portable Can Crushing and Pickup Device, Patent Number: 7267052*

A mix can squashing and recovering gadget having a round or tubular lodging containing a plunger and having a rectangular opening in its side divider. The lodging has a blade edged marginally sunken indent on the base of the lodging inverse the rectangular opening, which indent for the most part adjusts to the curve area of the necked down segment of a drink can. At the point when the curved indent is set on the lip of a can laying on its side and constrained down the can will "snap" upright, through the rectangular opening and into the lodging. The can is then held in the lodging around the necked down bit by a froth/elastic

covering situated at the lower inside end of the lodging. At that point the weighted plunger is constrained down onto the can, smashing the can and removing any liquids staying inside the can through the drinking opening. The can may then be catapulted from the gadget by squeezing an ejector bar [6].

3. *Empty Container Pressing Apparatus, Patent Number: 7219601*

A vacant compartment squeezing mechanical assembly is unveiled. The unfilled compartment squeezing contraption incorporates no less than one weight applying barrel area in which a first chamber and a second barrel chamber isolated by a weight accepting cylinder which slides in a chamber having the principal barrel chamber and the second chamber are arranged. Furthermore, a bay to which a weight applying medium provided from the outside is input and an outlet which depletes the information weight applying medium is associated with the principal barrel chamber. Further, the unfilled compartment squeezing device incorporates no less than one squeezing area which is associated with the weight applying barrel segment and gives a squeezing cylinder that moves together with the weight accepting cylinder by means of a weight transmitting part and applies squeezing power to a vacant holder, and the vacant compartment is squeezed [7].

4. *Can Collection Catch Bin for Use with Aluminum Can Compacting Mechanism, Patent number: 7219602*

An enhanced can compacting component incorporates a would collection be able to discover canister including a principle get container body having indispensably framed front divider, back divider, and contradicting dividers. Downwardly from the front, back and side dividers, is a story. The dividers and floor are essentially shaped into a solitary structure.

Upwardly from the floor, the side dividers are decreased deep down towards a body neck and opening. The upper most bit of the front and back dividers additionally end at the body neck and opening. The body neck is, in cross-area, a for the most part rectangular-molded structure and the body opening is a for the most part rectangular-formed gap through which compacted jars are aim to go as they drop by gravity from the can compacting instrument of earlier development [8].

5. Container Crusher, Patent Number: 7185585

A contraption for squashing compartments incorporates a kick the bucket characterizing an opening, a punch, and a framework for uprooting the bite the dust and punch in respect to each other. The punch might be settled and the pass on might be moved from a first position dispersed separated from the punch with the end goal that a holder to be pounded can be put between the punch and bite the dust and a second position in which the punch stretches out into the bite the dust opening to characterize an annular hole between the punch and pass on opening. The game plan is to such an extent that a compartment smashed between the kick the bucket and punch because of relocation of the pass on to the second position is in any event to a limited extent constrained into and disfigured inside the annular hole [9].

6. Compacting Press, Patent Number: 7178455

A compacting press having a help segment, a compacting segment which experiences translational development along a vertical pivot which is fitted with a pushed plate and which shapes a smash intended to pack cases by the use of weight, and a guide get together made up of a skirt, with a liner, a loop and a support. The support is fitted to a skirt holding area by a removable association made up of a reversible get together framework including the fitting into place and flat development of no less than one key-gap formed opening which goes vertically through the support and no less than one vertically orientated mushroom-molded haul. This press is ideally utilized for compacting a case containing risky materials, specifically radioactive waste [10].

7. Method and Apparatus for Recycling Oil Filters, Patent Number: 7162786

A mechanical assembly for naturally sustaining oil filter(s) into a devastating zone to shear a canister from a connector plate. The device feed the oil channels into the devastating zone each one in turn for the devastating by a portable divider against a settled divider to straighten the canister while cutting edge shears the canister from the connector plate. The contraption empowers catch of oil and reusing of the canister and connector plate [11].

8. Mobile Apparatus for Crushing Containers, Patent Number: 7069848

The present development gives a portable crusher to pounding holders, for example, 55-gallon drums. The mechanical assembly incorporates a crusher head and crusher base, every one of which are rapidly and effectively connected to a forklift. Whenever impelled, the forks of the forklift drive the crusher construct and compartment resting in light of it into the crusher head, consequently pounding the holder. The mechanical assembly might be designed to suit diverse sizes of forklifts and may incorporate a discretionary gadget to cut the compartment at the beginning of the devastating activity [12].

9. Device for Reducing the Volume of Bottle Made of Plastic Material, Patent Number: 7066084

The contraption as indicated by the innovation contains a lodging or casing for getting the jug, a component for settling the container, a warming component encompassing piece of the jug and packing implies for compacting the relaxed jug, wherein the lodging or casing is developed to get the jug with its mouth part upwards, the warming component or the piece of the warming component encompassing the jug is at most 60 mm high, and is masterminded around the neck some portion of the jug in its beginning position and the settling component is a sealable module the packing implies, to be fitted into the mouth of the jug and having an air channel, the cross segment of which is ideally customizable, ideally with stream control implies. The stream control means might be a valve [13].

10. Compactor Device, Patent Number: 6994023

A compactor gadget for the programmed compacting of void holders, e.g. dispensable jugs/jars of metal, plastic, glass or other appropriate material, wherein the compartment is basically being squeezed level and conceivably punctured, potentially pounded, and wherein the compacting zone is shaped by a cuneiform region between a transport line and a first jaw set and a second jaw set, and wherein a majority of jaws, which are given teeth on their dynamic side, are organized so that each substitute jaw, as observed transversally to the longitudinal heading of the transport line, is associated with the jaw sets separately, the jaw sets being rotatably associated with two normal unconventional shafts, and the offbeat shafts being framed so that the unusual movement of the jaw sets is out of stage, regularly by 180 degrees [14].

11. Can Crusher, Patent Number: 6923114

A compacting gadget is given that is appropriate to smashing jars. A compacting gadget is given that incorporates a majority of straight drive actuators situated nearby a pressure chamber to both lessen stature/size of the packing gadget, and give a more uniform pressure power to the can. A compacting gadget is given that incorporates a workpiece repository that gathers fluid or different garbage, expands the security of the packing gadget by protecting sharp edges of the pressed workpiece, and accommodates simple cleaning because of its removability and dishwasher safe development. A compacting gadget is given that incorporates creasing partitions that give more controlled less demanding pressing of work pieces, for example, aluminum jars [15].

12. Apparatus for Compacting Objects, Patent

A mechanical assembly to compact questions, for example, plastic containers and jars whose material is to be reused incorporates a finder gadget, two release openings and a compactor gadget. The indicator gadget has no less than one code peruser for recognizing affirmed from rejected items.

One of the two release openings is proposed for endorsed objects and the other for rejected items. The compactor gadget compacts the affirmed questions and has nonstop, non-cyclic activity. Accordingly, holding up times are maintained a strategic distance from between the release of an endorsed protest and the beginning of the compaction thereof [16].

13. Method and Apparatus for Crushing Cans, Patent Number: 6725768

The lowermost of a majority of vertically stacked jars, which have their longitudinal tomahawks considerably vertical, is held at a first stop. A press plate is progressed to have a first bit of its front divider draw in a mid segment of the lowermost can to crease it around a pivot opposite to its longitudinal hub. At the point when the press plate is pulled back, the lowermost can tumbles to a second lower stop and the following stacked can is held at the principal stop. The press plate has the primary segment of its front divider connect with the following can to overlay it and a second bit of its front divider draw in the whole surface of the collapsed can to smooth it to empower the leveled can to exit past the second stop [17].

14. Method and Apparatus for Crushing and Sorting Cans, Patent Number: 6684763

A strategy and mechanical assembly are accommodated pounding and arranging jars to gather squander jars in an ideal weight-to-volume proportion are given. The strategy incorporates deciding if a protest is provided to a can pounding gadget and whether or the provided question is a can by a nearness sensor introduced at a can supply unit, and when it is resolved that the provided question is a can, opening an opening/shutting plate introduced at the can supply unit, in this manner providing the can into a devastating/arranging/releasing unit, and smashing/arranging/ releasing for pressing the provided can by a devastating plate introduced in the devastating/ arranging/ releasing unit, arranging the squashed can utilizing an electromagnetic power connected to the devastating plate by electromagnets mounted on the devastating plate, as per the material of the can, and after that releasing the arranged can [18].

15. Method of Reducing the Volume of Empty Packaging and Compression Device for empty Packaging, Patent Number: 6684762

The innovation identifies with a strategy and a gadget for compacting void bundling waste. The pressure stroke is described by three diverse conceivably positions and the pressure gadget is arranged on or over a holder for gathering void bundling [19].

16. Compactor Device, Publication Number: 20040016354

A compactor device for the modified compacting of void holders, e.g. nonessential containers/jugs of metal, plastic,

glass or other sensible material, wherein the compartment is fundamentally being pressed level and maybe punctured, possibly beat, and wherein the compacting zone is molded by a cuneiform zone between a vehicle line and a first jaw set and a second jaw set and wherein a dominant part of jaws, which are given teeth on their dynamic side, are organized so each substitute jaw, as watched transversally to the longitudinal course of the vehicle line, is related with the jaw sets and exclusively, the jaw sets being rotatably connected with two typical fanciful shafts, and the uncommon shafts being encircled so the flighty development of the jaw sets is out of stage, consistently by 180 degrees [20].

17. Recycling Machine with Container Compacting System, Patent Number: 6675947

A reusing machine is given which compacts holders utilizing a multi-reason compacting framework which incorporates a roller gathering having a roller designed to draw compartments through a flexible compartment accepting throat. The compacting framework likewise incorporates a base plate get together with a portable base plate which in any event mostly characterizes the throat, the base plate being mounted for development between a first introduction wherein the base plate is a first foreordained separation from the roller in order to characterize an open compartment accepting throat, and a second introduction wherein the base plate is a second lesser foreordained separation from the roller to close the holder getting throat. The throat ordinarily is shut as the compartment goes between the roller and the base plate in order to minimal the holder there between [21].

18. Can Recycling System, Patent Number: 6626095

A device for crumbling and gathering a can using a plate having a first bit with a surface and a second part with an opening through the same. A lodging is additionally given and incorporates a press which is portable between a first position and a second position. The plate is guided with respect to the lodging to such an extent that the surface of the primary segment lies inverse the press and is fit for crumbling a can when put on the principal plate divide. At the point when the press moves to its first position the can is crumpled. The fallen can goes through the plate when the plate second bit lies inverse the press [22].

19. Hand-Held Household Container Compressing Device, Patent Number: 6609456

A hand held gadget for packing utilized or void family unit compartments comprises for the most part of a long, straight handle and a little non-slip base. The handle has a gap in the inside to get the highest point of the holder. The handle has adjusted focuses projecting from the base, close to the opening that gets the holder top. As one gradually pushes the handle descending the focuses push on the structure of the highest point of the holder. This makes purposes of

disappointment, and enables the compartment to be smashed descending in a straightforward, moderate, smooth way, requiring next to no descending power. The non-slip base, where the compartment is set before packing, shields the holder from slipping amid pressure. Before the holder is packed, the top is relaxed to give air a chance to out as it packs. When it is compacted, the top is fixed, so the holder stays packed [23].

20. Empty-Container Pressing Machine, Patent Number: 6598522

A vacant holder squeezing machine involves a platform including a compartment bearing segment fit for conveying subsequently a vacant compartment in an upright stance, a couple of guide posts gave outside the holder bearing part, a holder presser vertically portable along the guide posts, and a clasping component for clasping the body of the vacant holder. The compartment presser has a capacity to press and squash the unfilled holder on the compartment bearing segment from above. The clasping system has a capacity to clasp or disfigure the body of the vacant compartment by squeezing the sidewall of the body of the unfilled holder before the vacant compartment is smashed by methods for the compartment presser [24].

21. Article Compacting Device, Patent Number: 6571695

A mechanical assembly for the compaction of articles, e.g., dispensable metal jars or expendable plastic containers, incorporates a couple of commonly counter-rotatable, interfacing press rollers, wherein the primary roller has a settled help and wherein the second roller is bolstered in an arm-spring get together, in this way empowering the space between the rollers to be changed by the size and compactability of the article. What's more, the mechanical assembly has a precompactor that incorporates a transport, e.g., a belt or chain transport, and a lengthen squeeze plate slanted in respect to the transport and ideally spring-stacked, to guarantee that the article is bit by bit smoothed upstream of the crush rollers. The press roller might be furnished with an incurvate center bit and, alternatively with openings having a L, U or V-molded cross segment with grasping edges keeping in mind the end goal to encourage the nourishing of the articles, for example, bottles having a mouth and base areola, through the compactor [25].

22. Home Compactor, Patent Number: 6571696

The innovation concerns a compactor for void compartments comprising of a settled casing and a versatile component indispensable with the edge yet equipped for sliding inside or outside the settled edge, and of getting the holder between an upper piece of the settled component shaping an iron block and a piece of the portable component framing a packing part. The portable component can be subjected to a vertical descending power. Said constrain is connected on the lower some portion of versatile component by the client's foot. Said bring down part shaping a pedal is

situated underneath the settled casing top part to cause the versatile component to slide and pack the compartment between the contrary surfaces of said upper parts [26].

23. Automatic Sorting Compression Machine for Iron, Aluminum Cans and Plastic Bottles, Patent Number: 0057144

The present development identifies with a programmed arranging pressure machine for press, aluminum jars and plastic jugs. A delta is given on the fundamental body of the present creation. No less than one recognizing switch is masterminded in a preset position of the delta. A container is arranged under the bay. A restricted outlet and a two-way outlet are fitted at the front and backsides of the container. A leave selector controlled by a change-over attractive valve is arranged at the two-way outlet. A compartment is put under every one of the three channels of the outlets. The press shaft of an axle goes through the repository. The press shaft is fitted with a zapped magnet and a jolted post at the front end thereof while another energized post inverse to the charged shaft is mounted in preset position of the fundamental body. A microswitch is arranged in the most distant position of the press shaft being stepped back [27].

24. Press, Patent Number: 6530312

A press has two weight levers associated with weight plates which can be moved against each other by a driving engine. A control gadget follows up on the driving engine and licenses distinctive groupings of development of the weight levers amid the squeezing activity as per diverse working projects. A working system is accommodated pounding jars and holders and another working project is accommodated extricating juice. With a specific end goal to keep away from defective tasks, the weight plates are developed for getting distinctive mounts for the different working modes. No less than one weight plate is associated with a sensor which recognizes the kind of mount and reports it to the control gadget. Notwithstanding an extended application go, the working of the press is basic on the grounds that, for beginning both squeezing tasks, the hardware administrator incites just a single beginning switch, the choosing of the working projects occurring naturally, which guarantees a high wellbeing standard [28].

25. Compactor, Patent Number: 6481346

The present creation gives a powerful compactor mechanical assembly and technique for pounding void recyclable holders. The compactor has a lodging for containing the compartment to be smashed with a plunger that can be moved downwardly and pivoted inside the lodging. The joined descending and rotational development serves to accomplish a maximally packed compartment. The packed compartment is launched out from the lodging by encourage augmentation of the plunger [29].

26. System for Securely and Removably Attaching a Food Processing Adapter, Patent Number: 6435080

A framework for connecting a sustenance preparing connector to a nourishment handling unit incorporates an upper preparing connector joined to a weight get together of the unit, and a lower handling connector appended to a holder at a base of the unit. The holder incorporates a first space expanding evenly into a best bit of the holder, and a second opening inverse the primary opening and broadening vertically into the holder. A first tab broadens evenly from the lower preparing connector and is arranged to be embedded into the principal space. A second tab expands vertically from the lower preparing connector in order to be embedded into the second opening. A locking system is arranged to releaseably secure the second tab to avoid development of the lower handling connector amid task of the sustenance preparing unit [30].

27. Electric Aluminum Can Crusher, Patent Number: 0100376

The electric aluminum can crusher is an apparatus for smashing aluminum drink jars reasonable for use in family units and business foundations. The crusher has an electric engine pivoting a first crusher hagle second crusher wheel mounted on a spring one-sided bolster arm by means of a chain drive. Aluminum jars are embedded into a feeder chute having a release opening adjoining the intersection of the crusher wheels. The feeder chute has a sensor, ideally an electric eye arranged on an inside mass of the chute, which identifies the section of a can through the chute and turns the electric engine on for a coordinated interim. As a can exits the feeder chute it is smashed between the crusher haggles released from the crusher. A couple of aides hold the can between the crusher wheels. The help arm might be withdrawn to clear any stick between the roller wheels [31].

28. Apparatus for Crushing Cans, Patent Number: 0083851

A contraption for pounding jars, including a smash chamber, an air control valve, a pneumatic air chamber, a key lockable air supply get together, and a majority of air hoses. The devastating system or mechanical assembly incorporates the air chamber, a guide plate, and a smash plate. The control valve necessitates that the top be in shut position keeping in mind the end goal to actuate the device. The lodging likewise incorporates a removable liner; the liner is for the most part U-formed in cross-area and has a bended bit along its upper edge for hanging the liner within the smash chamber [32].

29. Empty-Container Pressing Machine, Patent Number: 0023552

A vacant compartment squeezing machine involves a platform including a holder bearing segment equipped for conveying subsequently an unfilled holder in an upright stance, a couple of guide posts gave outside the

compartment bearing segment, a holder presser vertically mobile along the guide posts, and a clasping component for clasping the body of the vacant compartment. The holder presser has a capacity to press and press the vacant compartment on the compartment bearing segment from above. The clasping component has a capacity to clasp or distort the body of the unfilled compartment by squeezing the sidewall of the body of the vacant holder before the vacant compartment is pounded by methods for the holder presser [33].

30. Method of Compacting with Shearing Compactor Pump, Patent Number: 6308618

A compactor for holders containing flowable materials in which the compartments are compacted in a compaction chamber and flowable materials from the holders are recuperated in a controlled way as by expulsion from the compaction chamber. The compactor profitably incorporates a shearing instrument to help with controlling the nourishing of holders into the compaction chamber as well as the arrival of the compartment's substance. The compartments are ideally compacted under adequately high weights to burst the holders and power any flowable materials out of the compartments. A gathering complex is ideally furnished in fixed correspondence with the compaction chamber to get flowable materials expelled from the compaction chamber. A channel or screening system fit for withstanding the weights created in the compactor is given to allow flowable materials to be expelled out of the compacting chamber, yet keeping up the cracked holders in the compaction chamber [34].

31. Method and Device for Emptying a Drum Filled with Solids, Patent Number: 6237808

In a technique for purging drums which are loaded up with solids and the covers of which have just been evacuated, the drum base is isolated from the drum and the solids are constrained out of the drum with the guide of a squeezing body. A device for exhausting drums loaded up with solids has a cutting ring for evacuating the drum base. To empty the drum liberated from the drum base and the rum top, the contraption has a squeezing body which is as a slam and, driven by water powered barrels, can be dislodged along the longitudinal pivot toward the cutting ring. A stop bolsters the drum against constrain acting toward dislodging while the solids are being constrained out of the drum by the smash [35].

32. Shearing Compactor Pump, Patent Number: 6178882

A compactor for holders containing flowable materials in which the compartments are compacted in a compaction chamber and flowable materials from the holders are recouped in a controlled way as by expulsion from the compaction chamber. The compactor profitably incorporates a shearing component to help with controlling the encouraging of compartments into the compaction

chamber or potentially the arrival of the holder's substance. The holders are ideally compacted under adequately high weights to break the compartments and power any flowable materials out of the holders. An accumulation complex is ideally given in fixed correspondence the compaction chamber to get flowable materials expelled from the compaction chamber. A channel or screening instrument fit for withstanding the weights created in the compactor is given to allow flowable materials to be expelled out of the compaction chamber, yet keeping up the cracked holders in the compaction chamber [36].

33. Method of Recycling Simultaneously a Plurality of Oil Filters, Patent Number: 6139601

A strategy for all the while reusing a majority of utilized oil channels includes setting a majority of the channels into a rectangular compartment having a best, inverse sides, a base, and first and second closures. Weight is applied on the oil channels a first longitudinal way, and a second compressive weight is forced on the channels a second longitudinal way at a generous right point as for the main longitudinal bearing. The first and second weights are adequate to pack the air channels to a significant independent rectangular square. This technique creates an independent square wherein 90% to 95% of the lingering oil in the channels is evacuated [37].

34. Trash and Recycling Center, Patent Number: 6138558

A junk and reusing focus having a secluded waste container unit and a particular reusing repository. The waste container unit has no less than two inside compartments and a portable top. A waste sack can be set in one compartment and utilized daily papers can be put away in the other compartment. The reusing container unit has a best with a can crusher, a void can capacity zone, and an opening for keeping pressed jars into the inside of the reusing repository. The inside of the reusing repository can have numerous racks or capacity draws or, can have a solitary stockpiling canister. The reusing container can likewise have a removable ledge reusing unit [38].

35. Method and Apparatus for Perforating and Crushing Containers, Patent Number: 6131509

A mechanical assembly and strategy for utilize is uncovered for a machine utilized for puncturing and straightening or smashing holders of shifting sizes and materials. The revealed machine has an edge having an information opening and a release opening. A first majority of shafts and second majority of shafts are rotatably upheld by the frame. The primary majority of shafts are arranged in a first plane and the second majority of shafts are arranged in a second plane. The second plane is intensely calculated as for the primary plane. At least one engines pivot the first and second majority of shafts, each pole having puncturing components situated along them. The puncturing components are counterbalanced between neighboring

performing shafts with the end goal that nearby puncturing components cover yet don't contact the adjoining shaft. The puncturing components have a majority of spikes fit for puncturing the holder being punctured and pressed. Being used, compartments are brought into the edge through the info opening [39].

36. Device and Method in Handling of Returnable Packages, Patent Number: 6112904

The development concerns a gadget and a strategy in treatment of returnable bundles, for example, bottles or potentially jars. The gadget includes a rotatable magazine for exchanging returnable bundles, for example, jugs or jars, from a feed station further. The gadget that exchanges the returned bundle from the bundle feed station is a rotatable magazine, which incorporates bundle spaces. The arrangement of gear includes, in the magazine, an external divider, which advances to of the feed entryway when the magazine is turned. The recognizable proof station, in which the returned bundle, for example, a can or a jug, is distinguished, is set after the feed station. The hardware incorporates implies by which a returned bundle set in a bundle space in the magazine is exchanged, by pivoting the magazine, from the feed station into the recognizable proof station, in which the returned bundle is distinguished [40].

37. Aluminum Can Compacting Mechanism, Patent Number: 6076455

An aluminum can smashing component incorporates a help base, which has a couple of help individuals stretching out from it. Arranged between the help individuals is a couple of compacting plates. The compacting plates use a couple of arrangement bars, one plate having the arrangement bars fastened there within and the other plate being practically adjusted to be versatile along the arrangement poles. Rotatably appended to the versatile plate is a handle part which, when turned from a by and large upwardly stretching out position to a descending position, causes the compacting plates to move towards each other along these lines compacting an aluminum can situated between the compacting plates. At the point when the handle part is turned upwardly, the compacted can drops out from the instrument without additionally treatment of it [41].

38. Compactor System, Patent Number: 6050181

A compactor for squashing metal jars. The compactor incorporates a magazine for unattended conveyance of jars to the devastating chamber [42].

II. SUMMARY AND CONCLUSION

For any inventor of can crusher machines, one needs scanning all previous inventions, which is hard work, awfully labor and time overwhelming. This study summarizes the inventions that introduced within 8 years, from 2000 to 2007. The study is devoted to gift a short

outline of inventions, however, an in depth description of inventions can be conferred in a very separate studies. A complete of thirty-eight patents with lined within the chosen period, while it is planned within the next papers to present the inventions for alternative time intervals.

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