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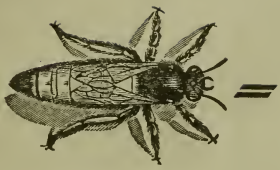

Restrictor.

The Queen-Restrictor.

DETAILING THE ONLY FEASIBLE METHOD OF BROOD-NEST INVERSION, CONTRACTION, AND EXCLUSION—BY THE USE OF BROOD FRAMES IN COMBINATION WITH QUEEN-EXCLUDING METALS.

As Invented and Applied by

C. W. Dayton.

ILLUSTRATED.

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1890.

Preface.

The new apicultural implement herein offered for inspection by the honey-producing fraternity, began its existence about six years ago. I have always made it my aim to study out and put into practice new and better ideas by which I might benefit both my friends and myself. I have for several years watched and used the different devices calculated to confine the queen without certain portions of the hive, intended to avoid the presence of brood in the surplus, and the propagation of supplies of brood to support when there was no expectancy of there being honey to gather. After long meditation upon the subject, the idea suggested itself to me, about five years ago, instead of guarding apartments from the queen, as is usually done, why not restrain the queen from the apartments?

With this idea as a motor, I set myself about devising hives and fixtures to accomplish the special purpose, i. e., to confine the queen within reasonable limits.

As the result I am enabled to offer to my friends and the bee-keeping fraternity in general, an entirely new and original work on bee-keeping, an entirely new and original device to used in the apiary and an entirely new and original system of management for the production of honey. I say new and original because the method originated with me and has never before, so far as I can find out, been published or practiced by any person in the world.

It is a system that should have been introduced long ago as the best managements now in practice are much less practical, scientific or economical in their treatment of the queen. Were it not that it may be as helpful to others as to myself I might remain silent. I am sure that with its help, more honey can be secured, in better shape, and with less la-

bor, when the other conditions are alike, than can be obtained by any other known method.

The device is composed of a combination of six separate inventions none of which have ever been described in any book or journal.

C. W. DAYTON.

Bradford, Iowa, Feb., 1890.

Introduction.

As I was engaged at binding wheat in July, 1879, a swarm of bees passed over our heads and settled upon a bush at the edge of the field. The farmer, by whom I was employed, left his work and put them in a hive he chanced to have near at hand. By this occurrence my attention was drawn to a half-dozen other hives of bees belonging to the farmer that before had remained unnoticed. This was the first that I had ever paid any attention to honey bees, whatever.

From this time onward, as long as the binding lasted, I spent my spare moments by the hives, morning, noon and evening, studying the habits of the bees, and the more I studied the greater was my interest and curiosity.

Two years more passed when I again found employment with a farmer who owned fifty to sixty colonies of bees. Here I assisted in the work of fixing hives, putting together sections, etc. in the absence of other farm labor. Here, also, I became acquainted with King's Text Book, which, in my opinion, is the best instructor for beginners yet out. This book was nearly committed to memory, as also was Root's A B C of Bee Culture, and Cook's Manual of the Apiary, obtained later in the season.

The next June (1882) eleven colonies of bees were purchased, and with that event began my practice in apiculture, though I continued at farm labor as before, handling bees only at odd times. I devoted my apiary to the increase of colonies, and with what was earned working for others I was enabled to build new hives, purchase an extractor and other needed supplies so that the season of 1883 found me engaged my own employer and a specialist in bee keeping and I subscribed for the Amrican Bee Journal and Gleanings in Bee

Culture.

It was in the latter part of the season of 1883 that reversible frames began to command almost unbounded attention. Nearly every one invented. I invented a frame unlike any of those described, but soon came to the conclusion that reversible frames were not what they were "cracked up to be," and gave the matter up. The following winter the idea of inversion in conjunction with contraction was perceived. Contraction of the brood chambers, to crowd the bees into the surplus apartments, was then receiving very unusual attention in the bee journals at the pens of such masters as Heddon, Hutchinson, and the Dadants. In the spring of 1884, a small, lightly constructed hive was devised, carrying a set of frames of reduced dimensions, to be manipulated on the inside of the regular hives. This small hive was experimented with through the following season and cast aside in the fall as impracticable for the purpose for which it was intended.

Toward the spring of 1885 my study drifted back again to the then much discussed questions of inversion and contraction. It was my idea at that time, and it is still my belief, that some fixture may or ought to be devised that will associate the principles of reversion, contraction and exclusion in so simple and convenient a manner as to give a new, precipitate impetus to apiculture nearly equal to that produced by the introduction of the suspended frame. I considered the contrivances in use so complicated that their application nearly obliterated their advantages.

Having failed to produce anything worth keeping in my experiments with the small hive I now concluded that the only hope for success lay in the arrangement of the frames. First, frames with bars 1½ inch in width were made and clamped together with straight sheets of perforated zinc tacked on the side of the outside frames. In this shape the device served the purposes of experiment during the season of 1885; the advantage of frames with narrow-

er bars to facilitate extraction of the honey was perceptible but was not put to actual test.

During the winter of 1885–6, the frames were narrowed down to one inch in width and otherwise changed. added to and improved so that it bore this description, which I copy from the AMERICAN BEE JOURNAL. of that year.

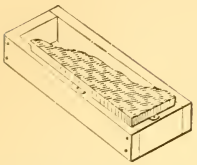
"The 'restrictor' is adapted to four frames, but there may be from two to eight. The frame material should be one inch in width all around; as that is the best width for both brood and extracting. Material of any thickness will do, so that the side-bars will be strong after having holes made through them. It wants four frames of this description, the same size of the other brood-frames used in the apiary, leaving off the projecting arms. Then five others of the same dimensions, except that they should be ⅜ of an inch or a bee-space in width. Setting all the frames on a level place, with a narrow frame between each two of the others, and a narrow one on each outside, they are all clamped together and a 3-16 inch hole is made through all of the side-bars at once edgewise, and one inch from the top or bottom of the frames. These holes are for small, flat-headed bolts that just reach through the frames, and are secured by a thin, flat nut. The bolts are six inches long.

Before using the bolts two sheets of perforated zinc are prepared exactly the size of the frames, and having holes in their edges to fit and correspond with the bolts, and be held securely and evenly in place upon the side of the outside frames. This completes a queen-cage into which the bees from the outside are unrestrained. Combs may be built from foundation or transferred into them from other frames.

It is also furnished with projecting wires inserted in the ends of the top-bars, near each of the four upper corners, and which wires are capable of removal to the other corresponding corners of the arrangement upon its inversion. Reversion is said to be a preventive of swarming by turning the queen-cells out of natural position, and being destroyed by the bees."

In March, 1887, strips of perforated zinc were substituted for the narrow frames, except those on the outside, and the extra frames consigned to the wood-pile. In the first place the zincs were fitted into saw kerfs made in the edge of the frames, but finally found a permanency lying flat on the outside of the

frames.



After the addition of the perforated side zincs the fixture remained without change for two years until the spring of 1889, when the ¼-inch crimp was given to the sheet of zinc on the outside and the remaining narrow frames were omitted. This afforded ample space for adjusting the nuts and the projecting bolt-heads.

In the fall of 1889, the nuts were changed for metal wedges fitting into slots with which the bolts are provided. A reversing device, also, was made to take the place of the old nails and wires as a more convenient arrangement.

The Hive.

It is advisable to adopt a plain, simple and serviceable hive, where the production of honey is the object. A plain, unadorned but well painted and constructed box is sufficient. Its construction should be accurate in all its parts. The square, box joint is the easiest to construct and the best for extensive manipulation. The corners to guard against warping should be halved and nailed from both ways. The size should be determined with reference to the use to which it is to be put and the requirements of the bees. It should be of sufficient size and shape to afford a good amount of surplus space above and at the side of the brood nest. All the hives in the apiary should be of a uniform size and interchangeable.

The Frame.

All frames in the apiary should fit equally as well into one hive as another. The top and bottom bars need to be about $\frac{1}{2}$ inch in thickness and the uprights should be not less than $\frac{3}{8}$ inch thick to maintain square and strong combs for ease and hasty manipulation. The best width for both brood and extracting is one inch. Some frame that is a recognized standard is the best to choose on account of the difference in convenience in obtaining future supplies. The shape or size of the frame makes little or no difference in the wintering or the amount of honey obtained.

The frame to be recommended is $9\frac{1}{8}$ x $17\frac{5}{8}$ inches, which may be safely declared the standard frame for the future.

Reversion.

Reversion is one of the most necessary accomplishments connected mith the manipulation of the modern bee-hive. Inversion of the combs received a decided impetus about seven years ago, and though it then attained a considerable degree of perfection it may, perhaps, be truthfully said to be on the wain. This, nevertheless, may not be satisfactory proof of its impracticability and that it may not be successfully revived again.

By the inversion of the brood combs the bees are caused to extend the combs and fasten them to the bottom bars of the frames thus utilizing all the available space within the frame. This increased brood-rearing space in ordinary hives is 15 to 30 per cent, and an-

nihilates large clustering spaces occupied by idle bees. When honey is stored in the lower portions of the brood combs inversion of the combs causes the bees to carry it above the brood again in which case if the upper portions should chance to be already full of brood they will be obliged to carry it into the surplus receptacles, and as the honey is moved and the lower cells become vacant the queen may have a chance to fill them with eggs.

Another decided advantage of reversion is the turning of the queen cells upside down which is contrary to Nature, and for which reason the cells will be neglected by the bees, destroyed by the queen and new ones began the other side up.

As a colony requires to have queen cells nearly ready to hatch before casting a swarm the operation of inversion projects the time of swarming into the future at from five to seven days.

Contraction.

All bee-keepers who have produced honey to much extent, have adopted, or have long wished to adopt some method of forcing the bees into the surplus receptacles earlier than it is their tendency to enter them.

The principal method of contraction is by the use of blocks of wood in the end of the hives by the side of the combs containing brood and retaining few combs for a brood nest. It is the tendency of the queen to spread the brood through more combs than is really necessary. Sometimes the queen will fill and maintain ten to twelve frames full of brood, and this number affords so much vacant space for bees to "stand around" that they seem to almost never enter the sections for

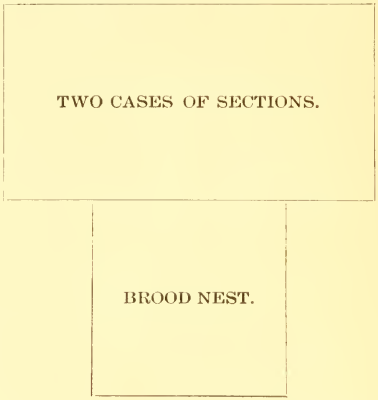
the construction of combs and the storage of honey.

With the present methods and appliances the results intended for realization have been only in a measure satisfactory and it is evident that when it paid for the labor and expense incurred it did nothing more and will not find a general acceptance by the great mass of honey producers.

In any of the great functions which have striven to be entered as a more modern and scientific manipulation of the hive, i. e., reversion, contraction and exclusion, we find those implements and contrivances for the accomplishment to consist of a single and separate line for the purpose of a single, final result. What is needed for one is as entirely useless for the other. The fact that the manipulations were most advantageous performed at different and distinct periods in the season have left unused any combination.

With the surplus at one side of the brood apartment the bees are nearly always slow in

the work that always pleases the bee-keeper more than anything else. At first large hives were used but to avoid so many bees staying closely in the brood nest the hives were in many apiaries reduced to hold eight frames;



and still more until the brood nest and surplus apartment necessarily assumed a shape shown in the diagram.

The instances are not very rare where the brood nests are contracted to four or five

frames to pass the honey harvest.

It is not unusual that there are queens prolific enough to maintain ten combs full of brood up to the end of the harvest when the brood cannot but hatch a worthless set of some 50,000 idle boarders. All bees that hatch out in the ten days preceeding the end of the harvest are nearly useless also. These two numbers equal 75,000 bees. Reckoning 7,000 bees to a pound it is $10\frac{1}{2}$ pounds. Calling a pound of bees a product of three pounds of honey and the time and labor of the old bees in caring for the brood equal to two pounds it is found to be equal to a total equivalent of $52\frac{1}{2}$ pounds of honey which because of the future support of these bees is worse than lost. Not all colonies show so much loss as this but there usually is from five to ten such colonies in every one hundred. Most of those colonies that are not able to swarm before the harvest are found to have the largest quantities of brood in their hives during the latter part of the harvest when it can hatch nothing but idle consumers.

Exclusion.

Exclusion, is as essential in the management of bees as is reversion and contraction. Exclusion is a term that when applied to a bee-hive means that some of the bees, the queen or drones, are excluded from some of the apartments of the hive. When there is a large number of drones in a colony we may wait until they are out of the hive to fly, and place strips of perforated metal at the entrance that allows worker bees to pass through it to enter the hive when the drones on account of their large size must stay outside.

Exclusion for the queen, is understood as the application of perforated metal at the entrance to prevent the queen leaving with a swarm; but exclusion in its broader sense

as now in use is accomplished by the use of the queen-excluding honey-board which prevents the queen entering the surplus apartments, which if she were allowed to do would result in the sections or extracting combs being filled with brood instead of honey. The honey-board is a result of brood-nest contraction as the cenfinement of the queen to the contracted brood nest in the lower story, and then upcn as few ccmbs as possible, creates a disposition to seek more spacious quarters. Again the combs usually left in the contracted brood nest are entirely of worker cells so that the want of eggs in drone cells starts the queen out for a ramble through the hive and on this account we find the queen so anctious to go above and put the eggs in the surplus combs.

It is a very satisfying to us when the combs for honey contain honey exclusively, and the combs that contain brood contain brood exclusively. This cannot be done until the queen is excluded from the surplus apartments

and confined closely within the brood nest.

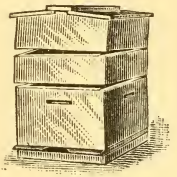
Old and New.

The posted reader of this book may have learned that the naked manipulations beyond the possession of hives, frames and cases that are in any way scientific in their applciation, and which may almost be called the great fundamental principles are Reversion, Contraction and Exclusion. This is in complete accord with my belief. It is already known that the fixtures in use are single, expensive and unsatisfactory, as compared to their advantages, insomuch that those contrivances and methods are continually shifting or being abandoned. Many of them, when they accomplished one purpose rendered another, perhaps a more worthy one, totally unavailing. In the following pages is shown a new, philosophical and the only satisfactory method of brood-nest Inver-

sion, Contraction and Exclusion yet invented.

Mark the words! I say, brood-nest; not hive Inversion, Contraction and Exclusion. I have never yet recognized a need to invert, or contract a whole hive.

The present and future interests of apiculture need what it almost demands, that is, a more practical and thorough method of accomplishing the three principles previously mentioned.



The New System.

The idea of the inventor in the original conception was based upon the contraction of the brood nest without material interferance with the regular hive space.

That the queen is the center round which nearly all else revolves, and which center, if properly adjusted, will conform the rest to the apiarist's pleasure.

That honey should be stored as near to the brood as possible and the interference of the queen prevented by establishing a defined limit for her operations.

That the reversible hive idea is too broad, and the reversible frame an idea that is too narrow for practical or practicable application.

The Queen-Restrictor.

The Queen-Restrictor consists of:

First, from two to eight bee-comb frames situated side by side, separated by a strip of queen-excluding zinc.

Second, strips of excluding metal crimped or provided with slots for the frames to rest in.

Third, a broad sheet of excluding metal crimped at the edges, fastened upon the outside faces of the outside frames.

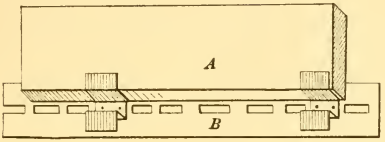
Fourth, the frames, from two to eight, the outward sides of the outside frames having the sheets of excluding metal secured upon them and a strip of excluding metal between each frame are fastened together by inserting a light bolt through the upright bars of the

frames from side to side. The fastening is completed by the simple adjustment of an ordinary nut or insertion of a wedge in a slot in the projecting bolt. One of these bolts is required for each end of the fixture.

Fifth, wires proceeding from staples or apertures situated in the center of the uprights and equally distant from the top or bottom of each outside frame, directly upward and then outward from the frame in time to rest upon the rabbets now in general use in bee-hives. One of these wires is needed at each side of the fixture. By withdrawing the feet of this wire turning them over and adjusting the same from the lower part of the device the principle of reversion is effected, by turning the complete outfit bottom upward.

Excluding strips are necessary at the openings between the bars of the frames and are made of ordinary perforated zinc. The clasp that forms the rest for the frames is best formed of a heavier grade of zinc than is the excluder and are made secure by rivets or

solder. In this way they are strengthened and made strong enough to withstand any



usage that they are liable to by the tension of the transverse clamp. The leaflike clasp lying upon the inside of the frames are necessarily small and sharp pointed to be easily and quickly adjusted. The frames are spaced $\frac{1}{4}$ or $\frac{3}{8}$ of an inch apart the main line of zinc lying upon the outside and overlaping the edge of the frames about 3–16 of an inch. These strips of zinc when ready for use being joined together at the opposite ends are continuous and hooplike, and instead of being wrapped around, as might be done, they are set up on edge and the frame pushed into them sidewise the bottom of the frame ahead.

The excluding sheets for the side of the

frames are constructed of the lightest grade of zinc and secured to the frames by two tacks or screws one each in the top and bottom bars and by the clamping bolts to the upright bars by passing through their crimped edges.

Reversing wires are utilized to accomplish the principle of reversion, and are made of No. 12 wire which is sufficiently strong to hold the weight of any five or six frames of brood. Reversion is accomplished by them with quickness and ease and in about the same manner as with reversible farmes except that the tension of the transverse bolts render unnecessary the projections in reversing devices for single frames to hold them in an upright position. It is the simplest reversing arrangement yet brought into utility, and is all that could be desired.

The clamps consist of $\frac{1}{4}$ inch bolts inserted in the end bars of the frames from side to side, and while they prevent the frames' and zincs' separation, they also hold them so they cannot slip up or down, and allow one frame

to drop down lower than another. Unless the combs are heavily loaded the excluding strips on the outside will nearly hold them in the right position without the aid of bolts. The length of the bolts is varied by the number of frames the Restrictor contains. For four frames the length is 6 inches; for five frames $7\frac{1}{2}$ inches; for six frames $8\frac{5}{8}$. The fastening is made by small wedges fitting into slots with which the projecting ends of the bolts are provided. One such bolt through each end of the device has proven amply sufficient.

Several devices have been experimented with, such as threads and nuts, and disc shaped contraction metals connected with hooked wires to hook over the edge of the outside frames that a half turn of the disc will bring the ends nearer together.

The Restrictor is best adapted in hives holding about sixteen frames so when the queen is confined to the five frames in the Restrictor there will be a good amount of space on either side for the arrangement of extract-

ing combs or wide frames of sections. The advantage of side storage will be spoken of again under contraction. Eight clean worker combs should be selected for brood combs and provided with single-frame reversing wires so when they are not in the Restrictor they may hang upon the rabbets and used as any other frame. The holes or staples provided in the end bars are as suited to the single-frame reversing wires as to Restrictor reversing wires.

The cost of the Restrictor is the minimum of all arrangements yet invented, and is as follows, which cost is figured upon a five-frame Restrictor, the size that I have designated as the standard. Eight new Langstroth frames are worth 20 cents. Four excluding strips of perforated metal at, 15 cents; two sheets of excluding metal 9½ x 17⅜ at, 25 cents; sixteen single-frame reversing wires, 16 cents; two Restrictor-reversing wires 4 cents; two clamping bolts, 5 cents. Total cost of all, furnished new, 85 cents.

With the Restrictor, all the brood frames have reversing wires to make them manipulative like regular suspended frames, either in the brood nest or in the extracting stories. Beyond the eight or ten brood frames none of the others are changed, or any selection made as to what combs are kept in the brood chamber. Whether the extra combs in the brood chamber contain drone cells or not, it makes little difference, as before the queen is prepared to extend the brood outside of eight regulation brood combs it will be time to adjust the zincs and confine her operations. This part of the management is explained more fully in other parts of this book, so I will not follow it out any farther here.

Reversion.

With the use of the Queen-Restrictor comes a new plan of reversion. There has been no satisfactory reversible hive or frame yet invented. For this reason none have been generally adopted. Reversing hives was truly a great chore. When the hive was inverted it carried with it combs that needed no such inversion. The arrangement of the frames in such hive was expensive and laborious and the arrangement usually defeated the readily movable character of the frames. Reversing frames involved a large amount of fussy labor and, in itself alone, not a very desiarble result. The reversion of the Restrictor inverts the brood combs and nothing more, with the same manipulation that is required

to reverse a single frame. This inversion is calculated to cause the failure of the queen cells to mature. Some have said, or advanced the idea at least, that inversion causes the bees to destroy the queen cells because they are not in the natural position. I am not prepared to dispute the assertion, though I have never seen a worker bee attempt to destroy a queen cell when so placed. I have repeatedly noticed queens tearing them down directly after inversion and that, too, in the height of the swarming season. I am inclined to the belief that the bees neglect the inverted cells when the queen, under almost any circumstances, will destroy them. I also know that the bees refuse to care for these cells or feed the larvae before they are old enough to cap, but I have also known some colonies to care for them for a time but never knew a queen to hatch when the cell was inverted before it was capped. If they escaped destruction by the queen they seem to have starved or died from some cause that I could not de-

tect. This is a part of the system that is still open for experiment and verification.

I may cite the authority that I have noticed and that is, one of the claims made in the columns of the AMERICAN BEE JOURNAL, a few months ago, the report of the NORTH AMERICAN BEE-KEEPERS' SOCIETY, for 1885, and two short items that subsequently appeared in GLEANINGS IN BEE-CULTURE.

However, each and all of these appeared to be founded upon the theory that they will be destroyed because of the unnatural position which theory is not true in the case of other brood. I believe it is entirely uncertain how and to what extent the queen cells are destroyed because of inversion. When the combs are reversed it causes quantities of honey to be moved from the lower edges of the reversed combs and then a supply of empty cells are to have eggs placed in them. Altogether there is quite a disturbance in rearranging the brood chamber after reversion, and this may cause the neglect of the cells.

When the queen cells are very young they will be neglected from very slight causes. If this is theory, its substantiation is near at hand. It is three days from the time the egg is laid until it hatches and two more until the cell may be said to be started it may be seen that if there are queens raised and the combs are reversed once in five days the queens must be started in inverted cells. Queens may hatch from inverted cells, but to start them in inverted cells is decidedly contrary to the instincts of the bees.

The Queen-Restrictor, is admirably suited for reversion every five days or even every three days, requiring as it does, the manipulation that is required to reverse a single, reversible frame.

Contraction.

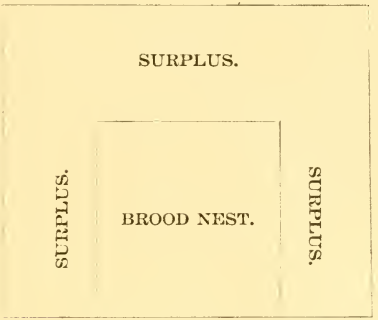
The Queen-Restrictor is especially adapted to contraction. With it only the brood space occupied by the queen undergoes change. That the Restrictor may contain one frame or be arranged to contain a baker's dozen makes it the most contractible device that can be invented. Contraction of the brood chamber contracts out of existence what should be the most accessible surplus space. The queen's laying space needs contraction but the surplus space never does. Some queens do not begin to lay to their full capacity until the honey harvest begins. Then they begin and keep it up at such a rate that it takes all the working bees to care for the brood. Starting into a honey harvest lasting fifteen to thirty days

with brood in four combs they will increase till at the end of the harvest there may be brood in fifteen to twenty combs. Such queens should be restricted to five combs at the beginning of the harvest. Other queens scatter it through the brood and surplus combs so that it makes slow, tedious labor in extracting from combs that are partly filled with honey and partly with brood. Many colonies spend nearly all the honey harvest gathering strength and when the harvest is ended they are then prepared to gather honey. This is a waste of time and labor. If a colony is not ready for the harvest when it begins they cannot get ready afterward. It requires 21 days from the egg to hatch a worker bee and 15 days more for it to begin work gathering honey. From this it may be seen that the eggs for the bees that gather honey must be laid 35 days previous to the end of the harvest. Any eggs that are laid later than this will produce bees that can assist but a few days in the work on the inside of the hive. In my experience I

have never known a honey harvest to last 30 days; and on this account I have determined to confine the queen upon five combs at or before swarming. How to manuge ten combs in a five frame Restrictor before the harvest is discussed elsewhere.

The Restrictor contracts the queen's laying space only, leaving all the other space for the storage of honey. It allows of contraction in such a way that the surplus receptacles may be arranged above and also on two sides of the combs that contain brood. Present contraction methods have first narrowed the hives down to eight and ten frames and driven the surplus upstairs. Then "dummies" have done still more until a narrow, indirect route to the surplus remains, that calls into use a disagreeable system of crowding. On many occasions the bees are crowded out of the entrance before they enter the surplus through a narrow parssage way of obstructions as the top bars of the frames, honey boards etc. make it.

On page 20, is the correct shape of the modern brood nest and surplus apartment and on this page is a more philisophically shaped one:



Honey is stored about the same as brood is spread, brginning in the center and extended in all directions, but slightly more upward than sidewise. If the shape of the surplus and brood apartment shown on page 20, is as correct as the one on this page, then the bees have made the mistake of conforming the shape of the cluster into a sphere.

To winter the bees in brood chambers whose shape corresponds with the accesibility of the surplus apartment in exclusive top storage they should be as in the following diagram:

Such a wintering chamber would not be tolerated for a single winter, while equally as poorly proportioned surplus apartments remain unaltered year after year.

Exclusion.

Exclusion, by the use of the Restrictor is of the most absolute kind. As the queen is confined upon the combs within it, she can lay eggs in those only and the remainder of the brood combs that may previously have been included in the brood nest may be moved away from the Restrictor, toward the ends of the hive and wide frames of sections or extracting combs placed between them, so that the traversing back and forth to the different brood combs through the sections encourages the bees to make an early start in them, which is an advantage of very great importance. Thus, practically, placing the sections in the center of the brood chamber, but in a manner that the queen cannot enter them.

By the time the queen is prepared to extend the egg-laying space to more than eight regular brood combs it is time to confine her to five clear worker combs. By this operation, the saving of drones heads from the knife or their destruction afterward is made, few if any eggs being laid in drone cells, while the bees leave it empty for them and wonder what ails the queen that there are no eggs placed therein.

Five frames is all that is necessary for brood during the harvest, and that they may be occupied by brood exclusively the Restrictor is occasionally reversed. The reversion for the destruction of queen cells also accomplishes this end of the system.

At the end of the harvest the combs outside of the Restrictor that were filled with brood when the queen was excluded from them have become empty of brood and, if not replaced by sections, are heavy with honey for extracting or wintering, while the five combs in the Restrictor, owing to reversion, contrac-

tion and exclusion are destitute of honey and filled as solidly with brood.

How and When to Use the Excluders, Contractors etc.

The reader, having made himself familiar with the workings and use of zincs, clamps, reversing wires, etc. as described in the foregoing pages will be ready to imagine the apiarist, on a pleasant June morning, loaded up with the bands of zinc strung upon his arms and his pockets filled with bolts and wires and all he can carry of zinc sheets, starting out into the apiary. Doubtless he intends to adjust all of the excluding strips and sheets and bolts and reversing wires at once.

This is not the correct usage of the fixtures. It is often more killful to know how to use an invention than it is to invent the same. The Restrictor is not necessarily applied

in any hive in a single day. It does not come into the apiary cyclone fashion—but as a quiet, gentle breeze. It comes with a general system of management commencing early in the season.

The sheets are the only thing to put on in June. The excluding strips, clamping bolts and reversing wires remain on the frames through the winter. In fact, they are used almost as if they were permanently attached to the frames. About the only thing they need to be removed for is to accommodate a less number of combs for small colonies, when to suit the will of the apiarist the clamping bolts and reversing wires may be taken out and frames and zinc strips separated and taken out until the number remaining is suitable for the smaller sized colony. In changing from five combs to a less number the necessity of a smaller and narrower reversing wire and clamping bolt is created, which is an extra expense of about 4 cents per colony. In an apiary of 50 colonies there

are usually about 40 colonies that will need all of the five combs contained in the Restrictor in the early spring, leaving 10 colonies to provide small clamps and reversing wires for.

The question, how to spread brood, when all these zinc-excluding strips are on the brood frames, will be asked. It is quite an easy matter to separats the frames in the center take out a frame of brood and insert an empty comb in its place leaving the full comb on the outside and which is to be provided with single-frame reversing wires and hung upon the rabbets the same as common frames. If there are five frames in the Restrictor, out of a full set of eight there will be three to hang upon such supports. The Restristor, in spring management is all complete except the side sheets are left off so as to allow the queen to use all the combs in the hive as fast possible. But to return to the spreading of brood. With these five frames fastened together and reversible, instead of being cofined to the prevalent methods of spreading the

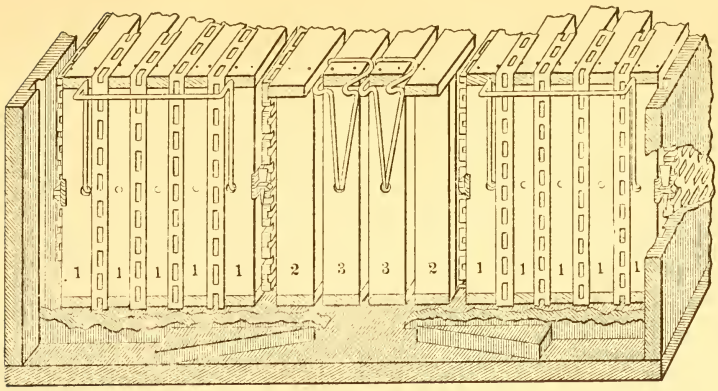
brood horizontally, we may now adopt the plan of having the combs filled up to the top bars and downward to the bottom bars, by the simple reversion of the combs; thus getting more brood in less comb.

Special Manipulations.

There is several very interesing manipulations that may be performed in using the Queen-Restrictor the most important of which probably is, the arrangement of two laying queens in one brood chamber. Having two queens in one brood chamber in early spring possesses particular advantages in building up the weak colonies, by having two colonies, one of which one is strong and the other weak, arranged in the opposite ends of a large hive. This is to be done by uniting the colonies, then dividing the brood in two Restrictors close together and introducing a queen to

each part. Empty combs should be put in on the inside nearest each other and the rate at which these inside combs will be filled with eggs is truly astonishing—the united warmth of two colonies, I believe, being equal to three separate ones. One thing to be watched is, to keep some empty comb between the two brood nests inside the Restrictor.

As the season advances and the queens require more than five combs for egg laying, empty ones may be put in the Restrictors. The Restrictors are to be moved apart and the extra combs of brood set between them. When four or five combs have been set out of the Restrictors long enough for the eggs all to be hatched and these combs have the appearance of queenlessness virgin queens may be introduced by the caging method. Thus, the laying queens are in the distant ends of the hive and the virgin at liberty near the entrance. As good or a better way is to use two frames of brood with a wide frame of sections on each side of them.

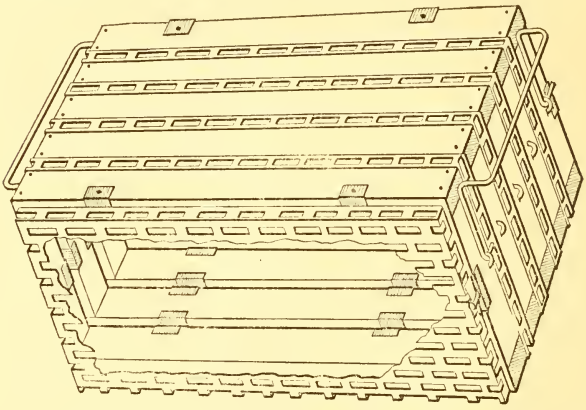


The above cut shows the arrangement of the frames for the maintenance of two laying queens and one virgin queen in one brood chamber. The frames 1, 1, 1, 1, 1, and 1, 1, 1, 1, 1, are in Restrictors and each set is occupied by a laying queen. The frames, 2. 2, ordinary frames

that have no brood in them, and 3, 3, are two frames of brood that have been in the Restrictors but are now provided with single-frame reversing wires to hang upon the rabbets and by the time the eggs have all hatched and the combs are covered with young bees a virgin queen may be introduced.

The foregoing cut represents the hive as having the front board nearly cut away. and entrance blocks in position that the young queen may be guided to her own part of the hive on returning from a fly. If young queens are not to be introduced sections and extracting combs may be arranged in place of the center combs and with a wider hive there will be surplus room on the distant sides of the Restrictors, and then the apiarist may realize the great advantage in the system, which is that as soon as a loaded bee is inside the entrance she is just as soon in the honey chamber. and has not to wend her way across the crowded brood combs and then through a narrow and crooked passage to reach the hon-

ey chamber almost exhausted. The New System transposes these apartments. With the prevalent methods the brood nest is readily accessible and the surplus difficult to get into. With the New System the surplus is most readily accessible and the Queen-Restrictor as difficult as excluding zinc may make it.



This cut shows a complete Restrictor with the zincs, clamps and reversing wires in use. A large portion of the side sheet is

cut away to show the position of the clasps on the inside. They are shown as made of small pieces of galvanized iron. The clasps are better when constructed of tinned wire. The clamp also is more convenient and serves the purpose equally as well to be a straight piece of copper wire to be bent over at the ends.

As a matter of economy a five-frame reversing wire is just right for four frames, and likewise the three-frame is suited to two frames.

In the cut is also shown a new plan for attaching the reversing wires to the frames by staples which is deemed more satisfactory than the old for Restrictors or single frames.

It will, doubtless, be judged that there is much machinery in this arrangement which, to consider the five frames in the Restrictor, may be a fact, but when it is considered that for fifty frames in a hive it only requires machinery for five, should convince that the machinery has been gathered into one place, when, to distribute it, there is comparatively little. Yours for Honey.