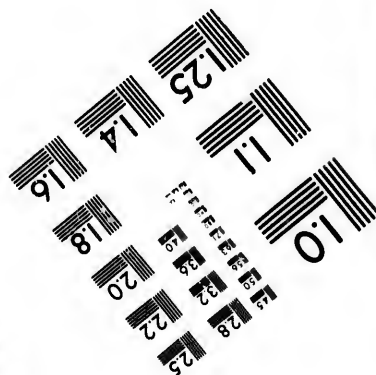
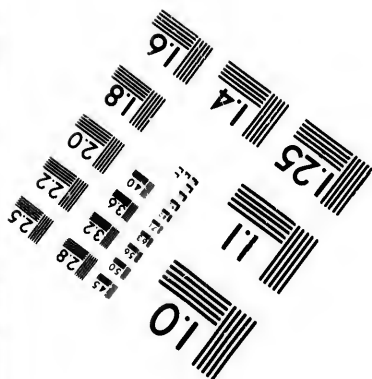
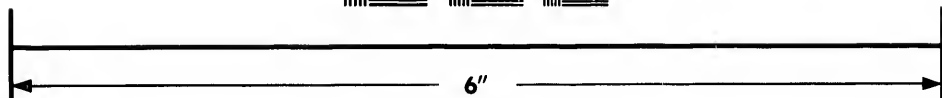
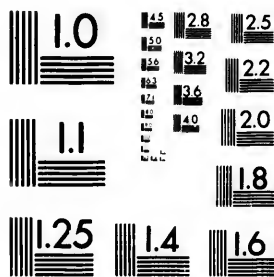
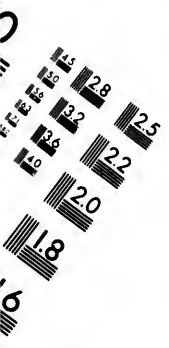


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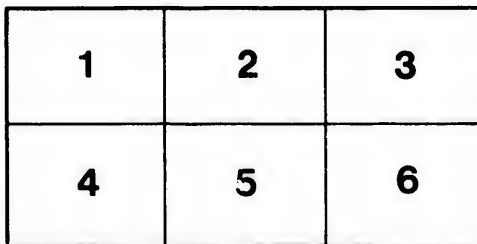
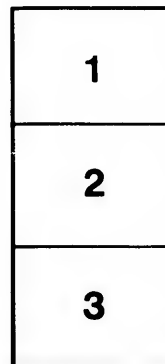
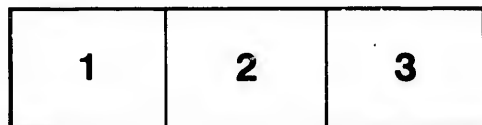
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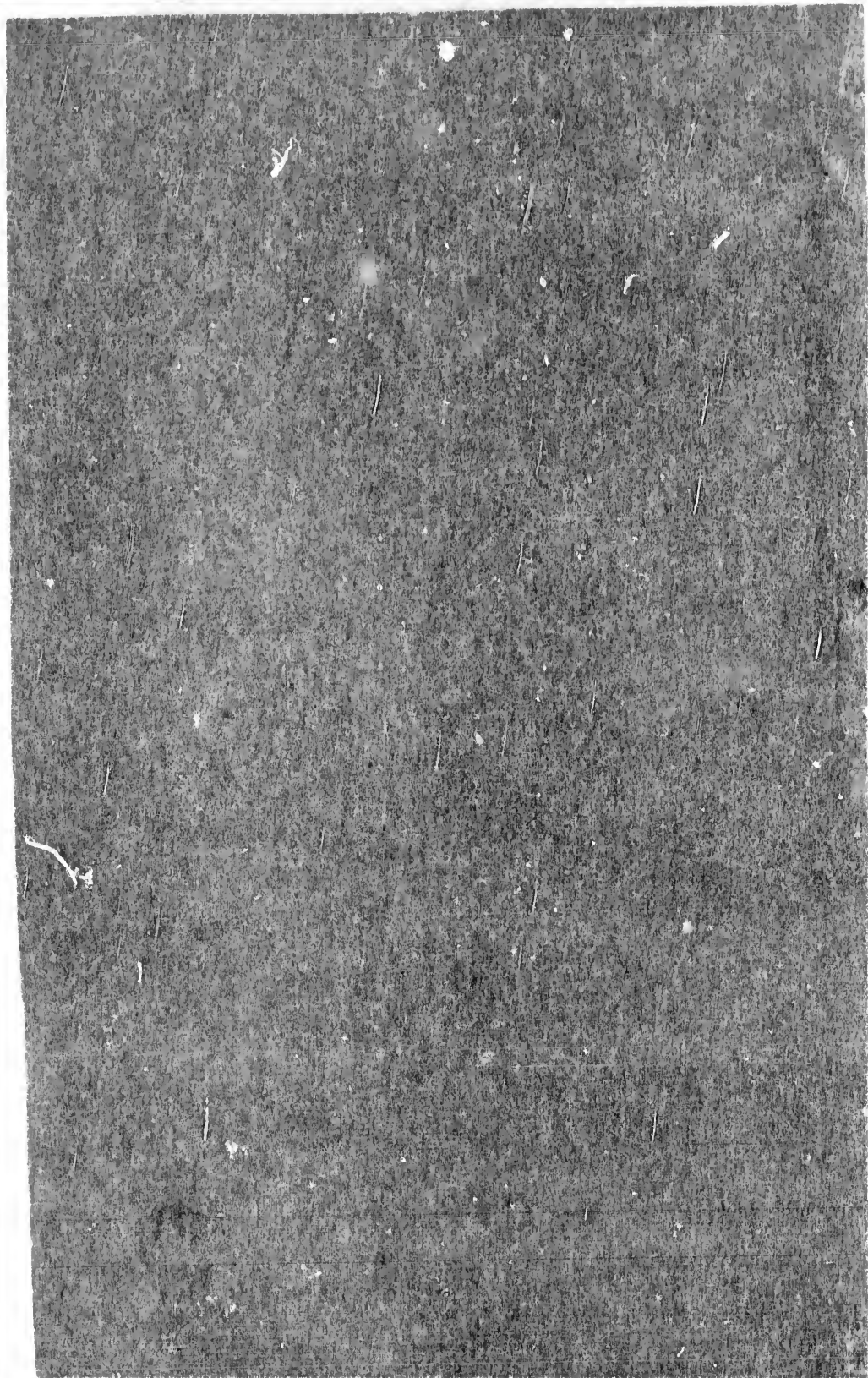


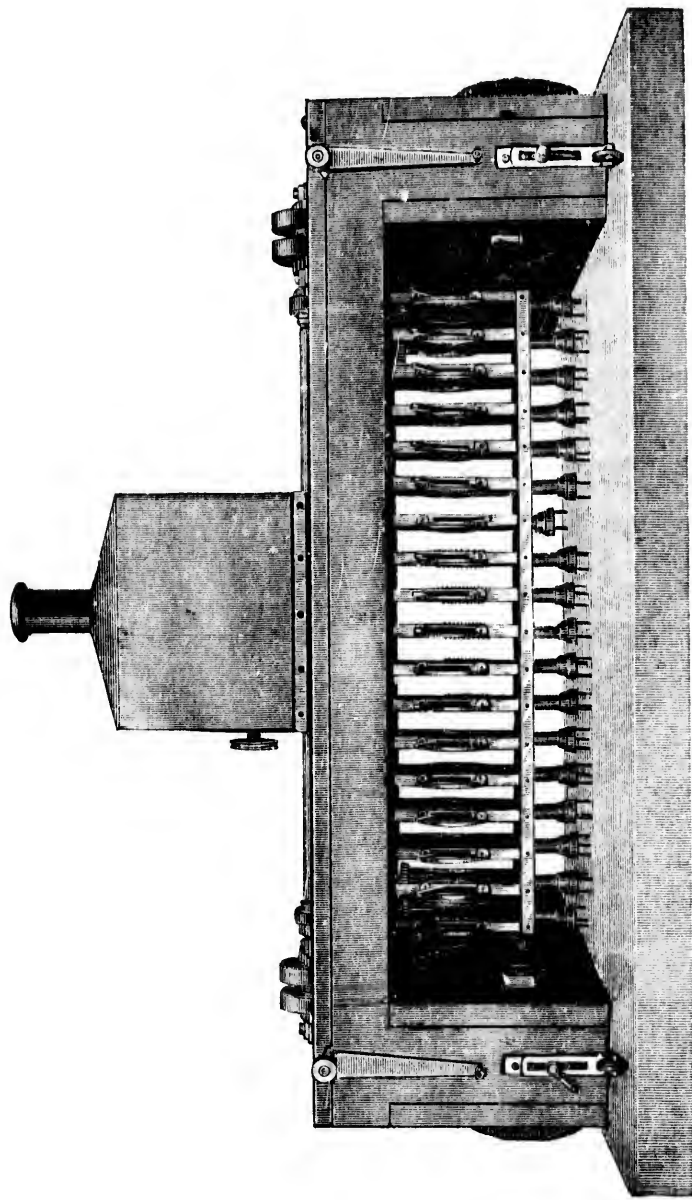
ROMAINE'S
MODERN
STEAM FARMER

HAMILTON, ONT.:
GRIFFIN & KIDNER, PRINTERS, 47 KING WILLIAM ST.

1887.

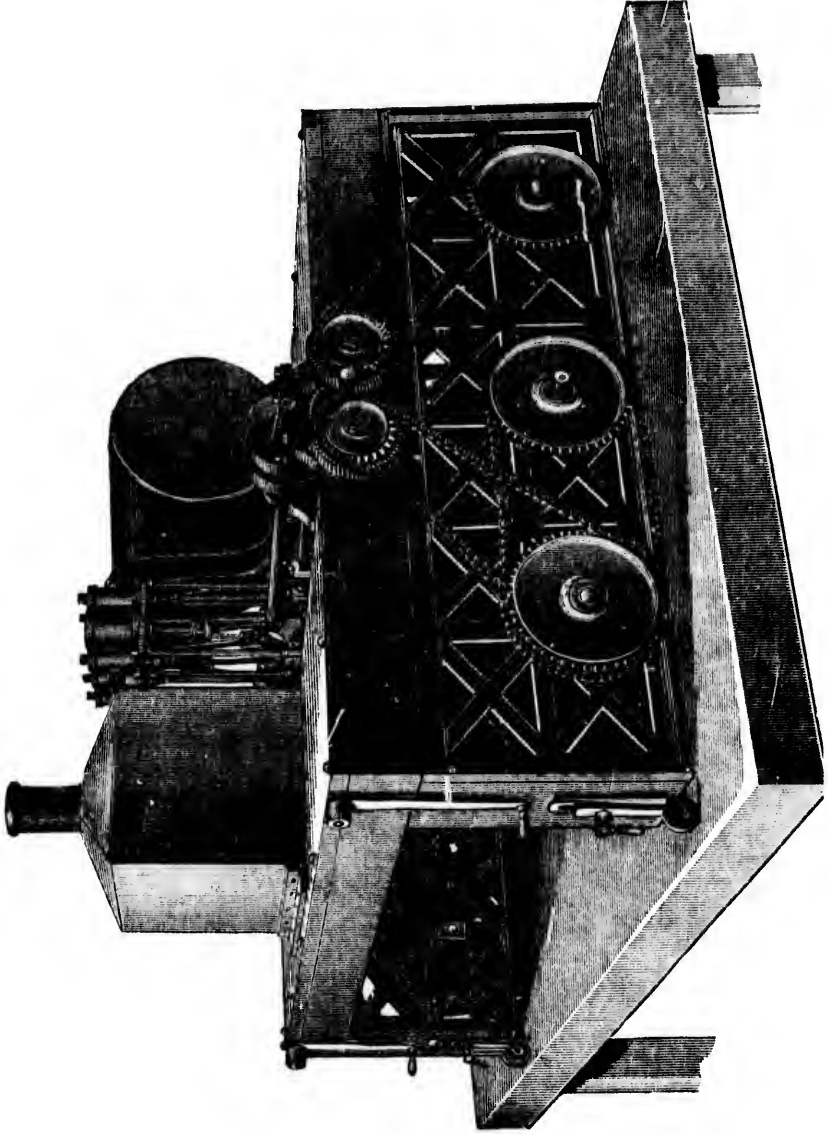






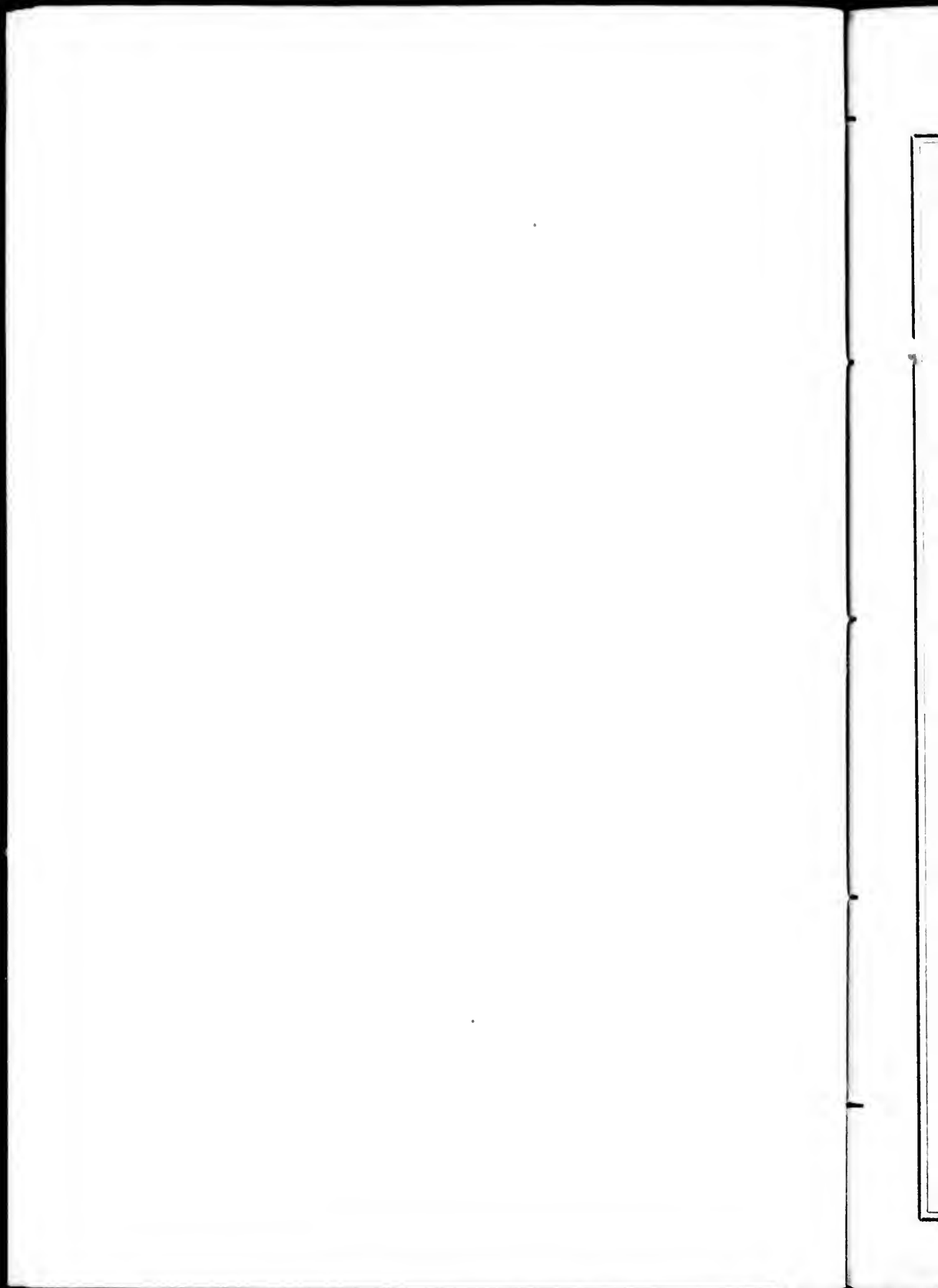
FRONT VIEW OF ROMAINE'S STEAM FARMER.





END VIEW OF HOWLAND'S STEAM FARMER

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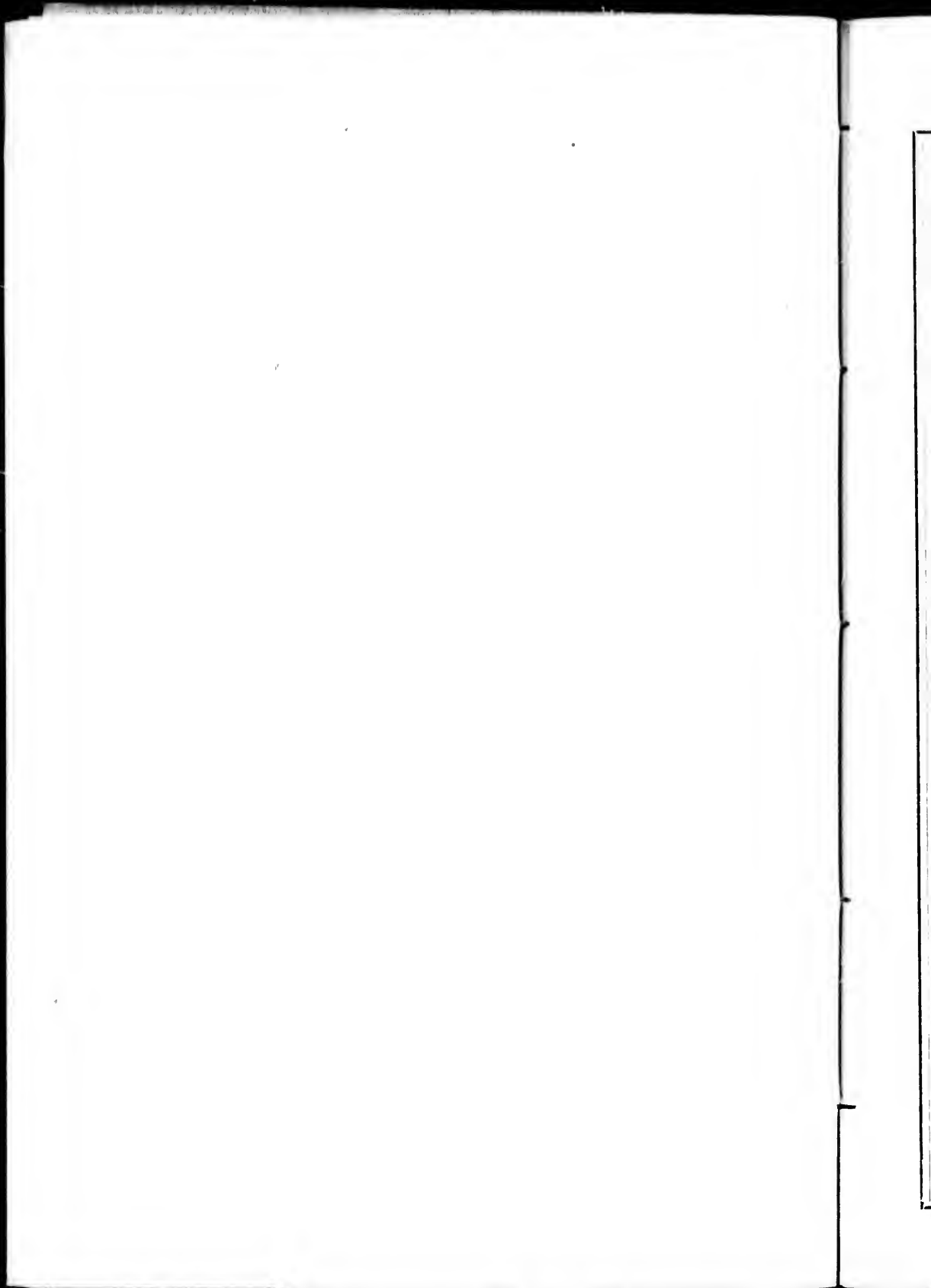


ROMAINE'S
MODERN
STEAM FARMER

THIS MACHINE IS INTENDED TO DO NEARLY ALL THE WORK OF THE
FARM, WITHOUT THE AID OF HORSE LABOR, FAR MORE
CHEAPLY AND THOROUGHLY THAN IT IS
PERFORMED BY PRESENT
METHODS.

GRIFFIN & KIDNER, PRINTERS, HAMILTON, ONT.

1887.

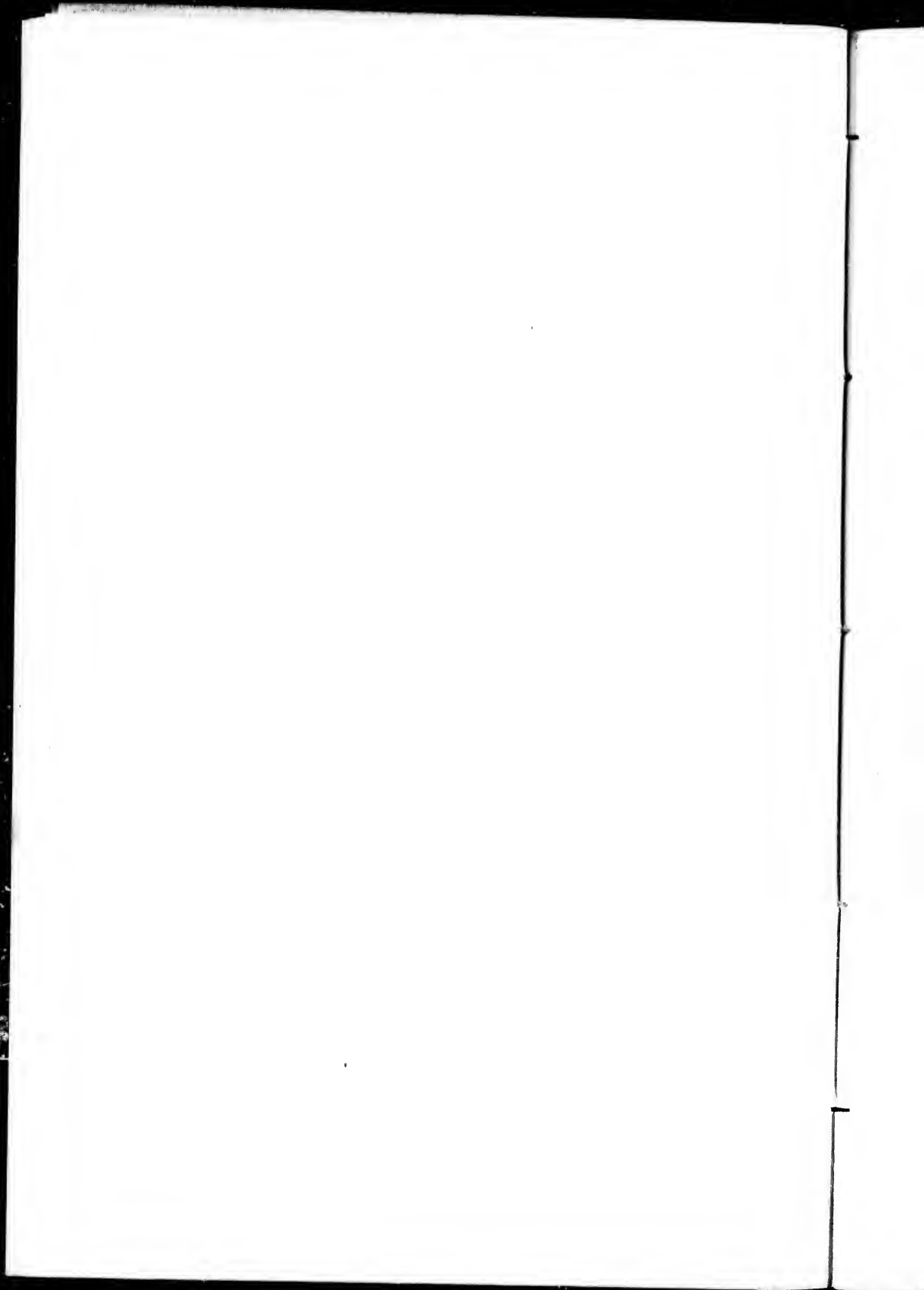


INTRODUCTION.

The writer of this pamphlet from his earliest days has lived upon a farm, and is conversant with all the work thereof, in its minutest details. He has also had abundant opportunity of observing the methods adopted by the most advanced agriculturists of the age, and has studied this great science in its scientific aspects, and should therefore be in a position to say something from a farmer's standpoint as to the probable merits of this invention, and its adaptability to the work which it claims to perform.

He has no hesitation in expressing the conviction that the principles sought by Mr. Romaine in the construction of THE MODERN STEAM FARMER, namely, cultivating the soil by means of *rotatory* traction, and stirring it without *foot* of man or beast treading upon it, will eventually revolutionize the present processes of agriculture.

All this is claimed by the invention herein described, and although the writer can say nothing from the standpoint of a machinist, (that is said by competent authorities elsewhere), he sees no obstacle in the line of agriculture that should hinder the successful working of this machine on all large farms where the land is not broken or very uneven.



ROMAINE'S STEAM FARMER.

The Little Use, comparatively, that has hitherto been Made of Steam in the Various Processes of Tillage.

It is a very singular fact that hitherto steam has been employed to so small an extent in the various departments of agriculture. It is true that it is now being employed in performing the work of threshing, in perhaps a majority of instances, and in a limited degree in assisting with the various operations connected with the preparation of food for stock ; but it is equally true that in the more difficult and labored operations of tillage it has up to the present had almost no place. And this is all the more wonderful when we consider the importance of these operations. While steam has made the waters of the ocean to subserve the purposes of a rapid highway, drawing nations nearer rather than separating them ; while it has brought the extremes of continents into proximity by means of the iron horse ; while it prepares equally the garments with which we are clothed, and the most delicate and intricate decorations that adorn these garments, it still sees man plodding on in conducting the operations of tillage in much the same way that these were preformed some centuries ago.

How Accounted For.

While this fact is apparent to the most careless observer, it is not so easily accounted for. It cannot be that the inventive genius of the race has reached the limit of attainment and is beating a retreat from the mighty material problems as yet unsolved. It cannot be that there is anything so much more difficult inherently in the processes of agriculture than in those of other industries. Nay ; the spinning of a single thread is certainly a more difficult operation in itself than stirring a piece of soil ; and yet, while steam has been taught to perform the one operation infinitely more easily than the most skilled housewife can do it, that which is surely less complex has virtually baffled every effort to the successful application of steam to its performance.

It may be that the bent of human genius has not been fastened upon this branch of the world's work as offering a hopeful or remunerative field. If so, it is surpassingly strange. It is the principal business of the ships of nations to carry the products of the soil in one form or another from shore to shore, and of railways to do the same from place to place on land : but surely the *production* of those products is of far more importance than their *transit*, for without the first the second class of operations would not be

required, and their production in the *easiest* and most effective way and at the *lowest* possible cost is a problem that might well engage the attention alike of the peasant and the king.

It is possible, too, that the attempts that have hitherto been made in this direction (for attempts have been made) have been based upon false premises. Indeed this is almost certain. Thousands of years before Cincinnatus followed the plough beside his neat little Roman cottage in fields that smiled on Tiber, the principle that has shaped the tillage of the world was propounded, whether by Tubal-Cain or later, mankind will never know. At any rate, it was practised alike by the Philistine in the days of Saul, the peasant of Attica in the time of Miltiades, and in earlier and later epochs amongst many nations and peoples widely scattered, and is now adopted by every nation on the earth that pretends to cultivate the soil. We refer to that mode, based upon the principle of doing it by means of *sliding traction*, which governs nearly all the methods now in vogue, as harrowing and cultivating, but more particularly that operation called *ploughing*, which up to the present time has been looked upon as indispensable to the successful production of a seed-bed for crops on a large scale.

So wedded to this method has the world become that anyone who has the hardihood to pronounce the principle as *radically defective* must first encase himself in armour that is scorn-proof. Ancient principles are venerable as well as ancient institutions, and when encrusted in the successive coatings of the approval of the centuries, it will take a sharp mattock indeed to break the encasement; and yet this is the very task that the inventor of the Modern Steam Farmer has taken upon himself. In the calm confidence of full assurance he approaches this mountain with the full expectation that it will one day become a plain, although he may not live to see it. Beside the cemetery where his ashes are soon to lie the peasant will till the soil by a very different process. He charges the principle as being *defective at its base*, *defective at its centre*, and *defective at its apex*—*wholly defective*, notwithstanding the approval of the generations of, it may be, fifty buried centuries.

Tillage by the Methods of Sliding and Rotatory Traction Compared.

Now, reader, come and let us reason together for a little. You are aware that it is a fundamental law in mechanics, that the amount of resistance to a *sliding* traction is much greater than to that of a *rotating*. Now, the methods of tillage by means of the plough, etc., are conducted on the former principle, and the power that propels these implements is therefore much greater than that required to perform these operations on the principle of *rotatory motion*, had we the proper implements and facilities for conducting them on this principle. The proportionate difference in the amount of the power required will be apparent if we compare the difference in the amount of the power required to draw a certain weight over the surface of the earth in the form of a wagon or in the form of a sleigh, when the ground is bare. Fancy our farmers performing all the operations of the farm requiring the use of the wagon in summer by means of the iron-shod sled! In very despair they would every one forsake the heritage of his father and

seek some more auspicious means of making a livelihood. Yet this is just the proportionate difference in the amount of power required to till the soil by the processes of sliding or cleaving and revolving motion, allowing something at the same time for a certain amount of sliding friction inseparable from cultivation on any principle, but which may be reduced to an insignificant quantity in many of the operations of tillage.

Then, with all the utility of the plough, in the absence of a better implement, its use is liable to grave objections. Its sliding, or it might better be termed cleaving or dragging motion, tends to give a degree of *impaction* to the soil which is very undesirable, and this is increased in the ratio of the dampness of the soil operated on. In sunny, tropical climates, where for months together the lands remain in a friable state through the influence of the sun's rays, this is less objectionable, but in stiff clay lands, or even those less tenacious in the temperate regions, it can only be used to the best advantage just at the auspicious moment of dryness, which, alas, too often does not come until the best season for sowing has passed away. When the owner of a clay farm has many acres to till, all of which is equally unfit for tillage up till a certain date, and all of which becomes equally ready for these operations at that date, and he is conscious that he has not the means of overtaking these operations in season, in his perplexity he is sure to begin work at too early a day, with the result that his lands become more and more impacted, and therefore more and more difficult to till, and less and less productive.

Evils Resulting from Impaction of the Soil.

The impaction of clay soils is also very materially enhanced by the *treading*, consequent upon the performance of these processes, both of man and beast. Draw a plough over a given surface for years and its pressure upon that surface, particularly where the soil is clay, closes the apertures through which the processes of filtration and aeration were performed while the same soils were in a virgin state, and therefore not only prevents them from unlocking their food-producing treasures, but also from gathering more from the aqueous and aerial domain, as we shall see further on. This explains the fact which every settler in a new clay country has observed, that when first cleared the waters remain but a short time on low places, until they disappear, mostly by filtration, and without the aid of surface drains; whereas, after a time, unless kept well drained on the surface, they disappear only by the process of evaporation, which means sure death to vegetation. By the time that lands are tilled a few years there is no part of the subsoil, plough-deep, that has not been further pressed together by the tramping of horse hoofs, supporting bodies weighing from 1000 lbs. to 2000 lbs., which in time suspends all relations between the vegetative treasures of the under soil and the elements, calamitous to high attainment in agriculture, and only mitigated by the action of frosts in climates where this reaches beyond the line of cultivation.

Then the *treading* necessitated in preparing a seed-bed, in performing the various operations of sowing, harrowing, cultivating, rolling, etc., tends to pack the soil upon its surface, just in proportion to its dampness. The

operation of ploughing clay lands that are a little damp often necessitates a much larger amount of labor in preparing them for sowing and in sowing them than was required to plough them, and by the time the work is completed their under surfaces are in a worse condition than before the plough had been driven through their bosom, and yet this is just a necessary evil that cannot be overcome with the present methods of tillage.

The evils that result from *impaction* of the soil in the performance of the processes of agriculture are very great. We make bold to say that the losses here are more annually than the revenues that pass through the hands of our Finance Minister. This process, the opposite of pulverization, hinders vegetation in proportion to its extent, and conversely pulverization, or attrition, promotes it. Plant food in the soil cannot be gathered by rootlets which fail to come in contact with it, and these cannot come in contact with nutriment in soils which the rootlets cannot penetrate. Every pore in the soil that is closed by impaction, is just a door locked up, which forbids the foraging of plant life there, as is manifest by the futile effort of rootlets to penetrate a dry clod to which they may be contiguous. All plant life is sustained by elements found either in the soil itself, or furnished it from some outward source. Air and rain water furnish unfailing sources for replenishing the loss sustained in producing plant life, and the soil has a marvellous power of extracting these elements of growth in favorable conditions, but under other conditions is powerless to secure them. The more perfect the state of pulverization, the more competent is the tillable portions of the earth to perform this work. It follows then that though rain water fall on earth which it cannot penetrate, it cannot give of its treasures held in solution to particles of soil which do not come in contact with it, and so of the air.

Again, it is said that some subsoils contain mineral ingredients as potash, lime, etc., sufficient to produce many thousands of crops of wheat, within, say two feet of the surface. If, at a depth of six or eight inches, the treading of horse hoofs and the weight of the plough, so pack what is below (and this is certainly the tendency), that the plants cannot forage deeper, all this vast store-house of substance will no more avail than though it lay near the axis of our earth. This furnishes the explanation why on lighter and less rich soils other things being equal, the farmers generally distance their fellows in material advancement, who live upon clay farms, though intrinsically far more fertile.

Remedial Measures.

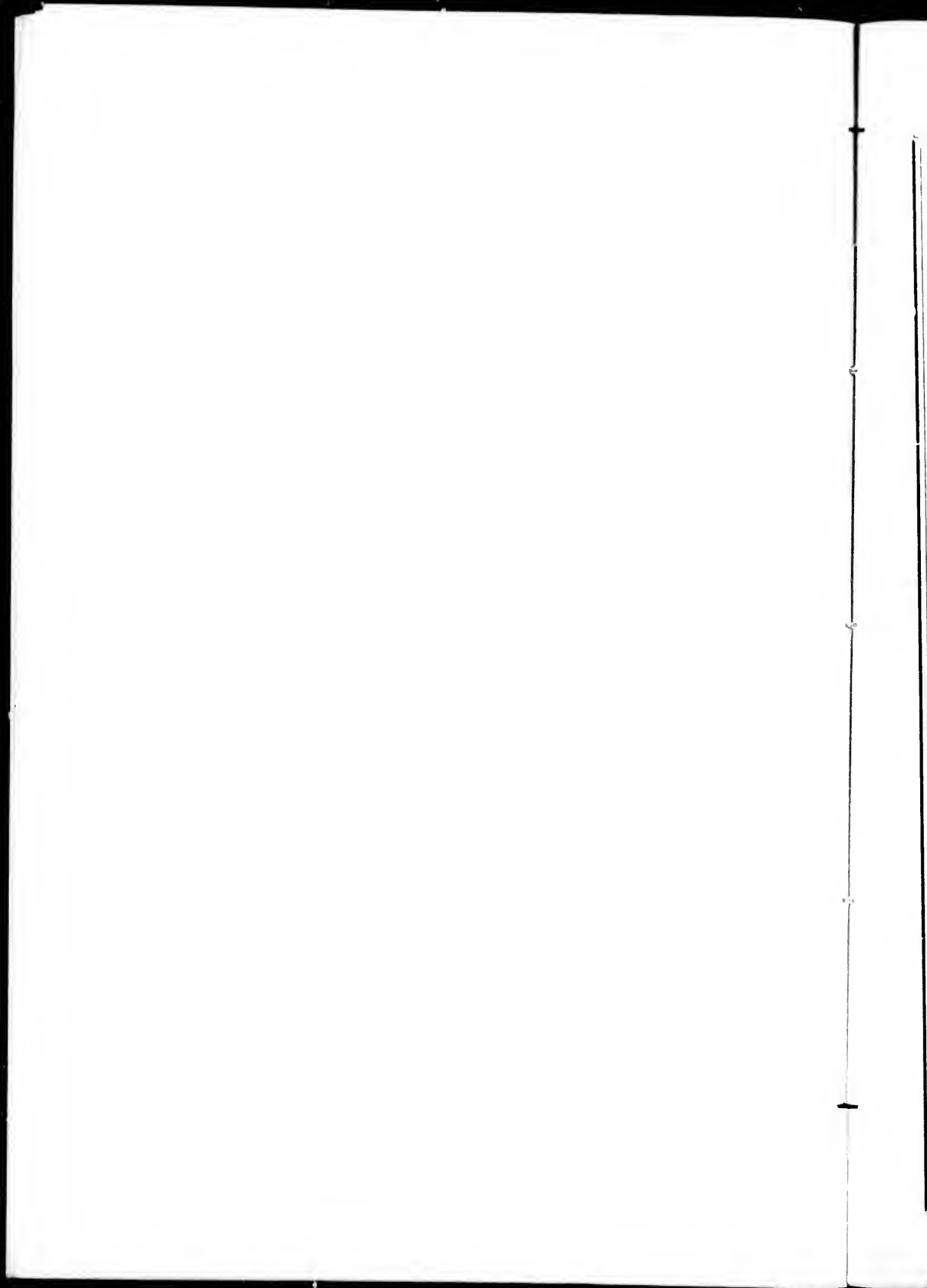
Any means that can be adopted to mitigate the evils resulting from the impaction of the soil should be eagerly embraced by the agricultural world. Underdraining, where adopted, has brought much relief, but while it mitigates the evils resulting from existing methods of cultivation, it does not remove them, for the tread of man and beast still presses upon the upturned surface, where they partially hinder the very effect which they are seeking—the pulverization of the soil. The gardener does not allow even a dog to tread upon his newly pulverized beds, and is he unwise in his desire? He knows very well that the more perfect the pulverization, the more perfect will be the processes of aeration and absorption, and in pro-

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portion with the perfection of these will be the perfection of the growth he is seeking.

The Great Remedy.

In the absence of better methods the agricultural world has acted wisely in clinging to these old-time ones ; indeed it could not have done otherwise ; but if it can be demonstrated there is a better and a much cheaper way, and we claim that it can—that is one main object in view in the issuing of this pamphlet—that portion of the community will stand sadly in its own light which does not try to put that better method into practice. If there is any plan by which the operations of tillage may be converted from a *sliding* or *dragging* to a *rotatory* motion, and thus reducing the exhaustion of power by more than *one-half*, its advent will surely be hailed with delight. If there is any machine that can be so propelled that it will obviate the necessity to a very large extent of the use of team help on the farm, and that will perform the processes now secured by the use of the plough, harrow, scarifier, horse hoe, cultivator, and binder and thresher, the intelligence of this age will surely not shut its eyes and close its ears to the claims made in its behalf, without earnest investigation, and when the claim is made that the implement will perform all this, without necessitating the treading of a single hoof or foot upon the land so operated upon, and with no other motive power than that of steam, the leaders of the farming world will be recreant to duty if they do not stay a moment amid the restless hurry of the age, and investigate for themselves, with a scrutiny the most rigid and impartial.

It is just such a machine that this little work proposes to make known to the agricultural world, and which has been denominated by the Inventor, Mr. Robert Romaine, Ottawa, Carleton County, Canada, "ROMAINE'S MODERN STEAM FARMER." Patents have been obtained for it in Europe, the United States and Canada.

The Nature of this Invention.

(1). This machine is intended to place in the hands of Farmers, Gardeners and others who require it, a powerful steam, self-propelling locomotive machine and apparatus, supported and propelled by means of a series of broad carrying wheels, which machinery and apparatus are suspended high enough above the ground to permit them to pass over the growing crops, until they have attained a height of about four feet, without injuring them, in order to cultivate, hoe, earth up and repeatedly stir the soil between the drilled rows of grain or root crops.

It is by preference made of four steel girders suitably braced transversely, and covered with a strong and creosoted plank flooring, appearing like and forming a species of portable or locomotive bridge, which may be made of different lengths to suit requirements, but which, as shown in the engraving, is about 25 feet long and 16 feet broad, thus enabling it to cultivate, or harvest a strip of land about twenty-two and a half feet wide at one time. Although the rate of speed at which it will travel will be usually two miles an hour, it may be made to travel at different rates of speed to suit the work in hand and by the use of artificial light, will do its work almost as well at night as in the day time.

It is propelled by four wheels at each end, which travel on parallel strips of soil about 18 inches wide, which are not disturbed at any time for purposes of cultivation. On these strips of land indentations are made by means of shallow and slightly bevelled grooves formed by projecting rims or flanges attached to the centres of the peripheries of the bearing wheels for the purposes of steering, and it carries all its own supplies along with it, including the workmen engaged in operating it.

(2). This machine substitutes for the traction implements now in use, as ploughs, harrows, etc., which involve the work of five or six expensive operations before producing a good seed-bed, a series of quick rotating and reciprocating implements, suspended over the whole width of land to be operated on, and capable of self-adjustment as to depth, thus securing a thorough and accurate pulverization of the soil to a depth of 12 or 14 inches, if required.

(3). It makes provision for the attachment of a series of rotating and reciprocating cutting and digging implements, whereby the soil between the rows of growing crops, whether grain, corn, root, or small fruit crops, cotton, sorghum, tea, or other tropical plants, may be stirred to any desired depth, hoed or earthed up, and at any stage of their growth until they attain the height of four feet.

(4). By attaching suitable appliances the operations of preparing a seed bed (hitherto termed ploughing, harrowing, etc.,) sowing the seed, and rolling, if deemed necessary, may be performed at one and the same time, and those of reaping the grain and threshing combined at another operation of the machine, where the climate will admit of this, the grain being carried to the headlands of the field or farm as it may more properly be termed, and there removed by means of a truck wagon to the out-buildings. In a similar manner, by the adjustment of suitable attachments, the operations of harvesting potatoes, field roots, etc., may also be performed, as the machine may be made to run at a very low rate of speed, conforming to the special requirements of these operations.

Advantages Claimed.

We shall now consider but a few of the advantages which will accompany the use of the "Modern Steam Farmer."

(1). IT IS LABOR-SAVING AND PROFITABLE.- It must be apparent to the most casual observer that it promises to be one of the greatest labor-saving machines that the world has ever seen.

Now, grant that it but reduce the use of horse labor by only one-half, although the inventor claims that it will very nearly obviate the necessity of its use on the farm. The report of the Bureau of Industries for Ontario, 1886, gives the number of working horses as 300,682. The cost of keeping a working horse for one year in hay and oats alone, hay at \$10 per ton and oats at 35 cents per bushel, is \$107. If by any process of cultivation even half this number could be dispensed with, we have a saving annually in feed alone, of \$16,086,487, to say nothing of the expenses of drivers, harness, shoeing, wear and tear of implements, and the first cost of these and of the horses.

The inventor claims for the Modern Steam Farmer, that it will do all

ROMAINE'S STEAM FARMER.

the work on three sections, 1,920 acres of our North-West prairies, including breaking up the prairie sod, harrowing, seeding, summer cultivating between the rows of grain and root crops, reaping and threshing the grain, and then carrying it to the headland.

The following computation, which is in no sense of the term an extravagant one, will show the profit that would arise from the use of the Modern Steam Farmer in the cultivation of wheat in our own North-West :

DR., 1920 Acres, or Three Whole Sections.

To One of Romaine's Steam Farmers, with attachments for performing all the operations enumerated above.	\$10,000 00
" 300 tons of coal (sufficient for six month's work), laid down at \$8 00 per ton.	\$2,400 00
" Two teams and drivers for the year, 365 days, at \$2.50 per day	1,825 00
" Eight men for six months, 180 days, at \$1 25 per day.	1,800 00
" Manager of the work	600 00
" Seed, say.	1,000 00
	7,625 00
Total outlay.	17,625 00

CR.

By wheat, 1920 acres, 30 bush. per acre, 57,600 bush., at 80 cts. per bush.	\$46,080 00
Total profit first year.	28,455 00

SECOND YEAR.

DR., 1920 acres.

To cost of working, as during previous year	\$7,625 00
" Interest on amount invested in machinery at 6%.	600 00
Total outlay.	8,225 00

CR.

By wheat, as during the previous year.	\$46,080 00
Total profit second year.	37,855 00

In the above computation no extravagant figures have been indulged in. The two teams would more than suffice for drawing the grain from the headland to the granary, where this was necessary, and to cart the same to the market. The yield chosen as a basis of computation is a very moderate one when we consider the nature and thoroughness of the cultivation that it ensures, as by its use, wheat will be tilled as effectually as though done by hand in a garden, and the profit (which of course does not include interest on the cost of the land), \$66,310, is certainly a very handsome one. Divide this sum by two and we have still what is well worth looking after as the result of two years' work.

The *Scientific American* of Oct. 22d 1881, contains a request from an East Indian planter, for an implement to be used in the cultivation of the tea plant, as the horse hoe then in use did not cut deep enough and injured the outer stems, and the plough cultivated but imperfectly, while at the

same time it cut the roots. The existence of the MODERN STEAM FARMER most completely answers that question. While a coolie will require several days to cultivate one acre, about 30 acres will be cultivated by this machine in a day of 10 hours, moving at the rate of 2,000 yards an hour.

(2). INCREASES PRODUCTION.—By the use of the MODERN STEAM FARMER, a system of deep and thorough cultivation is secured, which, in lands well underdrained, so thoroughly pulverizes and aerates the soil that a very great increase of crop may be looked for.

It is not usual to cultivate between the rows of wheat or other grain, because of the lack of facilities for doing this by the aid of our present appliances. But it has been demonstrated repeatedly, that by drilling wheat in rows twelve or fifteen inches apart, and leaving alternate strips fallow between the rows to the extent of half the land, good average crops for the whole of the land could be raised for a long term of years in clay soils, without the aid of any manure. (See experiments of Rev. S. Smith, of Lois Weedon, Northamptonshire, England, from 1851 and onwards, as detailed in "Word in Season," issued some years later, or in Morton's Cyclopaedia of Agriculture, Vol. II.) By the use of this machine a deeper and more thorough cultivation can be secured at a minimum of cost, and without the necessity of leaving any of the land fallow.

(3). IT MOST THOROUGHLY CLEANSSES THE LAND.—If necessary, the ground may be cultivated in the autumn by means of a revolving disc, with three to six revolving diggers attached, which slice the ground and loosen it by means of a complex motion that is progressive, and at the same time rotatory, which leaves the ground so cut and broken, and serrated with seams and apertures, that aeration is greatly accelerated, and filtration, owing to the depth to which the ground may be broken. Roots of weeds that are biennial or of longer life, are thus sliced to pieces. This process is far more effective than ploughing could possibly be.

In spring and summer cultivation a circular disc is also used, called a *disintegrator*, from which spikes project downward of any desired length, but longer in the centre and shorter as the circumference is approached. The motion here, too, is dual in its nature, forward and circular at the same time. It is evident that in such a place of torment for weeds, they cannot long survive. A few such stirrings would completely obliterate them for the season, and by perseverance in this mode of tillage we can readily conceive that soon no place of safety would be left for the intruders within the cultivated domain. This disintegrator is certainly the realization of the cultivator's dream of ages. It stirs the ground to any desired depth and width, according to the work desired, and does it without disturbing the roots of the growing plant, working equally well between rows of grain, field roots or corn, or beneath the outspreading arms of a small bush.

(4). IT TENDS TO THE ENRICHMENT OF THE LAND.—The thoroughness of the pulverization (a system so ably advocated by the wise old Jethro Tull many years ago) exposes it to the free action of the air, from which a constant supply of nutriment is drawn, to support the organic side of life. The same treatment allows water to percolate to a much greater depth, arresting and retaining the ammonia and other fertilizing elements which it has washed out of the air for a similar purpose. Then, by the repeated

stirrings of the subsoil the roots of plants have easy access to vast stores of inorganic food that were heretofore beyond their reach.

For what length of time fertility may be sustained in this way, without calling in the aid of artificial or home made manures, will depend largely on the original fertility of the soil and the frequency with which it is stirred. But there need not for a moment be a doubt in view of experiments hitherto made in this direction, that in clay soils it will be sustained in full sufficiency for a long time.

(5). **IT ENABLES THE AGRICULTURIST TO COPE WITH THE VICISSITUDES OF SEASON.**—On clay soils, and intrinsically they are by far the richest, the husbandman is largely at the mercy of the elements. If such lands are worked when wet, and particularly if they are trodden upon at such a time, impaction is sure to follow with all its vexatious train of evils. Oftentimes such soils might be stirred and sown several days earlier but for the treading inseparable from the process, and this difference, short as it is, in this climate, may mean the difference between the loss and the success of a crop.

Again, in harvest time it renders the farmer practically master of the situation, for at the rate of thirty acres a day harvested there can be no suffering of the grain from over-ripeness, unless the one farm is unusually large.

While man is powerless to influence or control the weather, if he can by any means meet the capricious variations thereof without serious loss, he has achieved a most substantial triumph, and this is just what can be accomplished by the use of this machine.

(6). **IT LEAVES NO PLACE FOR THE IMPACTION OF SOILS.**—Impaction is induced by (a) incomplete drainage, (b) the dragging traction of implements used in cultivation, and (c) treading upon the soil. The MODERN STEAM FARMER, by breaking up the ground to a great depth promotes ready filtration, and consequently the speedy drying of the soil. As all the implements used by it in tillage work on the rotating principle, while the ground is stirred, it is not pressed together, and is, therefore, always friable. But one of the grandest triumphs achieved by this machine is, that it enables the owner of a two thousand acre farm to keep the whole as free from treading by man and beast as the gardener can keep his little plot. This is restoring the art of cultivation to the method taught us by nature, and which she has made so grandly successful. It is with her a fundamental lesson, that while she clothes herself annually with a fresh coating of fertility (her method of cultivation), it is done without the tread of a single hoof.

(7). **PECULIAR ADAPTABILITY.**—While the MODERN STEAM FARMER may be used on farms, one part of which is grazed and another portion cultivated, it is peculiarly adapted to the tillage of large farms where grain is exclusively grown, in one or other of its varied forms, or in plantations of cotton, tea or sorghum. In the prairie lands of the great North-West, or in those of the Western States, its presence must prove a great boon. Steaming over the immense sorghum fields and cotton plantations of the Sunny South, it would bring happiness to the languid laborer and wealth to the planter. In the wide Tea plantations of India, it would send the weary coolie with a fresh offering to the Shrine of Krishna, and should it not one day till alike the steppes of Southern Russia and the boundless Llanos of the South American Continent, and indeed any of the productive places of the

habitable Globe where nature in her considerateness has left large stretches of level or gently undulating surfaces to provide sustenance for the human family?

Objections Anticipated and Answered.

Without a doubt, the advent of the MODERN STEAM FARMER upon its perilous work of overturning the time-honored methods of agricultural practice will be the signal for the springing into resurrection life of a host of objections to be marshalled against it in battle array. Some of these we have anticipated, as we have been fore-warned of their coming, which to the wise means simply to be fore-armed.

OBJECTION 1.—The *first cost* will be so great that the ordinary farmer will be unable to bear it. Answer, (a) several farmers living adjacent can combine in the purchase, where the lay of the land is suitable; (b) this objection will not apply in the case of large land-holders and extensive market gardeners near the large towns and cities, or of planters either in the Southern States or East and West Indies.

OBJECTION 2.—There is no *overturning or inversion* of the soil. Answer. We admit that this would be a serious objection where the tillage might be imperfect, but where it is so thorough that all existing weeds must soon perish and no intruders can get a footing, it loses its force.

OBJECTION 3.—It does not bring the sub-soil to the *surface*, and therefore will not encourage that deepening of the soil so essential to a high state of cultivation. Answer. It is true it does not bring the sub-soil to the surface, but it does what is far better—if cuts to the required depth the subsoil into a fine tilth and lifts it up a few inches. Unless the sub-soil is brought to the surface in very small quantities at one time, it will render the surface useless for purposes of agriculture, as many a rash experimenter has found to his cost.

OBJECTION 4.—It throws workhands *idle* in winter. Answer, (a) not necessarily so more than other modes of unmixed farming. Mixed farming may be carried on with the aid of this machine as well as without, by keeping one portion of the farm in grass, and alternating for periods of shorter or longer duration; (b) large quantities of flax may be grown, caring for which during the winter would provide a good deal of labor, assisted by the Steam Farmer.

The Result of Long Years of Study.

The MODERN STEAM FARMER is not the realization of a dream of yesterday. It is the outcome of *thirty-six* years of patient experiment on the part of its inventor, who, many years ago, supported by letters of introduction from Lord Elgin, went from Canada to England, and there patented a rotatory steam spading machine, capable of turning up on the principle of digging, many acres of land in a day, to the depth of twelve inches, and completely pulverizing and inverting it. But it did not sow the seed, in the process of which the subsequent treading sank much of it so deeply that it perished. This it was that prevented Mr. Romaine from triumphantly capturing the five hundred pound prize offered by the Royal Agricul-

tural Society of England in 1862. "for the best application of steam power to the cultivation of the soil."

References are made to this machine in the *Illustrated London News* of Oct. 3, 1857, p. 350, and in *The Engineer* of July 19, 1861, quoting from the *Mark Lane Express*, where the statement is made in referring to the award of the Royal Agricultural Society, that "insufficient justice has been done to Mr. Romaine, the work performed by his rotatory cultivator being the perfection of spade husbandry." But excellent as was the work done by the machine, the amount of horse and manual labor required to follow it was so great that the inventor laid it aside, prosecuting his labors with a determination that brooks no denial, the reward being the completion of the MODERN STEAM FARMER, ready to satisfy the desires of the land-holder who may have the enterprise to secure it.

Investigation Invited.

ROMAINE'S MODERN STEAM FARMER is now placed before the agricultural world with the full assurance on the part of the inventor that its use will revolutionize to a very great extent existing systems of tillage, and introduce a new epoch in the march of agricultural progress. He is well aware of the opposition that such an introduction as this is sure to produce, or the history of the past will cease to repeat itself, and of the keen criticism to which it will be subjected, before it will be given that place on the farm which it is expected to occupy at no distant day. And all this is not profitless, but a necessary crucible, as it were, in which new introductions must be tried to determine between the true and the false, the useful and the useless.

It is just this criticism that will be most warmly welcomed. It is not the criticism of public-spirited men of large means, and of legislators, who had it in their power to help, that has well nigh crushed the spirit of the struggling inventor, nearly forty years of the best of whose life, the writer feels quite safe in saying, has been placed on the world's altar of agricultural advancement, but it is their *indifference*. Hence it is not impossible that the mistake of the dead centuries may be repeated once again — that of allowing a benefactor of his race to struggle unassisted in life, and building a costly monument over his unconscious ashes.

Any further information that may be desired will be cheerfully furnished on application to Robert Romaine, House of Commons, Ottawa, Canada.

Letters of Reference.

The following letters of reference approving of the mechanical construction of the machine are herewith submitted :

MCGILL COLLEGE, MONTREAL, Sept. 20th, 1882.

ROBT. ROMAINE, Esq.,

SIR, —I have examined the drawings and specifications of the Romaine Modern Steam Farmer, and have pleasure in stating that I see no mechanical reason why it should not accomplish the work for which it has been designed.

C. H. McLEOD,

Prof. of App. Sc., and Lecturer on Mechanical Engineering.

ROMAINE'S STEAM FARMER.

MONTREAL ROLLING MILLS COMPANY, MONTREAL. 25th Sept., 1882.

R. ROMAINE, Esq.,

Having examined the drawings of your Steam Farmer, I do not see any mechanical difficulties in the way of its perfect success. Yours respectfully,

JOHN ROBERTSON,

Manager Montreal Rolling Mills Co'y Tube and Lead Works.

GRAND TRUNK RAILWAY OF CANADA,
OFFICE OF THE MECHANICAL SUPERINTENDENT,

MONTREAL, Sept. 25th, 1882.

ROBERT ROMAINE, Esq.,

DEAR SIR,—I have not yet had time to read over the specification of your Modern Steam Farmer, but have seen enough in the drawings you exhibited to me the other day, which, with your explanations, convince me that you have given an amount of attention to the subject, which will, sooner or later, be rewarded with the success it deserves.

The general mechanical arrangements of your various devices are quite practicable, and from your remarks I doubt not farmers will ultimately find it to their interest to adopt your principle—if they are not compelled to do so from the difficulty of obtaining a sufficient number of horses.

The farms in this country, from their size and shape, are admirably adapted for steam cultivation, and the wear and tear of the machinery will not be excessive, provided the tracks or road beds, on which the cultivators run, are level and well made at the outset, and reasonable efforts are made to adapt the farms to the new system.

Yours truly,

HERBERT WALLIS,

Mechanical Superintendent.

MCGILL COLLEGE, MONTREAL, 28th Sept., 1882.

R. ROMAINE, Esq.,

DEAR SIR,—After a careful examination of your Modern Farmer, I am convinced that there are no practical difficulties connected with its construction.

I can say nothing as to its probable efficiency, from an agricultural point of view, but it seems to embrace in a compact form all the implements required for farm operations. It is generally admitted that the proper development and cultivation of our lands must be aided by more improved machinery, and the shape of our farms will certainly facilitate the manipulation of such a machine as yours. I am, yours very truly,

HENRY T. BOVEY,

Prof. of Engineering and Applied Mechanics.

DEPARTMENT OF RAILWAYS AND CANALS, CANADA,
CANADIAN GOVERNMENT RAILWAYS,

OFFICE OF THE CHIEF ENGINEER, OTTAWA, 1st Dec., 1882.

To all whom it may concern:

This is to testify that I have examined the drawings of the Romaine Modern Steam Farmer, which appears to me to be a very ingenious piece of machinery, especially adapted for the use of extensive agriculturists, or for clubs of small farmers, and well suited for prairie farming in the North-West. So far as I am able to judge there is no good reason to doubt but that the machine will do its work well.

COLLINGWOOD SCHRIEBER,

Chief Engineer and Gen'l Manager Govt. Railways.

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